Culture and conventions: writing and reading Dutch scientific English
Acknowledgments

Many people helped and inspired. Alas, I cannot name all. When I was hatching the idea of this research, Mike Hannay of the Vrije Universiteit (Amsterdam) was encouraging. Marinel Gerritsen and Kees de Bot of Nijmegen University took me on as an external doctoral (i.e. PhD-equivalent) candidate (in the Netherlands, a person with a Dutch first degree (doctorandus) or its equivalent (a Master’s degree) may do such research, providing they find a university professor willing to be their supervisor). In our regular meetings, which proved to be practicals in intercultural communication, Kees and Marinel inculcated me into applied linguistics and the mores of Dutch academic research. Frans van der Slik of the Department of Applied Linguistics patiently helped me with the statistics.

The empirical studies reported in this thesis were possible thanks to the support and participation of colleagues from EASE (European Association of Science Editors), SENSE (the Society of English-Native-Speaking Editors), the now defunct WERK (Wetenschappelijk Redacteurenkring) and the Dutch Network of the Institute of Translation and Interpreting. Lindsay Haddon (Journal of Ecology), Hans de Kroon (Ecology), Pehr Enckell (Oikos), Pierre Chirac (Revue Prescrire), Frances Luttikhuizen (University of Barcelona), Frank Berendse (Wageningen University), Marinus Werger (Utrecht University) and Jan van Groenendael (Nijmegen University) helped me recruit the biology reviewers for the reception study. I am especially grateful to the reviewers and journal readers who invested their time and effort in that study, and to the three Dutch scientists who allowed me to use their texts.

On March 11 2001 a fire destroyed much of our house. My ground-floor study was severely water-damaged and I lost all back-ups of the thesis that were in the building. The salvage team rescued my computer; the hard disk was dried out and (thanks to Bas van Dam, Physical Geography, Utrecht University) miraculously yielded its contents. The shelter, practical help and friendship given by so many (especially Mieke and Rob, and Sandra and Maurits) helped us get over the disaster and enabled me to complete the thesis.

Jan Klerkx, a SENSE/EASE colleague and friend, admirably translated the summary: for me it was a salutary experience to be in the shoes of the commissioning client! Jacqueline Burrough checked the other Dutch translations required.

Since 1976, many Dutch scientists have entrusted their texts to me for editing or translation. I learned on them and from them. Had I always known as much about editing NNS texts as I do now, at the end of this personal project, I would have served them better. I hope that one of the spin-offs of
This study will be to accelerate the learning curve of authors’ editors, so that they can give their NNS clients optimal assistance earlier in their careers.

This is the second thesis that Peter Burrough has seen me through. He has encouraged me to pursue this ambition (obsession?) of mine and has shown me how to translate my ideas for maps and diagrams (especially Figure 1.1!) into reality. I would like to thank him for his love, companionship and moral and practical support. Without him, I couldn’t have done what I did, so this thesis is for him: tèrimah kaseh!

Wageningen, March 2002
Table of contents

Abbreviations used in the text

Chapter 1 The research topic: background and justification 1
  What is the use of studying Dutch scientific English? 1
  On culture and conventions 5
  From the Dutch author’s screen to the page of an English-language journal 6
    Author revision of the draft 8
    Input from colleagues or supervisors 9
    Language correction and authors’ editors 10
    The journal reviewer or referee 17
    The journal editor 21
    The copy-editor 22
  Implications for the research approach 23
  From practice, to theory, to …? 23

Chapter 2 An overview of the theories relevant to research on the writing and reading of Dutch scientific English 25
  Theory on writing 25
    NNS writing 27
    Interlanguage and error analysis 29
    Contrastive rhetoric 29
    The genre paradigm 31
    Social constructionism 33
  Theory on reading 34
  Theory explicitly combining writing and reading 37
    Text evaluation 37
    Translation theory 38
  Towards a model to characterise another person’s critical reading and emending of a text 41
    Modelling revision 41
    Revising versus editing 46
    The practitioners’ viewpoint: editors on editing 47
  The proposed model: a revision continuum 50
<table>
<thead>
<tr>
<th>Chapter 3 Towards a characterisation of Dutch scientific English</th>
<th>55</th>
</tr>
</thead>
<tbody>
<tr>
<td>How Dutch scientists acquire proficiency in English</td>
<td>55</td>
</tr>
<tr>
<td>Linguistic and rhetorical differences between Dutch and English</td>
<td>59</td>
</tr>
<tr>
<td>Differences between English and Dutch scientific writing</td>
<td>65</td>
</tr>
<tr>
<td>Differences in the evolution of scientific writing</td>
<td>65</td>
</tr>
<tr>
<td>Differences in the organisation of English and Dutch research articles</td>
<td>67</td>
</tr>
<tr>
<td>A contrastive study of scientific Dutch and English</td>
<td>68</td>
</tr>
<tr>
<td>Analysis of the data</td>
<td>73</td>
</tr>
<tr>
<td>Discussion of the results</td>
<td>77</td>
</tr>
<tr>
<td>Conclusions from this study</td>
<td>79</td>
</tr>
<tr>
<td>Features of Dutch scientific English</td>
<td>80</td>
</tr>
<tr>
<td>In conclusion</td>
<td>82</td>
</tr>
<tr>
<td>Chapter 4 Two reconnaissance studies using Dutch and English subjects to investigate cohesion</td>
<td>83</td>
</tr>
<tr>
<td>Inferring cohesion: NSs and NNSs restoring connectives and paragraphing</td>
<td>83</td>
</tr>
<tr>
<td>The Mauranen study</td>
<td>83</td>
</tr>
<tr>
<td>The rerun of the ‘experiment’</td>
<td>84</td>
</tr>
<tr>
<td>Results</td>
<td>86</td>
</tr>
<tr>
<td>Discussion</td>
<td>89</td>
</tr>
<tr>
<td>Inferring cohesion: NSs and NNSs restoring sequences of sentences</td>
<td>92</td>
</tr>
<tr>
<td>Material and methods</td>
<td>92</td>
</tr>
<tr>
<td>Results</td>
<td>96</td>
</tr>
<tr>
<td>Interpreting the results and refining the analysis</td>
<td>100</td>
</tr>
<tr>
<td>General conclusions from both studies</td>
<td>106</td>
</tr>
<tr>
<td>Chapter 5 The reception study on Dutch scientific English: design, readers’ assessments, reading times, and proofreading and epistemic annotations</td>
<td>109</td>
</tr>
<tr>
<td>The design of the reception study</td>
<td>110</td>
</tr>
<tr>
<td>Aims</td>
<td>110</td>
</tr>
<tr>
<td>The general hypotheses to be tested</td>
<td>111</td>
</tr>
<tr>
<td>The approach</td>
<td>111</td>
</tr>
<tr>
<td>The three test texts</td>
<td>112</td>
</tr>
<tr>
<td>The dry run</td>
<td>114</td>
</tr>
<tr>
<td>The readers</td>
<td>114</td>
</tr>
<tr>
<td>The implementation of the study</td>
<td>116</td>
</tr>
<tr>
<td>The findings of the assessment by e-mail</td>
<td>119</td>
</tr>
<tr>
<td>Sociological characteristics of the readers</td>
<td>119</td>
</tr>
<tr>
<td>The global assessments of the three texts</td>
<td>121</td>
</tr>
<tr>
<td>Conclusions from analysing the e-mail questionnaire</td>
<td>127</td>
</tr>
<tr>
<td>General issues relating to the annotation part of the reception study</td>
<td>128</td>
</tr>
<tr>
<td>Time spent annotating the texts</td>
<td>128</td>
</tr>
<tr>
<td>Classifying and analysing the annotations</td>
<td>129</td>
</tr>
<tr>
<td>The implications of epistemic annotations</td>
<td>137</td>
</tr>
<tr>
<td>The reception study data discussed in subsequent chapters</td>
<td>140</td>
</tr>
</tbody>
</table>

### Chapter 6 Coherence and the annotations relating to cohesion | 141

- Probable reader strategies and the constraints to evaluating them | 144 |
- The data collected | 145 |
  - Sentence refocusing | 145 |
  - Adjusting sentence length and cohesive devices | 149 |
  - The paragraphing and the readers’ responses to it | 164 |
  - Out-of-place and redundant text | 166 |
- Synthesising discussion of the results | 172 |
- Differences between texts | 172 |
  - Sentence refocusing | 173 |
  - Adjustment of cohesive devices | 174 |
  - Paragraphing | 178 |
  - Out-of-place and redundant text | 178 |
  - Metadiscourse | 179 |
- Conclusions | 180 |

### Chapter 7 The annotations affecting hedging | 183

- Hedging, politeness and face-saving | 184 |
- Scientists’ attitudes to hedging | 186 |
- Culture/linguistic influences on hedging, and NNS proficiency | 189 |
- Hypotheses on hedging | 191 |
- What constituted a hedge in this study | 192 |
- How the data were collected | 193 |
- Qualitative assessment of the data collected on hedging | 194 |
- Quantitative assessment of the data collected on hedging | 199 |
- Testing the hypotheses that reviewer status and native-speakerhood influenced hedging annotations | 202 |
- Discussion | 204 |
  - The validity of the three hypotheses | 204 |
  - Inappropriate lexis (NNS English) as a motive for the hedging annotations | 205 |
  - Differences among readers in the frequency of hedging annotations | 206 |
  - The findings in relation to previous research | 207 |
  - The implications of this study for theory and future research on hedging | 207 |
Chapter 8 The annotations to verb tense

Part 1: Conventions of tense use in scientific discourse

English scientific discourse
Conclusions on English tense use in science writing, and the implications for the reception study
Tense conventions in non-English scientific and other discourse
Conclusions on present tense use in non-anglophone discourse and the implications for the present study

Part 2: Why Dutch authors might favour the present tense in their scientific English
Lack of proficiency in English
Influence of Dutch tense meanings
Mistranslation/transfer of auxiliaries from Dutch

Part 3: Presentation and analysis of the data on tense changes
The form in which the data on tense changes were collected
The scope for making tense changes
Scope in terms of the verbs present in the text
Scope in terms of readers’ predisposition to make changes
From scope to actuality: the tense changes at global level
Changing present tense to past tense
Explaining the differences at textual level
Correcting ‘wrong’ verbs
Extreme reader response
How reader attitude might affect tense change
Which present tense verbs were changed
Changing past tense to present tense
Discussion
When present tense ‘means’ past, but there are not enough other clues about temporality
The role of readers’ native writing culture and of reviewer status
NSs’ assessment of tense in NNS science writing

Chapter 9 Discussion and conclusions

Recapitulation
Outline of this chapter
General conclusions about the three texts
What the reception study revealed about the readers
The importance of native-speakerhood and reviewer status
Magnitude of the response and its relation to readers’ proficiency in English
Levels of revision
Intervention and abstention
Overall conclusions from the reception study
A critical assessment of the reception study
   Difficulty of quantifying revisions
   The quality of the revisions
   Ascertaining readers’ motivation
   The reception study’s strong points
Inferences that can be drawn about Dutch scientific English from the research described in this thesis
Implications of this research
   Implications for the theory and practice of applied linguistics
   Implications for Dutch and other NNS scientists writing in English
   Implications for language professionals helping Dutch scientists to publish in English
   Implications for journal reviewers and editors
   Avenues for further research

References

Appendices

3.1 The articles from which the text extracts were drawn for the contrastive analysis of scientific English and Dutch
4.1a The test administered in Maastricht in 1996
4.1b The authentic text
4.2 The ten edited versions of the first three sentences of the Coasts text
5.1 The three reception study texts
5.2a The 6 questions used in Part 1 of the reception study
5.2b The e-mail questionnaire to elicit personal data
5.3 The instructions sent out with Part 2 of the study
5.4 Mapping the textual changes
5.5 Readers’ comments (uncorrected!) collected from Part 1 questionnaire ‘Comments’ section
7.1 Hedging annotations per text and the readers who made them
### Abbreviations used in the text

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>American (a reader code in the reception study)</td>
</tr>
<tr>
<td>B</td>
<td>British (a reader code in the reception study)</td>
</tr>
<tr>
<td>C</td>
<td>Catalan (a reader code in the reception study, a subgroup of the Spanish group)</td>
</tr>
<tr>
<td>D</td>
<td>Dutch (a reader code in the reception study)</td>
</tr>
<tr>
<td>E</td>
<td>Spanish (a reader code in the reception study)</td>
</tr>
<tr>
<td>EAP</td>
<td>English for Academic Purposes</td>
</tr>
<tr>
<td>EFL</td>
<td>English as a Foreign Language</td>
</tr>
<tr>
<td>ELT</td>
<td>English Language Teaching</td>
</tr>
<tr>
<td>ESP</td>
<td>English for Specific Purposes</td>
</tr>
<tr>
<td>F</td>
<td>French (a reader code in the reception study)</td>
</tr>
<tr>
<td>G</td>
<td>German (a reader code in the reception study)</td>
</tr>
<tr>
<td>GLM</td>
<td>General Linear Model</td>
</tr>
<tr>
<td>J</td>
<td>Japanese (a reader code in the reception study)</td>
</tr>
<tr>
<td>L1</td>
<td>first language (synonymous with mother tongue)</td>
</tr>
<tr>
<td>L2</td>
<td>second language (i.e. a language learned after the mother tongue)</td>
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<tr>
<td>MT</td>
<td>mother tongue</td>
</tr>
<tr>
<td>NNS</td>
<td>nonnative speaker (i.e. a person with English as L2)</td>
</tr>
<tr>
<td>NS</td>
<td>native speaker or native-speaking (unless specified otherwise, with English as mother tongue)</td>
</tr>
<tr>
<td>S</td>
<td>Swedish (a reader code in the reception study)</td>
</tr>
<tr>
<td>TESOL</td>
<td>Teaching English to Speakers of Other Languages</td>
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</tbody>
</table>
Chapter 1

The research topic: background and justification

What is the use of studying Dutch scientific English?

The 1999 Nobel prize for physics was awarded jointly to the Dutch physicists Gerardus ’t Hooft and Martinus Veltman ‘for elucidating the quantum structure of electroweak interactions in physics’. As they elucidated mostly in English (of the 172 publications ’t Hooft lists on his web page, only 14 are in Dutch and one is in French), in publications read by the world’s scientific community, it can be inferred that the English in which they communicated their scientific insights was – and is – effective. Whereas from 1981 Veltman operated in the English-language environment of Michigan University, as Professor of Physics, his erstwhile doctoral student ’t Hooft remained based in Utrecht University, where in 1977 he was appointed a full professor. In 2001 an undiluted flavour of ’t Hooft’s English could be obtained from his home page, where he wrote spontaneously, informally, and apparently without external editing. For example:

[1] Quantum gravity and black holes. Whenever particles are separated further than $10^{-33}$ cm, the gravitational force between them is very adequately described by Einstein’s theory of general relativity. But when they come closer, the gravitational force becomes strong, whereas gravity is more complicated than gauge theories. Finding a logically coherent theory telling us how particles behave at such small distance scales is a fundamental problem. The most dazzling problem is the question whether these particles will make microscopic black holes. Predicting the behavior of such tiny black holes is a deep theoretical challenge. Or maybe they can’t form black holes? Formulating laws of physics that avoid black hole formation is even more difficult.

(www.phys.uu.nl/~thooft)

The link in Professor ’t Hooft’s first sentence led to a web page of Professor Ted Bunn, of Berkley University, California. Compare his style:

[2] What is a black hole?
Loosely speaking, a black hole is a region of space that has so much mass concentrated in it that there is no way for a nearby object to
escape its gravitational pull. Since our best theory of gravity at the moment is Einstein’s general theory of relativity, we have to delve into some results of this theory to understand black holes in detail, but let’s start off slow, by thinking about gravity under fairly simple circumstances.

Suppose that you are standing on the surface of a planet. You throw a rock straight up into the air. Assuming you don’t throw it too hard, it will rise for a while, but eventually the acceleration due to the planet’s gravity will make it start to fall down again. If you threw the rock hard enough, though, you could make it escape the planet’s gravity entirely. It would keep on rising forever. The speed with which you need to throw the rock in order that it just barely escapes the planet’s gravity is called the “escape velocity.” As you would expect, the escape velocity depends on the mass of the planet: if the planet is extremely massive, then its gravity is very strong, and the escape velocity is high. A lighter planet would have a smaller escape velocity. The escape velocity also depends on how far you are from the planet’s center: the closer you are, the higher the escape velocity. The Earth’s escape velocity is 11.2 kilometers per second (about 25,000 m.p.h.), while the Moon’s is only 2.4 kilometers per second (about 5300 m.p.h.).

(\text{http://cfpa.berkeley.edu/BHfaq.html#q1})

Whether or not the English of [1] is effective, it is certainly different from the English of [2], in terms of ‘that difficult-to-pin-down concept of “flow”’ (Gosden, 1998: 21). But what is it about [1] that makes it a recognisable example of NNS\textsuperscript{1} writing of the Dutch variety? That is one of the questions this thesis sets out to answer. Presently I will explain why this is a worthwhile research topic. At this point, however, it is worth noting that the presence of ‘errors’ \textit{per se} does not make a text less ‘native-like’ or less smoothly flowing. Though [1] has shortcomings, they are not as obvious as the errors in [2]. The latter text contains two obvious errors: the second sentence contains a spelling mistake (instead of ‘start of’ it should be ‘start off’) and a grammatical mistake: using the adjective ‘slow’ instead of the adverb ‘slowly’ (though, arguably, Bunn may have been deliberately using colloquial American English). There is also a lexical error in the third sentence of the second paragraph: the slowing-down caused by the planet’s gravity is ‘deceleration’, not ‘acceleration’.

\textsuperscript{1} Throughout this thesis, NNS refers to nonnative speaker of English and NS to native speaker of English.
Professor ’t Hooft’s publication record, and his many awards for scientific achievement testify that not only is his science of the highest quality, but also that he has been very successful in communicating his scientific insights in English. In terms of the latter, he is not unusual among Dutch scientists. From 1994 to 1998, for example, the Netherlands was ranked tenth in the world on the basis of all articles, reviews, letters and notes appearing in international scientific publications (and therefore, by definition, in English) and ranked third (after Switzerland and the United States) in terms of citation impact score (Tijssen et al., 2001). From these statistics we may infer that to examine Dutch scientific English is to examine an effective variant of NNS English – effective in the sense that very many research articles written in it subsequently successfully pass through the system of peer review that ensures that ‘Journals reflect the concern of referees as representatives of the larger audience that the paper is intended to reach’ (Grabe and Kaplan, 1996: 169). Later in this chapter I will show that by the time the papers written by Professor ’t Hooft and his fellow Dutch scientists have appeared in print, their content and language will have been scrutinised and amended, so that ‘the published paper is a multilayered hybrid co-produced by the authors and by members of the audience to which it is directed’ (Knorr-Cetina, 1981: 106). Once published, therefore, Dutch scientific English (and NS scientific English, for that matter) should be free from errors and shortcomings like those alluded to above in the context of [1] and [2].

The persons who screen Dutch scientists’ writing are not only the journal reviewers, but also the language professionals who might be called in to ‘correct the language’, or who are employed by publishers as manuscript or copy editors. Given that ‘forewarned is forearmed’, it would therefore be useful to know what aspects of Dutch scientific English are likely to cause problems to these readers. This knowledge could also be extremely useful pedagogically, providing foci for those who teach young Dutch scientists to write in English. And it must not be forgotten that many established Dutch scientists would themselves like to know what aspects of their English they

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2 Dutch readers of this thesis should note that the New Oxford Dictionary of English (1998) defines a scientist as ‘a person who is studying or who has expert knowledge of one of the natural or physical sciences’. To NSs the term is thus much narrower than the Dutch wetenschapper, which is applied to scholars and academics regardless of discipline. When I refer to ‘scientific English’ I therefore mean the English written by scientists (e.g. physicists, biologists, geologists). On the few occasions that I wish to generalise beyond science, to include the humanities, I use the term ‘academic’, in accordance with convention in English.

must be careful about. These points testify to the potential practical benefit of investigating the phenomenon ‘Dutch scientific English’.

More important (because nomothetic rather than idiographic) is the scholarly or academic motivation behind studying Dutch scientific English. It will become clear later in this chapter and in chapter 2 that since the mid-twentieth century there has been great research interest in NNS English, its variants, the reasons for its characteristic features and its manifestations in different types of texts. Much of this research has been pedagogically driven, the aim being to improve the teaching of English as a foreign or second language. But so far there has been a dearth of research for and from the standpoint of the professionals working with NNS academics and scientists to help them prepare their English-language manuscripts for publication: the authors’ editors (Shashok, 2001). Authors’ editors have contributed idiosyncratic and anecdotal accounts of the interventions they make in their authors’ texts (see McNab (1988) for Dutch-authored texts, Shashok (2000), and Wallace (2000) for Spanish-authored texts, and Norris (1998) for Finnish-authored texts) but have not attempted to position their work within the framework of theory, presumably because they have been largely unaware of the research being done in applied linguistics (Burrough-Boenisch, 1997). This contrasts with certain teachers of ESP who have been working as authors’ editors with scientists. Prominent among these is Gosden, whose work in initiating Japanese scientists into the international discourse community has given him various insights. One concerns the rhetorical strategy to use when writing about the approach and method followed for a piece of research and the inferences drawn from it; he argues that for an effective research article, the author must be able to handle themes successfully and can best do so by knowing how to link and develop their propositions (Gosden, 1992a). Another insight has been his analysis of the textual revisions made to the first research articles written in English by Japanese scientists (Gosden, 1995). These and other theoretical insights into scientific writing in general, the research article in particular, NNS writing in general and its variants and into the way texts are read and textual shortcomings are identified and dealt with, are clearly very relevant to authors’ editors. At the moment, many authors’ editors work in a theoretical vacuum, and though they arrive at insights by themselves, through experience, it would greatly benefit the quality of their work and the satisfaction of their clients if they understood what general principles underlie their actions.

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4 The difference between ESL (English as a second language) and EFL (English as a foreign language) is that in the former, English is the language of the community in which the learner is situated, whereas in the latter, the learner is not in an English-language community (van Naerssen and Eastwood, 2001).
Looking at what ‘makes’ Dutch scientific English, and how readers respond to it, and relating this to textual revisions, would therefore be helpful. The aim would be to distil some principles that could be applied to the revision, correction and alteration of NNS texts by language professionals, and to give these principles a firm footing in theory from applied linguistics and related fields. In turn, these principles would enrich the applied linguistics theory, being driven as they are by the needs and experience of language professionals ‘at the coalface’.

Summing up this preamble, therefore, it will be clear that

- Examination of what constitutes Dutch scientific English and why, will contribute to other research on the nature of NNS writing in general and on Dutch English and scientific English in particular, and will have applications in ESP teaching.
- Examination of what aspects of Dutch scientific English cause problems to readers will contribute similarly to the body of knowledge on writing and reading, and will have applications in the editing profession.

The above two points are the ‘writing’ and ‘reading’ referred to in the title of this thesis. But what of the other key words in the thesis: ‘culture’ and ‘conventions’? Elucidation follows.

**On culture and conventions**

Our culture provides the words, images and forms from which we fashion text. Cultural differences matter.

(Hayes, 1996: 5)

Hayes’s standpoint is the one I had chosen to take in the early stages of the research leading up to this thesis, even before I had read his article. The citation above echoes the view of culture as being ‘software of the mind’, as articulated by Hofstede (1991), in which culture is the mindset acquired by a person by virtue of the linguistic and ideological environment in which he or she grew up and was educated. So, Dutch scientists are products of Dutch culture. They have grown up within Dutch society, speaking the Dutch language and learning (actively or passively) the norms of that society. The latter includes the conventions relating to writing in general, and to academic (i.e. scientific) writing in particular, in terms of what is appropriate style, textual organisation, word choice, tense choice, etc.

From the preamble, it is clear that Dutch scientists seek to publish in English to communicate with their peers in the international community and
to establish their credentials in a particular scientific field in the Netherlands and abroad. As they are communicating from their culture to other cultures, they are engaged in intercultural communication (Scollon and Scollon, 1995). They communicate in English (a global language), via an internationally accepted genre of writing: the research article. This entails writing according to the conventions of scientific English and the conventions of the Anglo research article, as they perceive these from scientific journals and are enjoined to do in these journals ‘Instructions to authors’. In other words, to succeed in being published, they must adjust Dutch conventions to meet Anglo conventions. Only by so doing will they transcend the writing culture of their minority language and move successfully into the global arena. In this thesis, therefore, there will be instances in which features of Dutch scientific English can be attributed to a mismatch between Dutch and Anglo cultures, or between Dutch and English linguistic conventions. Furthermore, as the readers of Dutch scientific English may or may not be NSs, I will also have to bear in mind their cultures and conventions. In the next section, I will point out the moments at which readers’ culture and perception of research article conventions may impact on assessments of Dutch-authored research articles or on emendations to such articles. However, first I wish to note that ‘culture’ also has the connotation of group identity: ‘the “particular way of life” of a time and place in all its complexity experienced by a group that understands itself as an identifiable group’ (Miller, 1994: 68). In this sense, there is a culture of science, and the research article is a product of that culture. The language of the science culture is English (Day, 1995: 10-11; Grabe and Kaplan, 1996: 171; Benfield and Howard, 2001) but because of the diversity in mother tongue, upbringing and belief systems of its members, the English must be international, as the editor of Nature has acknowledged (Maddox, 1992). This being so, the super-culture of science and its super-language English can be envisaged as shaping the subcultures of science in individual countries. In the case of the Netherlands, as I will show in chapter 3, but also in other minority-language countries, this leads to Anglicisation of science writing and reporting – in terms of the language used and the stylistic and organisational templates of science writing. This feeds back into the Dutch science culture, which therefore becomes diluted by Anglo conventions (some might argue it becomes enriched by such conventions).

From the Dutch author’s screen to the page of an English-language journal

Several times in this chapter I have already alluded to the readers of a research article. As some of these readers have an impact on the final (i.e. published)
form of that article, it is important to be aware of their role, especially in relation to the possible interplay of culture and conventions referred to above.

The readers with a direct or indirect influence on a Dutch-authored research article are shown in Figure 1.1, which depicts the path such an article typically follows from the author (a Dutch scientist) to the printed page of an international (thus usually English-language) peer-reviewed journal. Each of these readers instigates revisions. Some of these specialist readers intervene directly in the text, making on-screen changes. Others intervene indirectly; their comments or changes are made on hard copy, or are otherwise communicated to the author, who in both cases decides to what extent he or
she will change the text. They all act as surrogates for the final reader, to ensure that he (or she) receives an effective, worthwhile text. Thus, in that sense, the target reader influences all those who create the final text. The figure shows that the author rereads and revises several times. The journal editor appears three times in the trajectory, twice as the intermediary between the author and reviewers and the third time as the instigator of the last stage of pre-publication changes, which are completed by the copy-editor. The authors’ editor appears twice, but in fact the author may decide to call on her services once only. As the paper spirals outwards from the author’s first draft, it accumulates changes, until finally, like the hammer thrown by an athlete, it is released into the wider world: in this case, the international scientific community.

I will now deal in detail with each of the specialist readers in turn, describing what they do to the text and why. My aim is to show how the procedure of publishing scientific articles has created an institutionalised set of actors and factors that may influence the English of a Dutch scientist’s text. Wherever possible I will draw on the literature by applied linguists and language professionals. This combined review of the literature and account of the research article’s trajectory leads to a justification of the approach I followed in the core research for this thesis. Many of the themes mentioned below will be expanded on in chapter 2, which considers the framework of theory within which this study has taken place.

**Author revision of the draft**

The first person to critically read the draft of the research article is the author. As will be explained in more detail in chapter 2, the reading and rewriting of one’s own text is an integral part of the writing process (for a review, see Butterfield et al., 1996). As the text is intended for a particular journal, during this reading the author must bear the journal’s house style and ‘instructions to authors’ in mind. He or she may also try to assume a journal reviewer’s persona in order to ‘detect and diagnose’ (Flower et al., 1986) shortcomings in the text. More detail on this will be given in chapter 2. What is important to note here is that the article’s shortcomings are of two main types: those to do with the science content and those to do with how that content is communicated by the text. Clearly, the author’s competence in English and cultural background affect which textual problems he or she detects and diagnoses and which remedies are applied. For example, if the author has written the research article in a second language, and the writing style of that language and the conventions for reporting science in that language differ from those of his or her mother tongue, there could be problems. Resorting to a computer
grammar and spelling checking program to help in correcting grammatical and lexical errors will not be enough, because the standard programs not only assume that users are NSs but are also unable to cope with all but the simplest errors (James, 1998: 252). This is illustrated below, using three examples from authentic Dutch-authored texts. In [3], the only errors recognised by the Word spelling and grammar facility are the wrong form of the indefinite article, a spelling error and a Dutch term:

[3] The total nitrogen content was defined on the first place after destruction with a aggressive solution (salicylzuur in a H₂SO₄-Se mixture) with which not only the for plants easy available nitrogen gets off, but also the not or difficult for plants available nitrogen store.

In [4] and [5] the misspellings that are ‘written misencodings’ (James, 1998: 137; see also Burrough-Boenisch, 1998: 57-62), i.e. result from applying Dutch pronunciation to produce an ‘English’ spelling, are not detected by the spelling checker. (I have shown the correct spelling, in square brackets):


[5] The growing significance of visual consumption can be seen both as a threat [threat] and as an opportunity to the conservation of ecologically vulnerable regions.

Input from colleagues or supervisors

If the paper is co-authored, the revision will be a cooperative effort. Knorr-Cetina (1981) has shown the interaction between three authors (the least experienced had 40 publications) in revising a biotechnology paper. Of interest is the influence exerted by the senior author. Knorr-Cetina characterises this as deleting redundant, weak or controversial text, reorganising paragraphs by reshuffling statements, and modifying via modality, generally to tone down claims. However, even if the paper has only one author, it is usual for colleagues or research supervisors to comment on draft versions. As the first external readers of the text, their role is primarily to check the scientific soundness of the article: to act as in-house peer reviewers. Like the author, however, they may be so familiar with the research involved that they are unable to read the text critically. This makes it difficult for them to identify the need for background information or for links in the argumentation. They nevertheless provide feedback to the author (usually in the form of annotations on the manuscript) that is useful for revision. This
feedback occurs even when both the reader and the writer are NSs: Dudley-Evans (1991) has discussed the changes a PhD supervisor in the UK made to the draft of a biology thesis. The changes had to do with content, but also with the organisation of the text: layout (headings, layout of references, paragraphing) punctuation, genre conventions (e.g. suggesting where to state the objectives of research), language (spelling mistakes, grammar, verb tense, cohesion, sentence order, lexical choice and strength of claims).

The changes NNS supervisors make to their NNS students’ texts were studied by Gosden (1995). He compared the first (English-language) drafts written by Japanese scientists with the final drafts incorporating the comments of their Japanese supervisors. He found that the changes the supervisors instigated not only included the deletions, reshuffling and altering modality that Knorr-Cetina (1981) reported an NS senior author doing, but also the addition of technical detail and the superficial polishing of text. It can be assumed that Dutch supervisors would do likewise.

Dutch colleagues or supervisors may correct some language errors made by the Dutch author, but they will not necessarily detect mother tongue interference in the text, or the transfer of stylistic features or conventions that are appropriate in Dutch but non-standard in English. Furthermore, they may even suggest ‘improvements’ that are grammatically wrong or rhetorically infelicitous in English. Their background knowledge about Dutch conventions in scientific writing, plus their ‘Dutch’ perceptions of how English should be written will affect their feedback on language and style. This knowledge, plus their assumptions about the Dutch context in which the fieldwork was done (especially important in the case of the earth and environmental sciences, because of the unusual physical characteristics of the Netherlands5) can be grouped under the heading of ‘cultural background’. Feedback that has this ‘cultural’ component will reinforce the generic Dutchness of the text.

After this local feedback has been incorporated, the manuscript is at the point at which it will have its first assessment from a reader from another culture. As Figure 1.1. shows, that reader may be a language corrector, or, if the author is confident in his language skills, it may be the journal editor. I shall assume that the author opts to call in a language corrector.

**Language correction and authors’ editors**

The language corrector is usually an NS of the language the paper is written in (in this case, English); in the Netherlands, the corrector often does not have a

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5 A flat country, much of it below sea level, with an unconsolidated geology, dependent on well-coordinated hydraulic engineering via which drainage and water tables are manipulated (see Burrough-Boenisch, 1994b).
background in science and is employed on the strengths of her}\(^6\) mother tongue skills. Some correctors are, however, trained in teaching English to NNSs. Examples of such EAP-trained correctors include Sionis (1995), Gosden (1992b, 1995), Kerans (2001) and Norris (1998) who work in France, Japan, Spain and Finland, respectively, and have written on aspects of the didactic correction of scientists’ English texts. In the latter cases the relationship between the reviser and author is one of teacher and pupil, and the revision is interactive and instructive. Sionis (1995), for example, describes how he helped two sets of French scientists to revise their joint-authored articles that had been rejected on the grounds of inadequate English. The first set, two professors, had written on structural dynamics and mechanical engineering, the second (younger) set, three assistant professors, had written on geotectonics. He notes that the latter group was more motivated to learn the skills of English-language writing and more prepared to use ‘general language’ in their article, whereas the two professors had avoided using general language, in favour of using formulaic mathematical language (over which they had more control). In both articles, Sionis identified a major problem of ‘message reduction’ (the practice of expressing less, or less precisely, because of the constraints of their learner English); this included the absence of transition forms (resulting in jerky text). There were also problems arising from the use of false cognates. In face-to-face sessions with each group, Sionis explained the shortcomings and helped the authors revise the papers. The revised papers were accepted for publication, and Sionis notes with satisfaction that the three younger scientists adopted the techniques and approach for writing in English that he taught them: the next paper they wrote in English was accepted for publication and the journal editor stipulated only minor textual changes.

The ideal of the revision carried out at this stage is illustrated by Ventola and Mauranen (1991) in their examination of what they call a ‘textually motivated’ rewriting of a text. They contrasted the original Finnish-authored text with the version revised by an NS reviser, showing where the reviser had corrected and improved the English. The reviser had clearly adopted a minimalist approach to the editing and had not attempted to resolve problems of poor text organisation. Ventola and Mauranen then rewrote and reorganised the original text, with the aim of making it more readable. They did so largely by inserting more explicit links between sentences (improving cohesion) and by inserting forward and backward referencing to other parts of

\(^6\) Women predominate in the Society of English-Native-Speaking Editors in the Netherlands (SENSE). Most of the respondents to a survey of authors’ editors in SENSE and EASE (European Association of Science Editors) in autumn 2001 (Burrough-Boenisch, 2001) were female.
the text (thereby providing more context and improving text reflexivity). This drastic revision must have taken much more time and effort than the corrector’s satisficing approach (and was therefore probably uneconomic). The resulting text was longer, which is also what Roberts et al. (1994) found when they examined the effects of editing for readability in articles submitted to the *Journal of the American Medical Association*. In Ventola and Mauranen’s study, an unspecified number of teachers of English (Finnish and NSs) were shown the author’s, corrector’s and Ventola/Mauranen versions of the texts. They judged the latter – the drastic rewrite – to be the best version. The author agreed.

The corrector’s appraisal of the text is usually primarily linguistic; rarely is she competent to assess scientific merit. However, a corrector should be sufficiently familiar with the genre of scientific research articles and the conventions relating to the presentation of research findings in English to be able to identify and correct other shortcomings in the text. Such shortcomings may be superficial: inadequate or wrong citation of references, incorrect abbreviations of scientific units, incomplete or inelegant tables or figures – all of which are aspects of text presentation that copy-editors are expected to identify and remedy (see Butcher, 1992; Lyle, 2001). Or they may be shortcomings of discourse and rhetoric: ‘redundancy, unsupported claims, and confusing or contradictory reasoning’ (Shashok, 2001: 116). Other discourse problems could be the lack of a clear distinction between the author’s research findings and the findings of others, and the conflation of results with conclusions. Some rhetorical problems have to do with inappropriate tone: overuse of the personal pronoun, resulting in very assertive writing; overuse of the passive, creating ambiguity about the agent of the action; the use of informal language (especially contractions); too many qualifiers that create an impression of uncertainty; blunt language that creates an impression of overconfidence that is unjustifiable given the research data and results. These sorts of shortcomings could reflect an imperfect command of English, or they could reflect a mismatch between what is appropriate in the author’s writing culture (in this case, Dutch) and scientific English. For this reason, to be able to revise the text properly the corrector must also be aware of both cultures and their languages. This awareness should include an appreciation of differences in writing style and of how much a text needs to be changed for it to function adequately in another culture. Language correctors who go beyond correcting grammar and spelling to amend the author’s discourse and rhetoric to match the norms of the English-language research article are revising at a deeper level. These are the true authors’ editors; they ‘help authors to produce a piece of writing that will effectively communicate their message to the
target audience’ (Shashok, 2001: 115). They not only correct obvious errors, but also advise authors on effective communication.

If a text is poorly written and contains many errors, unless the language corrector or authors’ editor works in-house or has the mandate to improve a scientist’s writing skills in follow-up face-to-face discussions, constraints of time and economics (the two conflate) and of the medium (paper or electronic) may affect how much revision is done to it. There is some evidence (Gould and Grischowsky, 1984) that proofreaders work faster from paper than from screen. However, it seems likely that paper constrains the amount of changes made to a manuscript (the problem of not being able to see the wood from the trees, i.e. at a certain point the amended manuscript becomes so messy that it is difficult to read it: Burrough-Boenisch, 2001). The corollary to this is that revisers might make more changes on screen, because the manuscript remains legible and it is easier to move words and chunks of text (Alley, 2000; Sharpe and Gunther, 1994.) An e-mail discussion among members of the European Association of Science Editors on the pros and cons of editing on paper versus editing on screen revealed wide divergence of opinions (Polderman, 1999). And of the 31 authors’ editors from Australia, Canada, Finland, France, Germany, Indonesia, Netherlands, Norway, Spain and the UK who responded to my informal e-mail survey of authors’ editors (Burrough-Boenisch, 2001), 19 always edited on-screen, five edited only, or almost only, on paper, and the remaining seven edited on both, depending on the client’s wishes or aptitude.

Though many authors’ editors use the ‘track changes’ facility, to allow their authors to see the changes made, some continue to revise on paper, primarily for didactic reasons (Burrough-Boenisch, 2001). Revising on paper not only puts physical constraints on the reviser but also gives scope for errors to be introduced when the author subsequently incorporates revisions into an electronic version.

In the Finnish study mentioned earlier, the NS language revisers were employed by Helsinki University, were working under pressure (Ventola and Mauranen, 1991: 460), and were correcting paper manuscripts from a range of disciplines. These revisers were constrained by time and had little personal contact with authors, so it is hardly surprising that Ventola and Mauranen found that their revisions were not ideal. Ventola and Mauranen noted that they tended to correct only the most obvious errors and often wrote questions and suggestions in the text margin, in the expectation that the author would act on these.

In other words, the revision work was only one of the steps in the production process of the article. The subsequent step required further rewriting and processing of the text by the writer, and then possibly a consultation with the reviser during which appropriate realizations of the intended meanings were negotiated. (Ventola and Mauarinen, 1991: 460-461)

The Helsinki revisers were clearly adopting a pragmatic approach to the revision. They corrected grammatical, orthographical and punctuation errors, but tended to devolve responsibility for making substantive changes back to the author, via questions and comments. Ventola and Mauarinen note that they made few changes that involved reorganising information within sentences, or sentences within paragraphs, let alone paragraphs within the text.

There appear to have been no studies of the constraint of time (which, in the case of freelance revisers, is related to the actual cost of editing) on the intensity of external revision (i.e. revision not performed by the author) of research articles. In the commercial world of publishing, however, publishers usually impose time constraints on freelance editors. Under the constraint of time and faced with a manuscript containing many errors and much second language interference, it seems very likely that revisers will adopt a satisficing strategy: not wasting time on minor problems, but instead removing only the most jarring errors and making stylistic changes that require the least input of time. There also seem to be cognitive constraints to the amount of cleaning up a reviser can do to an error-rich NNS text. Broekkamp (1995; see also Broekkamp and van den Bergh, 1996) has presented empirical evidence to show that adding lower-order problems (in this case, linguistic errors commonly made by Dutch authors when writing in English) to text diminishes the number of higher-order revisions made by revisers. (The higher-order revisions being changes to organisation, as well as to discourse and rhetoric.) He argues that when the reviser’s focus of attention is on linguistic errors, the higher-order problems of text organisation, appropriateness for the genre, etc., recede into the background and tend to be overlooked. It should be noted that Broekkamp’s experimental subjects were university students, i.e. novices to revision, and that the task he set them was actually more ghost writing than a revision assignment. In the real-life revision situation, where the author and reviser are both working to produce a text in the same genre, it seems likely that the more experienced the reviser, the faster she will work and the more skilled she will be in identifying and rectifying text problems. With practice, the correction of linguistic errors becomes mechanical, freeing up the reviser’s attention to cope with the higher-order textual problems (personal
Introduction

experience; see also Fletcher, 1995, writing on the editing of science articles written in English by Taiwanese). This learning curve leading to faster performance may, however, be counteracted to some extent by prolonged exposure to error-rich NNS English; there is certainly evidence that NS language professionals who live in a non-anglophone country suffer from mother tongue attrition (Porte, 1999).

Not all authors are as compliant as the Finnish author of the text used by Ventola and Mauranen. Dutch authors are assertive and will ignore revisions which they think show that the reviser does not understand the science, or when they do not like the resulting style, or when they think the reviser does not know about the research article genre, or has made a mistake in the English. Many overestimate their competence in English (van Els, 2000: 72). Also influential on whether the author accepts revisions is the reviser’s confidence (or assertiveness). I have already speculated that an undermining of the reviser’s proficiency in her mother tongue by long exposure to error-rich NNS English might affect her confidence in correcting errors in the text, but a reviser’s confidence has a social dimension too. In another study involving Helsinki University revisers, Mauranen (1997) pointed out the reluctance of the revisers to change the author’s hedging – i.e. the devices conveying nuances of certainty about conclusions and assumptions. In that paper, Mauranen implies that the three revisers used in her case study were themselves novices in academia (graduate students?). This adds an additional situational dimension to their revisions: it has been demonstrated that status and experience within academia influence assertiveness in writing (Myers, 1985 – who demonstrated that established biologists had less need to hedge; see also Matthews et al. 1996: 104-106, on the subtle use of verb tenses to convey status in the scientific community). The author’s perception of the reviser’s competence is probably also linked to the reviser’s assertiveness. There is evidence that the reviser’s status influences author’s acceptance of revisions: Deguerrero and Villamil (1994) showed that NNS authors were more likely to agree to revisions suggested by colleague NNS authors whom they perceived as having superior linguistic or scientific skills and ability. (See also Nelson and Murphy, 1993, and Butterfield et al., 1996: 254 for empirical evidence of students’ readiness to accept more revision suggestions from their professors than from their peers). Furthermore, it seems that the author’s assumption about what revisions should be made is also cultural. In Japan, language corrections made to Japanese-authored English texts by NSs are accepted, because these are perceived to be rectifying errors. However, NSs are not expected to improve the writing of fellow NSs except by correcting factual errors (personal communication, Professor Brian Harrison, Chuo University Faculty of Policy Studies, Tokyo).
A further factor affecting the revision performed by the language corrector has to do with the ethics of improving a text which, once published, enhances the author’s standing in the academic community. As will be explained below, this poses a moral dilemma to revisers of NS texts as well as to revisers correcting NNS texts. It has not, however, been addressed in textbooks on writing, or by applied linguistics researchers, who focus on achieving perfect text, assuming that external revision is the didactic correcting and rewriting of texts that have been written by novice writers (students and language learners). This view ignores the ethical implications of altering texts that are to be published under another person’s name. The issue does, however, concern principled editors and revisers. Back in 1973, DeBakey and Woodford (both distinguished science editors and trainers of scientist authors) discussed ‘editorial rewriting’. Their assumption was that to serve the reader, extensive revision is often necessary. But should editors do this for the authors, or should they merely tell authors what needs to be done, thereby devolving full responsibility for the text on the author? They note (page 150) that:

From an ethical standpoint, it seems improper for an editor to revise a manuscript extensively – in essence, to rewrite it – and keep the original author’s name in the published version.

DeBakey and Woodford were assuming that the author would be sufficiently competent in English to act on advice to revise and to revise effectively. That assumption does not hold for NNS authors, however. The dilemma of to what extent the revision of an NNS manuscript should include revision of the discourse and rhetoric has been articulated by Shashok (1992), an authors’ editor working with Spanish scientists: ‘Does the freelancer dress up an otherwise mediocre manuscript and cause editors and referees to waste valuable time reaching the decision to reject a superficially well-presented but scientifically weak manuscript?’ Writing on experience in China, Quian (1995) discusses ghost writing and the ethical issues arising when people trained in English (i.e. non-scientists) take on the task of ‘overhauling a paper that is to be published under someone else’s name.’ He concludes that ‘the published report should represent overwhelmingly the conceptual and literary efforts of the author and only minimally those of additional assistants or others’, whether these be laboratory assistants or language revisers. Recently, however, it has been argued that revision by authors’ editors should be put on the same footing as assistance in other aspects of the research (collating data, statistical analyses, etc) and that authors’ editors must therefore be listed as contributors (Riis, 1999; Jones, 2000; Horton, 2000).
The journal reviewer or referee

After incorporating all or some of the revisions of the language reviser or authors’ editor into the text, the next step is to send the revised text to the journal editor, who screens it for appropriateness and then sends it on to several scientific reviewers or referees, whose task is to assess its scientific merit. As Page et al. (1997: 47) put it: ‘the referee is the guardian of publication standards’.

Journal reviewers may be NS or NNS. There is some evidence that NNS reviewers rate a paper more highly when it is submitted in English than when it is submitted in their own language. The study reporting this (Nylenna et al., 1994) used 156 Scandinavian reviewers and two medical papers. Each reviewer was sent one of the papers to review, in two versions: English and in the national language of the reviewer’s country.

Refereeing is unpaid work, so the constraints of time and the satisficing strategy are again operational. Although reviewers are not primarily expected to revise, in the sense of correcting linguistic or stylistic errors/infelicities, many do: in his survey of 127 journal editors, Gosden (1992b) found that 67% answered ‘yes’ to his question asking whether manuscripts accepted for publication were generally returned with referees’ or editor’s language corrections. (See also Gordon, 1980; Pierie et al., 1996.) Webster and Oliver (1993), both seasoned reviewers (Webster is also a respected journal editor), however, have argued that it is not the reviewer’s job to give undue help to authors of badly written papers. They maintain that the reviewer’s primary allegiance is to the journal and its editor, saying that the reviewer ‘owes the authors nothing, and if he helps them it is out of kindness and not duty’.

Rather than rewrite and improve an author’s text, many reviewers instead prefer to annotate the text with advice to the author: ‘explain more clearly’, ‘reword’, ‘shorten’, for example (see McNab, 1997 for an NS corrector’s personal account of the comments provided by referees to Dutch scientists’ manuscripts).

Butterfield et al. (1996: 282) have noted that in revising expository texts (which is what scientific articles are) ‘the relative order of detecting, diagnosing, or correcting error types is lexical, syntactic and semantic’, i.e. a progression from superficial to substantive. I would venture to suggest that whereas language correctors/revisers can be expected to follow this sequence, journal reviewers must try to suppress the lexical and syntactic cues and concentrate on the semantic aspects of the text, as their job is to assess content. This is easier to do if the language revision stage has been effective. The reviewers for science journals are in any case unlikely to be as linguistically alert and gifted as language professionals (whether language
revisers or language teachers) and are therefore less preoccupied with the linguistic aspects of the text. Evidence to support the latter contention is provided by Krishnan and Murphy (1993), who found that university lecturers in engineering based their assessment of student essays on content, whereas language lecturers attended equally to content and language, penalising more heavily for linguistic error and assigning lower scores overall. (It could also be that language lecturers were more aware of the writer’s duty to the reader.)

Their bias toward content is likely to predispose reviewers/referees to suggest semantic changes. This was found by Benfield and Howard (2001) in their study of the changes reviewers and language professionals made to NNS manuscripts submitted to the *Annals of Thoracic and Cardiovascular Surgery*. As Butterfield *et al.* (1996: 251) note, ‘greater topic knowledge is associated with more revision of meaning’. Put simply, this means that revisers are more likely to attempt to improve how an author is expressing himself if they understand the topic. As is the case in most of the empirical work done to date in the United States on revising and writing, however, the studies reported by Butterfield *et al.* used novice revisers (students). Journal reviewers, such as Professor Benfield and his colleagues, are more mature and have more experience in (and of) revision. Though they are operating as subject experts when they read the scientific articles they are sent to evaluate, their role is not primarily to edit. Any substantive changes they make or suggest, however, can be assumed to reflect a deeper knowledge and understanding of the topic compared with the language reviser.

As already noted, after being processed by a language reviser or authors’ editor, a manuscript should contain few, if any, linguistic errors or first language interference. As demonstrated above, the reviser will probably not have drastically reorganised and rewritten the paper, but by removing the superficial linguistic errors she will have exposed higher level problems of text organisation and style. The reviewer may therefore be more likely to detect and diagnose these. In the study mentioned above, Benfield and Howard (2001) examined the reviewers’ comments on 50 manuscript articles on lung cancer submitted to the *Annals of Thoracic and Cardiovascular Surgery*. Their aim was ‘to focus upon the language burdens of NNS authors’. They seem to have assumed that the reviewers were NSs. Twenty-seven of the papers were NNS (from Japan, France, Italy, the Netherlands, Austria, Taiwan, Germany, Switzerland and Korea); the remainder were from the US, Canada, Australia and UK. There were no significant differences between the NS and NNS papers in rejection rates and in scientific quality of the papers (the latter as assessed by the journal’s standard rating procedure), but there was a statistically significant difference between the two groups in the number of reviewers’ comments relating to ‘language’ and ‘writing quality’. The former included comments about grammar, word choice and inappropriate
register or style, as well as suggested rewrites. The latter comprised all the comments about writing quality that did not fit into the categories of ‘language’ or ‘organisation’. Howard (an applied linguist) performed an error analysis of 10 of the NNS papers (we are not told which). She identified far more errors than the reviewers did, and most of them were to do with missing or incorrect articles. The reviewers had focused more on ‘word choice, and the need for correction of grammatical errors in a general way’. I have already alluded to the finding that the NS reviewers corrected terminology (the ‘word choice’ category): Benfield (himself a surgeon) demonstrates this by showing how he was able to properly correct a passage that a reviewer had marked as being unclear even though it had been corrected by ‘a German language professional’.

It seems probable that an NNS reviewer will be less likely to correct the language of an NNS (in our case, Dutch-authored) paper, not only because linguistic errors and mother tongue interference it contains may be similar to those he himself might make, but also because much of his cognitive capacity to process text will be taken up with trying to comprehend the text (Grabe, 1993). This, plus his duty to screen the text for scientific integrity, is therefore likely to bias the NNS referee’s revision suggestions towards epistemic rather than stylistic or linguistic improvements. It is also probable that compared with an NS referee, an NNS referee will not feel the need to rectify ‘shortcomings’ in the argumentation of the text – such as the more explicit links within paragraphs and between parts of the text (the type of reader-friendly devices inserted by Ventola and Mauranen (1991) and applauded by their panel of teachers and by the Finnish author of the test text). Again, the reason could be that these are not perceived as shortcomings – because these are shortcomings his own writing would show, or because in his writing culture these features are not perceived as shortcomings. Or, the NNS referee may be able to detect the shortcomings, but not be sufficiently competent in English to be able to diagnose and remedy them. He is therefore more likely merely to draw attention to them (e.g. by comments or marks in the text margin). There is some experimental evidence of a difference in the intensity of revision in L1 and L2. A study on anglophone Canadian students (Whalen and Ménard, 1995) showed that they did more revision to their L1 (English) texts than to their L2 (French) texts.

Another factor operating in the case of journal reviewers is probably the alacrity with which a solution can be found to a text problem, given that their prime function is to assess content, rather than to correct or improve the

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8 L1 is the first language, i.e. the mother tongue. L2 is the foreign language. These abbreviations are also used for the speakers of these languages. This terminology assumes an ESL viewpoint (compare footnote 4).
language. Though response speed is likely to be slower in NNS reviewers, it also affects NS reviewers. Gosden (1992b) notes that journal editors reported not correcting awkward constructions that require rewriting, and idiosyncrasies (‘sounds funny, but OK’) in NNS papers.

More evidence that the demands made by the revision task on the NNS reviewer’s cognitive capacity constrain the recognition of and response to text shortcomings is provided by the research by Broekkamp (1995; also Broekkamp and van den Bergh, 1996) described above, in relation to authors’ editing. Broekkamp’s conclusion – that much of an NNS reviser’s text-processing capacity is taken up with remedying linguistic errors, at the expense of sorting out deeper structural problems – is important. It gives an NNS dimension to the contention that the interplay between working memory and long-term memory determines how much and what type of revision a reviser can do at a given moment and at a certain point in the text (Butterfield et al., 1996). Also relevant is his finding that when revisers are given explicit instructions about how to revise the text, they revise more substantively (but note that his experimental subjects were novices: students).

There is also a social dimension to the journal reviewers’ intervention in the text, which has already been hinted at in relation to the young revisers working at Helsinki University. Reviewers differ not only in whether they are NS or NNS and in their cultural background: they also differ in age and hence in seniority and status within the scientific community. Gordon (1980) has presented evidence for the importance of these factors. His survey of editors of academic journals in a wide range of sciences led him to opine:

…younger referees tend to put more effort into refereeing, as they are less busy than their seniors and so have more time to give. They are also more likely to be flattered by being asked to referee and rather more eager to display their critical abilities, since they are at a stage in their careers when they are still trying to establish themselves professionally. Older referees … more often have very tight time schedules and, having already established their professional reputations, are less willing to sacrifice the hours required to give extensive, detailed criticism. They compensate for this, however, by being able to draw on their greater experience to place papers within the perspective of on-going work in their discipline, and so offer firmer editorial recommendations.

(Gordon, 1980: 269)

As they are anxious to be published, authors have a strong motivation to revise the manuscript to incorporate improvements suggested by the reviewers. (See Berkenkotter and Huckin, 1995a, chapter 3, in which they
present an ethnographic study of how a biologist incorporates reviewers’ comments into her paper; also Myers (1985), who has described how two biologists made textual changes to research proposals in response to reviewers’ comments.) Thus, by virtue of their status as gatekeepers to publication, journal reviewers exert much more influence on the author’s final text revision than do the language revisers. The reviewers usually operate anonymously, therefore the author can only guess at their culture, linguistic background or scientific standing. They seem to be increasingly commenting on manuscripts in general terms, via e-mail, rather than by annotating the hard copy they are sent (personal communication Dr L. Haddon, Editor, *Journal of Ecology*). Indeed, from the positive reviewers’ reactions to a recent trial of on-line peer review (Wood and Hurst, 2000) it seems likely that commenting electronically via a standard on-line form will soon be commonplace. This being so, NNS authors are less likely to be able to find out what specific linguistic, rhetorical or other textual errors and problems have been detected by the referee (note that in the Woods and Hurst trial mentioned above, all the reviewers and authors were NSs). Furthermore, the language revision burden laid on the NNS author will become heavier, because he may be expected to identify the particular instances (sentences or paragraphs) that the referee’s general comments apply to, as well as to know how to improve them. The NNS author’s final revision is therefore still likely to contain ‘un-English’ infelicities and errors which, unless a language corrector is called in again, must then be rectified by the journal editor or copy-editor, if at all.

**The journal editor**

The journal editor may add to the reviewers’ requests for changes to content, and may also recommend that the text be revised by an NS. He or she will endeavour to ensure that, if necessary, the author adjusts the paper in accordance with the journal’s guidelines to authors. When reading the resubmitted article the journal editor may make further minor changes to the style, based on these guidelines (O’Connor, 1978).

Page et al. (1997) note that sometimes journal editors undertake the rewriting of papers submitted by NNSs. One such editor is Richard Webster. In his valedictory editorial (1990) he discussed how he tackled circumlocution in manuscripts submitted to *Soil Use and Management*. For example, faced with the NNS writing shown in [6a] he ‘translated it’ into [6b]:

![6a](image)

The concept of workability used in this paper implies the ability of soils permitting field operations needed to prepare seed-plant bed conditions without structure deterioration or compaction of top and sub-soil at a time in spring as close as possible to the optimum date
for sowing and planting. Applied on harvest conditions workability means the ability of the soil allowing harvest operations with good results with regard to the soil, action of machines, yield and quality of products to be harvested.

[6b] When we write that soil is workable we mean that the farmer can cultivate it for sowing or planting and harvest his crops from it at the right times without spoiling its structure. (Webster, 1990: 5)

Webster is equally stringent with NS authors. His editing has influenced the discourse of several soil science journals, such as *Catena* (Webster and Yaalon, 1994). He is currently editor of the *European Journal of Soil Science*.

**The copy-editor**

The manuscript has now been accepted and scheduled for publication, so changes made at this stage will not be drastic. A senior freelance manuscript editor employed by leading British biomedical journals describes her work as:

Authors often welcome careful editing, but they do not welcome rewriting at this stage, especially if they fear it might delay publication. My clients, the publishers, do not expect me (or pay me) to rewrite the author’s material or even to edit it heavily in order just to improve the prose style. They certainly would not expect me to do anything that invited another round of revision from the author. Anything of this magnitude should have been dealt with earlier, perhaps in conjunction with an author’s editor. (Lyle, 2001: 32)

This final stage of text revision is nowadays done on-screen, with minimal contact with the author. The policy at the *British Medical Journal*, for example, is only to consult authors (by e-mail or fax) at this stage if the in-house copy-editors are unable to handle a text problem (personal communication, M. Cooter, *British Medical Journal*). If the journal is North American or British, it is at this stage that the manuscript will acquire its ‘English accent’. This will be done by applying the house style and thus by standardising spelling and punctuation in accordance with American or British style manuals. If the journal encourages manuscript and copy-editors to adjust sentence length or otherwise improve readability, however, features of American or British syntax or lexis may be grafted onto the text.
Implications for the research approach

From the detailed description above it is clear that so many actors have had the opportunity to intervene in the text en route from the author’s computer screen to the journal page that few Dutch traits may survive in the published article. This is a good reason for not attempting to characterise features of a particular variant of NNS written discourse on the basis of an analysis of published NNS texts. Unless the published texts are processed by NNSs sharing the author’s mother tongue (a situation not uncommon in the Netherlands), such an analysis will be confounded by the contributions of other language professionals and by the publisher’s stipulated house style. It was for this reason that the Dutch-authored English-language texts I used in the studies described in this thesis were selected from unpublished manuscripts that had not been corrected by NSs.

But what of the readers of Dutch-authored texts in general, and of Dutch scientific English in particular? Of the various readers mentioned in the preceding section, two interesting groups emerge: language professionals who are not subject (i.e. content) experts, and scientific peers, who may or may not be NSs. I have shown that both groups have potentially great influence on a text, and to some extent overlap in the ways they might change a text. In this exploration of Dutch scientific English, therefore, representatives of both these broad groups were recruited to read Dutch-authored texts. Furthermore, the group of peer readers included reviewers and non-reviewers. All the reader groups I used included NSs and NNSs; in this way, I mirrored the real-life readership of Dutch scientific English.

From practice, to theory, to …?

In Figure 1.1 and the account of a manuscript’s journey from the author to the journal page, I emphasised praxis and pointed out how different people, from different professional backgrounds, can influence the style and content of a Dutch research article. Before proceeding to the empirical chapters of this thesis, which report on the research I have done on Dutch-authored texts, it is appropriate to examine the academic viewpoint on writing, reading and revision, particularly in relation to NNS authors and readers. The next chapter is therefore devoted to theories on these aspects.

Readers anticipating a ‘Structure of this thesis’ section at this point will be disappointed. They will also be Dutch. I would respectfully refer them to the Contents list, which performs the same function more economically. In chapter 3 the (cultural) reasons for my standpoint should become clear.
Chapter 2

An overview of the theories relevant to research on the writing and reading of Dutch scientific English

The theories most relevant to this thesis are those relating to the production of a text by an author and its interpretation by a reader. These are theories on writing and on reading. In this chapter, I will recount how the theory in these two areas has been evolving along similar lines, though not always in synchrony, in the United States and the United Kingdom. To do so, I shall venture into the realms of NNS writing, contrastive rhetoric, error analysis, text evaluation and translation studies, noting how similar approaches have been applied in these fields. And because writing manuals and textbooks influence scientists’ writing skills and the approach of the various actors involved in the publication of research papers, I shall also indicate how they reflect the development of writing theory.

In chapter 1 it was pointed out that at several stages along its progression from the scientist’s computer screen to the printed page of a journal, a research paper is read and commented on by language professionals and scientific peers. In the literature there has been little discussion of the implications on writing and reading theory of these external readers who contribute directly or indirectly to text revision. I shall therefore attempt to position these shapers of the final published text in a theoretical framework. The aim is to enable both the interventions in a research article and the interveners to be placed in the broader context of producing the published research article, and to be related to the author(s) of that article.

Theory on writing

The science text that is the physical object considered in this thesis is a product of a person’s writing, so it is appropriate to begin by considering the theory on writing in general, and its offshoot – NNS writing. This theory developed in the United States, where it was generated by ‘writing across the curriculum’, an approach introduced into US universities in the mid-twentieth century, to rectify the perceived poor writing skills of American students.

In the sciences, the perception that many American scientists lacked writing skills resulted in the Council of Biology Editors (CBE) issuing its manual Scientific Writing for Graduate Students (Woodford, 1968). In the preface, Woodford (a chemist turned editor, who had worked in the Netherlands) pleaded that ‘formal instruction in scientific writing should form
an integral part of a scientist’s university training’. CBE envisaged that practising scientists would be responsible for this training. Because the problem of poor writing was so widespread, however, it was tackled across the board, rather than being left to individual university departments. This was ‘writing across the curriculum’. Composition classes given by English language specialists were introduced into the university curriculum and by the 1970s they were mandatory for all first-year university students in the United States, including those studying science subjects (see Johns, 1990). A spin-off from this has been a flood of textbooks written by professors of English, for use by teachers and students in writing classes. They include general textbooks on writing and style (for example, Hefferman and Lincoln, 1982; Strunk and White, 1979; Flower, 1989), books aiming to teach by giving examples of good writing (e.g. Zinsser, 1989) and those that aim to get students over writer’s block – the mental paralysis that may afflict people who have been told to produce text (a good example of this type of textbook is Klauser, 1987). However, writing across the curriculum has also spawned textbooks for technology and science students written by scientists, or persons with a background in science. For example, Leslie Olsen (Olsen and Huckin, 1991a, b) has a degree in chemistry. Robert A. Day (1994, 1995), a microbiologist, has a distinguished background as an editor in biological science, though he is now a professor of English at the University of Delaware, Michael Alley (1996) is an engineer, Matthews and his co-authors (1996) are entomologists, and Huth (1990, 1999) is a medical doctor.

University teachers of composition have not only had to underpin the university teaching of writing but have also had to consolidate their academic standing by researching and publishing. In their deliberations on theory, they have moved the focus of research and the goal of teaching from the product – the text – to the process of writing. The paradigm shift was from the assumption that the writer knows what to write and therefore needs only to be taught how to organise the content (the product approach) to one which assumes that it is by understanding the process of writing that the writer discovers what to say (the process approach). In the process approach, writing is seen as a problem-solving exercise (Flower, 1989), incorporating stages such as planning, drafting, rereading and revising, which require the mastery of techniques such as rapid writing and editing. Hudelson (1988) dates the paradigm shift as occurring in 1982.

The contrast between the product and process approaches is reflected in textbooks too, with Strunk and White (1979) and the first edition (1982) of Hefferman and Lincoln’s *Writing: A College Handbook* as examples of the product approach, and Klauser (1987) and Flower (1989) as examples of the process approach: note that Hefferman and Lincoln incorporated process theory in the second edition of their manual (1986). One of the tenets of the process
approach is the importance of building in a revision or ‘editing’ stage into the process of generating a text. Flower’s process-oriented strategy for revision is to define the task, comprehend it and evaluate it (Flower, 1989, especially pages 239-258). It is based on her recognition (Flower, 1979) of the difference between reader- and writer-based prose, in which writer-based prose is seen to be the product of immature, unskilled writers, and reader-based prose is seen as the ideal. This distinction emerges during the process of writing, with the first draft being writer-based (essentially egocentric). Her contention is that the writer, even if experienced, must revise to make the prose more reader-based, so that the text communicates effectively. This interplay between writer, reader and text also underlies Fitzgerald’s model of revision (published 1987, quoted in Butterfield et al., 1996), which is based on a consideration of text and reader from the writer’s perspective.

Because there is no standard ‘writing across the curriculum’ programme in the UK, British books on writing are not so much textbooks for university courses as manuals intended to help beginning or mature professionals who need to be able to write well in their careers. Process theory is not explicit in British books on writing. The books available to help scientists assume that scientists know what they have to say, but merely need help in organising themselves to say it effectively. Product-oriented books tend to be written by experienced author or editor scientists, to help inexperienced colleagues (see for example, Booth, 1984; Farr, 1985; and Lindsay (an Australian, writing in the British tradition), 1995). Kirkman (1992) is unusual, in that from a background in English, communication studies and applied linguistics, he has become a science and technology communications consultant. O’Connor (1991) has contributed on the basis of her career as a professional biomedical editor, and Albert (2000) as a medical journalist and editor.

NNS writing

So far, I have considered how the theory of writing has been developed by researchers and practitioners focusing on NSs – specifically on American student writers. But while Flower and other process-oriented writers were consolidating their theories on how NSs should be taught how to write English texts, in the United States the research into NNS (i.e. L2) writing was growing, partly in reflection of the social and demographic trends. In the United States the teaching of English has long been seen as a means of integrating immigrants into society, but in recent years a new challenge has emerged, as students have been attracted from abroad to study in US universities and there has been an influx of economic migrants from Mexico and Cuba. The latter has resulted in
sizable groups of Spanish speakers needing to be taught English writing skills (by 2000, for example, 32.4% of the population of California was of Hispanic or Latino origin). The research on NNS writing was primarily a response to a practical problem: that of how best to teach English writing skills to students from a different linguistic and cultural background to enable them to function optimally in an anglophone university setting, including in the mandatory freshman composition classes. (See Grabe and Kaplan, 1996: 141). Its clearest manifestation was in the emergence of TESOL (Teaching of English to Speakers of Other Languages) and its journal TESOL Quarterly in 1966 – coincidentally the year in which Robert Kaplan, a teacher of English to ESL (English as a Second Language) students, published his seminal paper on culture-based differences in writing (Kaplan, 1966), in which he first propounded the theory of contrastive rhetoric: that patterns of discourse are cultural and are transferred into writing in a second language (see below).

The product to process paradigm shift occurred in the theory of NNS writing teaching at almost the same time as it occurred in NS writing. In her review of 25 years of TESOL writing teaching, Raimes (1993) implies that the ‘focus on form’ (i.e. the product) was paramount until 1976, after which TESOL researchers and teachers embraced the process paradigm (which she calls a ‘focus on the writer’, meaning a focus on the person generating the text product). In fact, however, although it was infiltrating the field at that time, process thinking does not seem to have taken hold until the early 1980s (see Hudelson, 1988). Writing at the time, Raimes herself (1983) expressed doubts about how widespread the revolution was. The process approach took longer to be adopted by the ELT profession in the United Kingdom. It was still being promoted in the late 1980s (White, 1988).

The adoption of the process paradigm spawned research (much of it focusing on university-student NNS writers) investigating whether the processes of NS and NNS writing differ. Among the results were indications that ESL (English as a second language) students and NSs deploy very similar processes when writing (Hudelson, 1988: 211), with the unsurprising qualification that the former often behave as less-skilled NS writers (Grabe and Kaplan, 1996: 141). But as Raimes (1993) notes, the product approach has never been totally abandoned and continues to be useful for obtaining insights into NS/NNS differences in texts (for example, differences in deployment of cohesion devices). As will be shown below, it has underpinned much of contrastive rhetoric research.

1 US Census Bureau (http://quickfacts.census.gov/qfd/states/06000.html).
2 As van Naerssen and Eastwood (2001) explain, ELT (English language teaching) is the acronym used in the UK.
According to Raimes (1993), two more strands were woven into TESOL writing pedagogy in the mid 1980s: a ‘focus on content’ and a ‘focus on the reader’. Although Raimes does not explicitly say so, the former signals a realisation that writing needs to be seen as part of a particular context – in the TESOL case, as part of learning how to operate in a particular subject area (a science, for example) in an academic setting. The writing teacher aims to impart the skills the NNS student needs to be able to write as a chemist, or biologist, or economist. The ‘focus on the reader’ is closely related, as it brings the readership’s expectations into the writer-text interaction. It ties in with the process school’s admonishments to write with the reader in mind (Flower, 1989), but takes this a step further by striving after more than readability. The writer must learn to manipulate text content, style and register in a way appropriate for a specific reader: the reader of an international peer-reviewed biology journal, for example.

The growing awareness of the NNS dimension to writing apparent in theory (Grabe and Kaplan, 1996) has entered American textbooks on writing. Examples include books by Olsen and Huckin (1991b) and by Swales and Feak (1994), Weissberg and Buker (1990), which are specifically for NNS authors.

**Interlanguage and error analysis**

It was Selinker (see e.g. 1992) who used the term ‘interlanguage’ to describe the language intermediate between the mother tongue and target language, in which learners of the target language communicate. The interlanguage contains properties of both the mother tongue and target language, and changes concomitantly with the learner’s proficiency (Crystal, 1999). One of the benefits of the concept is that it accommodates varieties of near-English such as the English spoken and written by Dutch learners: Dunglish (Burrough-Boenisch, 1985, 1998; Hannay, 1994). Another benefit is its application in error analysis, i.e. the analysis of errors in the interlanguage, with reference to the target language (James, 1998). Though error analysis has receded since its heyday in the 1970s, later in this chapter I will show how one of the models developed to explain the various intensities of error analysis applied to a text can be used as a starting point for a conceptual model that can be applied to explain the changes made by non-linguist peer readers to a Dutch-authored science text.

**Contrastive rhetoric**

Mention has already been made of the emergence of contrastive rhetoric in the late 1960s. Kaplan’s highlighting of the manifestation of culture-based differences in rhetoric (1966) was based on an examination of text as a
product (he examined 600 student essays). So, studies triggered by this theory that examined and catalogued culture-based rhetorical patterns were also product-based (see, e.g. Connor and Kaplan, 1987). One of the interesting insights the contrastive approach generated was Hinds’s (1987) typology of reader versus writer responsibility in writing. In simple terms, reader-responsible writing assumes the reader will bear the onus of extracting the message; for writer-responsible text the writer has the duty to be explicit, so that the reader does not have to work hard. Hinds arrived at this distinction by examining the contrastive rhetoric of Japanese and English texts. In a later paper (Hinds, 1990), he expanded this theory into one of ‘deductive’ and ‘quasi-inductive’ rhetoric, arguing that English writers (and readers) are familiar with deductive and inductive rhetorical frameworks, but that certain Asian readers and writers (Japanese, Koreans, Chinese and Thai) prefer a more inductive reader-responsible framework.

As we have already noted, the distinction between reader-oriented and writer-oriented texts was one that the proponents of the process approach had noticed and were exploiting with the specific aim of making texts more readable (see Flower, 1989). What Flower and her fellow teachers of NS writers did not realise at the time was that their choice of a strategy of making the reader’s task easier (reader-based writing) was a very cultural one. Yet studies in text linguistics (a branch of discourse analysis focusing on written rather than spoken discourse), which can be seen as an extension of the contrastive rhetoric approach, have shown that in some cultures, it is writer-based writing that is deemed appropriate (Mauranen, 1993 – for Finnish writers; Čmejrková, 1996 – for Czech writers). There is a link with cultural anthropology here, specifically with the typology proposed by Hall (1976), which distinguishes between ‘low context’ (i.e. explicit) and ‘high context’ (implicit) cultures. Applying Hall’s theory, it can be expected that in high context cultures (such as Japan), which set great store on implicitness, texts are more likely to be what Flower calls ‘writer-oriented’ (which is equivalent to what Hinds calls ‘reader-responsible’) than is the case in low context cultures (such as the United States). It might therefore be assumed that in texts from low context cultures, the writer will help and guide the reader by saying in advance how the argument will be developed, and by alluding to what has been discussed.

Finland, characterised as a high context society (Victor, 1992: 154), does indeed seem to have a high context (i.e. writer-oriented) writing culture. Mauranen (1993) has argued this, on the basis of contrastive analysis of five Finnish and five NS published academic texts and five Finnish-authored academic manuscripts in English (but not subjected to language revision). This inductive style contrasts with the explicit deductive style favoured by the Anglo-American writing culture. She argues that what accounts for the
implicitness of Finnish writing (whether in Finnish or in English) is Finnish cultural homogeneity, which allows Finnish writers to assume that they and their readers have much knowledge in common. She hypothesises that:

...in a cultural context which is relatively homogeneous it is natural for writing conventions to remain relatively implicit, whereas in contexts which are culturally much more heterogeneous, like those in dominant English-speaking countries, it becomes imperative to develop writing habits which are more explicit and leave less room for personal interpretation.
(Mauranen, 1993: 258)

However, after analysing academic writing in German and German-authored academic writing in English, Clyne (1987) found that compared with equivalent NS texts, the German-authored texts contained very few ‘advance organisers’3 to alert readers to how the argument was to proceed. Germanic cultures are thought to be lower-context cultures than North American cultures, which are in turn lower context than ‘English’ (presumably, ‘British’) cultures (Victor, 1992: 143), so one might have expected that the German texts would contain more explicit forward referencing than their NS counterparts. From this we may infer that the ‘low context versus high context’ distinction should be applied with care to writing styles. Indeed, Victor (1992:145) warns of the danger of stereotyping a culture as high or low context and notes that a culture may contain a mixture of high- and low-context institutions.

Contrastive rhetoric has influenced pedagogy as well as research. It has been suggested (Leki, 1993) that one of its pedagogical uses is to enhance awareness of cultural differences: a teacher can exploit this to help L2 writers understand why they write the way they do. In a landmark overview of the theory and practice of writing, Grabe and Kaplan suggest how this can be done (1996: 200-201). The seven ways they suggest in which contrastive rhetoric can contribute to a theory of writing are all to do with enhancing awareness of the existence of cultural pluralism in aspects such as rhetoric, strategies of composing, conventions of style and genre, and audience expectation.

The genre paradigm

While contrastive rhetoric was sharpening awareness of the existence of a culture-based plurality of writing styles and was infiltrating mainstream theories and praxis, recognition of the influence of genre on writing and reading acts.

3 Also called metadiscourse (i.e. text about text), or ‘text reflexivity’.
was spreading rapidly, and there was mutually enriching interaction between these two fields. By recognising that texts for different purposes have different styles, the genre paradigm accommodates stylistic differences in writing within a culture. The concept of genre has been defined as:

...a class of communicative events, the members of which share some sort of communicative purposes. These purposes are recognised by the expert members of the parent discourse community, and therefore constitute the rationale for the genre. This rationale shapes the schematic structure of the discourse and influences and constrains choice of content and style.

(Swales, 1990: 58)

The genres of research article and children’s story, for example, co-exist in English writing, but are far apart. The science article can be seen as the product of a transnationalist discourse community (compare Swales, 1990: 65) whose form and function is recognised the world over. It is thus a universal genre and is perpetuated by participants in that discourse community, who find that the standard formula is an adequate medium for reporting research to their colleagues.

Complementing genre theory, in the 1960s texts (products!) were examined to ascertain their distinguishing grammatical and lexical features. Frequency counts and statistical analyses of the resulting data yielded information that could be fed back into ESP teaching, so that students could be told how to assemble texts appropriate for their purposes (for an overview of this register analysis, see Jordan, 1997: 228-229). Biber (1988, 1995) has used statistical analysis to characterise the textual features of different genres by means of their co-occurrence patterns. By so doing, he provided quantitative support to the traditional qualitative classifications into genres such as ‘romantic fiction’, ‘personal letters’, ‘academic prose’. The latter include frequent use of nominalisations and of passive voice. Scientific writing, a subset of the genre, therefore displays these features. (This in spite of all the books on writing that admonish scientists to write simply, clearly and in the active voice: see Day, 1994, 1995.)

While some researchers were dissecting texts into their grammatical and lexical building blocks, to identify the micro elements that gave a text its characteristic ‘flavour’, others were looking at the meso and macro elements. This latter approach is discourse analysis: it involves examining longer stretches of text, and characterising the language and its structure (Jordan, 1997: 229). This gives insights into the devices and conventions deployed in text types, allowing, for example, ‘rules’ to be inferred about the tense usage in scientific articles (Malcolm, 1987): Swales (1990: 131-132) gives an overview of the
analytical studies of the English research article from the 1970s to the late 1980s.

Genre analysis has looked at structure in terms of rhetorical moves in the sections of the research article. Swales’s analysis of the Introductions to 48 articles (16 from the ‘hard’ sciences, 16 from biology/medicine and 16 from the social sciences) resulted in his CARS (‘Create a Research Space’) model (1990), which characterises article Introductions as consisting of three moves: establishing a territory, establishing a niche and occupying the niche: a progression from the general to the particular. By contrast, Discussion sections move the other way: from ‘stating the results themselves, to placing them within the established literature, to reviewing their general significance’ (Swales, 1990: 173). The rhetorical ‘shape’ of the IMRAD (Introduction, Methods, Results and Discussion) research paper can thus be schematised as an hourglass (Jordan, 1997: 248). These and similar insights, plus the findings of discourse analysis, have been incorporated into writing textbooks (Swales and Feak, 1994; Weissberg and Buker, 1990). In this way, the normative genre characteristics become reinforced and (as both these influential textbooks are aimed at NNSs) the Anglo way of reporting science is promulgated. Studies that combine genre and discourse analysis with contrastive rhetoric have revealed to what extent culturally based differences in rhetoric survive in the research article even when NNS writers are attempting to follow the conventions of a particular genre (for example, see Clyne, 1987; Mauranen, 1993, 1996, Ventola, 1994).

Social constructionism

In the 1980s, largely via the interpretive anthropologist Clifford Geertz, but also via Hall (1976) anthropology began to influence linguistics, including contrastive rhetoric, via methodology (Connor, 1996: 76-79; Hatim and Mason, 1990). The social setting and culture in which the writer (or reader) is embedded became recognised as important (Connor, 1996: 101-116), so ethnographic studies (focusing on individuals) were done on readers and writers, such as Myers’s (1985) study of how two biologists reacted to referees’ comments on their paper and Gosden’s (1995) study of the revisions seven novice Japanese writers made to drafts of their papers after input from their supervisors. The tenet of this approach, social constructionism, is that ‘the knowledge, the language and the nature of the discourse are determined by the discourse community for which it is written’ (Gosden, 1995: 39). As Gosden has pointed out (ibid.), EAP teachers and teachers working with NNSs were finding the process approach to be removed from the real-world writing environment in which their students would have to operate. Social constructionism provided them with a way to put the task of writing a
particular genre into its context. For researchers on writing, embedding the object of study (be it the research article or the scientist-author – see Knorr-Cetina, 1981; Myers, 1985; Gosden, 1995) in its social setting imparts much added value to the research findings. It makes it easier for readers of the study from different cultures to relate the research project and its outcomes to their own situation. Grabe and Kaplan (1996: 161-173) are among those who have extolled the benefits to writing theory of the detailed insights social constructionism yields.

**Theory on reading**

A person decides to read a text for a purpose, thereby anticipating a gain which could be, for example, the knowledge needed to assemble a piece of apparatus (assembly instructions), or an insight into an aspect of science (a research article). The intentionality of the act of reading predisposes the reader towards the text (and, by implication, to its author). Approaching a text with a particular purpose in mind, a reader will be thrown off course if that text does not match that purpose. A reader expects assembly instructions to be clear and straightforward, for example, or a research article to explain the purpose of the research and how it was conducted, present the results and draw conclusions. Contrastive rhetoric and genre theory provide frameworks for explaining why certain mismatches occur between expectation and actual experience, the former by identifying cultural differences in rhetoric, and the latter by accounting for text identity being based on patterns of features and conventions. Both these theories implicitly assume a concept fundamental to the theory of reading – the schema – which will be explained briefly below. First, however, I will sketch the climate in which reading theory developed. Note that this review of the theory deals with the higher processes and strategies involved in reading, not with the primary decoding of texts.

As in the case of writing, it was the demand for insights useful for teaching that powered the quest for theories and models of reading. Here too, theories and models developed initially for first language reading were adopted and refined by second language researchers (Barnett, 1989). The models developed reflect whichever emphasis in psychology prevailed at the time: behaviourism versus cognitive psychology, for instance (Barnett, 1989: 11).

In reading research, process (how the mind functions) has dominated product (for instance, the results of comprehension tests: Barnett, 1989: 36). Schema theory, which was developed in cognitive psychology to explain comprehension of spoken and written language (see Ulijn and Strother, 1995: 127-132) is derived from the process approach.
Schema theory is based on the idea that a person’s long term memory is a systematic personal organization of that person’s total experience. What we already have stored in that organized memory helps us make sense of new information that comes to us. (Ulijn and Strother, 1995: 128)

By emphasising the dynamic interaction between text and reader, whereby the text is simultaneously assessed against the reader’s schema and adds to it, while the reader subconsciously uses the schema to comprehend the text, schema theory acknowledges the importance of reading as a process.

Schemata have been divided into formal schemata and content or background schemata (Barnett, 1989; Carrell, 1988; Carrell and Eisterhold, 1988; Grabe, 1993). The former are built up of knowledge about formal discourse structure and therefore shape expectations about the appropriate rhetoric and stylistic conventions of the text, and thus about its organisation and content. Content schemata comprise knowledge of terminology (and its appropriate deployment) and may encompass epistemological knowledge of a particular science or academic discipline or profession. The knowledge in both categories of schema, whether acquired by experience or learnt formally, will be influenced by culture. It also includes explicitly cultural knowledge: cultural and linguistic traits that are imbibed from a person’s surroundings (the landscape, the prevalent language and religion, for example). It is thus also a mindset.

Clearly, the background knowledge (and hence schema) of the NNS reader is shaped in a different cultural and linguistic mould from that of the NS reader. So, even if the group of readers being investigated can be expected to share the schema of a particular science (for example, biology), if they come from different countries and have different mother tongues they can be expected to differ in terms of the schemata they deploy while reading an English text. It has been suggested that TESOL teachers of writing who are proponents of the process approach should encourage their pupils to read more in their L2 to acquire a good L2 schema (Leki, 1993). The idea is that this will create awareness of the existence of different schemata, which the learner can then actively exploit to improve his or her writing. The corollary is that having an L2 schema in addition to an L1 schema could be advantageous to a reader whose mother tongue is not English and who is reading an English text by an L2 author with a different mother tongue – a common combination in the science discourse community.

Looking at the process of reading a text, researchers have come up with models that distinguish between whether the reader constructs meaning from individual words or from larger chunks of text. The distinction is between bottom–up, in which readers process information word-for-word (i.e. syntactic
and lexical analysis are dominant), and top–down, in which the dominant process is conceptual analysis, which unpacks into syntactic and lexical analysis (Ulijn and Strother, 1995: 123; Grabe, 1993: 214). The bottom–up models are text-driven models, whereas the top–down models are reader-driven (Barnett, 1989: 13). This dichotomy parallels the ‘form versus process’ (or text-focused versus writer-focused) dichotomy identified by Raimes (1993) and mentioned above in the account of the development of theory on writing. In reading theory, as in writing theory, the focus has shifted from the object stimulating the process (text) to the human processor (writer/reader): bottom–up models of reading have given way to the psycholinguistically-based top–down models.

More recently it has been recognised that in reality, readers deploy both top–down and bottom-up processes when reading, with readers who are less skilled tending to favour the latter. The ‘less skilled’ category includes learner NNS readers: ‘who do not expect target language texts to make sense, who read words individually’ (Barnett, 1989: 19). As their reading proficiency improves, they use top–down strategies more often (Davis and Bistodeau, 1993).

The emergence of interactive models of reading in the 1980s (Barnett, 1989; Grabe, 1993) signified a recognition that while reading, the reader is constantly using text feedback to augment the ongoing processing of fresh text. There are parallels with the cyclic process models of writing promoted by Flower (1979: 19) in which feedback is incorporated into rewriting and editing, and with the closely related models of text revision (Butterfield et al., 1996) which is itself the process of incorporating feedback (the author’s or a reviser’s) by reading, rewriting, and rereading. As the writing researchers have incorporated reading into their writing theories and models, so the reading researchers have, since the mid-1980s, increasingly brought writing into their theories: ‘reading described as a composing process’ (Barnett, 1989: 14). Acknowledging the feedback between reading and writing leads to a blurring of the distinctions between the performers of the reading and writing acts:

> Writers are readers as they read their own texts. Readers are writers as they make their responses on a written text. (Raimes, 1993: 251)

The performers not only swap roles, they also transform them. Readers, while remaining readers, are seen as being required to fulfil a variety of roles while reading (Coney, 1992). The corollary is that skilled writers can manipulate their readers into various roles by using rhetoric effectively. Theory is becoming more dynamic, with the recognition that readers and writers no longer need be analysed as static, empirical objects, analysable in terms of their roles, backgrounds and biases.
Theory explicitly combining writing and reading

Text evaluation

In chapter 1 it was argued that it is the reader who ultimately assesses a text’s effectiveness. In effect, the theories on writing, contrastive rhetoric and the genre paradigm discussed above, are themselves based on text assessments made by a very special group of readers – linguists and language specialists – though this is never explicitly stated. The act of reading texts written by novice writers or NNSs may generate epistemological insights, as happened when Kaplan recognised different, culture-based rhetorics, or Flower distinguished between reader- and writer-based prose. Whether they are researchers, editors or (see below) translators, specialist readers consciously attempt to read texts more objectively than ‘normal’ readers. To do so, they must train themselves to examine texts analytically, to disengage the predisposition to empathise with the author with which normal readers approach a text. As Kaplan (1982: 141) has noted:

Editors, a special sub-set of the category writers, earn their living by developing fairly sophisticated sensors for shared information so that they may judge when an author has “met” an intended audience and when he/she has “missed” the audience.

The formal process of assessing a text’s effectiveness is called text evaluation. Its aim is to be able to rate how effectively a given text fulfils its supposed function, the idea being that this will reveal how the text could be improved (Renkema and Schellens, 1996). Being a formalised reading strategy it therefore draws on theories of reading. The Dutch researchers in text evaluation tend to concentrate on specific genres of ‘functional’ texts; for example, Lentz and Pander Maat (1992) examined applications for grants, Renkema (1996) focused on a letter sent by a local council to all residents in the municipality. Their orientation is thus on the product: the text, which is assessed in terms of how well it meets certain criteria. For example, in the CCC (correspondence, consistency and correctness) model for text evaluation (Renkema, 1996), the criteria relate to text type, content, construction, formulation and presentation. When applied top–down, the model can be used to evaluate writing; when applied bottom–up, it can be used to evaluate reading, thus becoming a model application of Raimes’s writer–reader feedback loop (Raimes, 1993: 251, quoted above). It is significant that Renkema is also closely involved in setting norms for the standards of writing in the Netherlands. His Schrijfwijzer (1995), the manual and style guide for writers issued by the Dutch Government Printer, is based on the assumption underlying
all Dutch text evaluation research: that a good writer orients the text to the reader (Renkema, 1996; Lentz and de Jong, 1996).

Translation theory

Translation theory offers insights into a very special category of readers-cum-writers who shuttle between languages and cultures. It therefore offers insights into others who read or write (or do both) in several languages. Translators who translate into their mother tongue are professional NNS readers. Those who translate from their mother tongue into a second (or third) language are professional NNS writers.

Not surprisingly, theory on translation mirrors theory on reading. All translators exploit the schemata of the target and source languages and, like NNS readers, they too have been shown to deploy bottom–up and top–down strategies when translating, with the word-for-word bottom–up strategy being adopted by non-professionals and the top–down approach being characteristic of professionals and very advanced students (Lörscher, 1991).

Translation theory sheds light on the processes deployed by NNS writers to write and revise texts. In the late 1970s, when Translation Studies emerged as a discipline (Bassnett-McGuire, 1991), the translation theories were product-oriented. Thus, A. Lefevere, the Belgian who proposed the term ‘translation studies’ in 1978, distinguished between reader-oriented and text-oriented translations (Rose, 1981), in much the same way as researchers on writing (Flower, 1989) and reading (Barnett, 1989) were distinguishing between reader- and writer-oriented texts. Concomitantly, in her theory of ‘covert’ versus ‘overt’ translations, Juliane House (1977, quoted in Rose, 1981) distinguished translation products (texts) that are not bound to a particular culture. These covert translations include commercial, scientific and diplomatic documents – all with a clear international function and therefore, by implication, very reader-oriented. The covertness is achieved by the translator aiming to produce a translation that leads a life of its own as an authentic document in the target language, free from alien elements carried over from the source language and culture (the aim of the reviser of NNS texts: see chapter 1). In contrast, overt translations are recognisable as coming from another culture; the reader is implicitly expected to adapt to accommodate the text.

The shift to looking at translation as a process occurred in the late 1980s (Bassnett-McGuire, 1991; Hatim and Mason, 1990; Connor, 1996), and was also accompanied by acute awareness of the social context of the translation act. Hatim and Mason (1997) contend that because they provide a commercial service, translators – unlike ivory-tower linguists – have long been aware of situational factors that affect the way they work (these include the
Theory 39

source and status of the text, the client’s wishes, the use to be made of the translation: note the similarity with the position of the reviser of NNS texts).

Another shift to occur in the theory on translation was from comparing a translation with the source text to evaluating the target text in terms of how well it functions in the target culture. It was alluded to above, in relation to covert versus overt translations. Called Neuorientierung, this shift occurred in Germany the early 1980s and was driven by K. Reiss and J. House (see Hulst, 1995). It represents an acknowledgment of the pragmatism of much translation (particularly the translation of scientific and other non-fiction texts), that aims at producing text that communicates effectively with the intended readership. As such, it implicitly sanctions changes made by the translator to ensure that the target text fulfils its intended function effectively. This repositions translation firmly in the real world, where most translations are not of literary works, but are of texts written by business people, administrators and scientists, who are not gifted writers. If the original text is poorly written – which applies to many texts submitted to commercial translators – it is difficult to defend the contention that a translation must faithfully reflect the original text.

In common with mainstream theory on writing, which, as I have pointed out, was developed in the low-context culture of America, Hulst’s (Dutch!) viewpoint is that text must be reader-oriented. Her model to evaluate the functionality of translations (Hulst, 1995) implicitly acknowledges that texts are usually flawed. Her approach, directly inspired by Neuorientierung, involves looking at the cohesive links and progression of the topic in the target text, before conducting the same analysis on the source text (she used Spanish and Dutch texts). The elegance of this model is that it reveals the weaknesses of the original text and how, if at all, the translator has coped with them. Hulst’s work is an extension of the Dutch work on text functionality, particularly that done by Pander Maat (e.g. Lentz and Pander Maat, 1992), who was the co-supervisor of her doctoral research.

Where translation theory differs from theory on writing is that the latter has been coloured by its developers’ experience with unskilled (student or NNS) writers, but much theory on translation has been developed by considering translations of (literary) texts written by skilled writers. Theory on writing thus assumes that the original text can be improved, but translation theory has tended to assume that the original text is sacrosanct. Though literary translators may be able to assume that the author of the source text knows how to write and has written effectively, neither the translators of commercial and academic texts nor the language revisers and editors can do so. The latter two groups of language professionals and, to some extent, the scientific referees who are given texts to screen for scientific merit and publishability, will not hesitate to correct, reword, delete, or amplify text passages because they deem
them to be wrong, inappropriate or inadequate. Professional translators are also urged to revise (i.e. edit) texts to improve readability:

Ook in de praktijk zal de vertaler met …onvolkomenheden worden geconfronteerd. Het is dan zijn of haar taak om deze fouten niet klakkeloos over te nemen in de vertaling, maar juist te verbeteren. Er moet immers een prettig leesbare tekst afgeleverd worden die tegemoet komt aan de wensen van de uiteindelijke lezer4.

(Lemmens and Parr, 1995: 11)

The textual changes translators make when revising their translations are not necessarily a response to ungrammatical writing but may be made because without them the text will read well but will not convey what the author had in mind. Good translators know when and how to make such changes and they do so because they are:

...trying to assist in the negotiation of meaning between the producer of the source-language text and the reader of the target language text.

(Hatim and Mason, 1990: 1)

Towards a model to characterise another person’s critical reading and emending of a text

So far in this chapter, but also in chapter 1 (Figure 1.1), we have noted that various persons may critically read a text and alter it, with the aim of attuning it to the target reader and thus to prepare it for publishing. In the foregoing overview of theory on writing and reading I have alluded to the revision of text, but now it is time to examine theory on revision, prior to developing a model that can be used to describe the critical reading and emendation of (science) texts prior to publishing. Such a model should, to paraphrase Hatim and Mason, accommodate the interventions of those trying to assist in the negotiation of meaning between the producer of the text and its target reader.

Modelling revision

I noted earlier that the incorporation of a revision stage into the process of generating a text is crucial in the process approach to writing. In an early

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4 The translator will also be confronted with [textual] inadequacies in practice. It is then his or her duty not to uncritically reproduce these errors in translation, but to rectify them, because the text must read well and satisfy the target reader’s requirements.
model of the cognitive process in composing, which they presented in an article written for writing-across-the-curriculum teachers of English at US universities. Flower et al. (1986) made revision and evaluating part of the general process of ‘reviewing’, which, in turn, was the third component of the writing process, the other two being ‘planning’ and ‘translating’ (the latter term being used to mean text generation). Flower and her co-authors (who included J. Hayes) dismantled revision into a series of sequential cognitive processes with some feedback loops, which the writer performs. In their terminology, whether or not a revision action is carried out depends on whether the reviser (in this case, also the writer) detects a problem and diagnoses it. ‘Detection’ means realising that something is wrong in the text, whereas ‘diagnosis’ means being able to pinpoint exactly what is wrong. (Though Flower and Hayes do not say so explicitly, this implies understanding why something is wrong or inappropriate.) Having diagnosed the problem, the reviser can then decide how to remedy it.

The Flower–Hayes model, in its original (1986) version, implicitly assumes that the reviser is the writer of the text. How a writer should carry out this revision process is explained in Problem-Solving Strategies for Writing (Flower, 1989), in which the standpoint is that prose should be reader-oriented. Flower’s nine steps in the writing process are:

1. Explore the rhetorical problem.
2. Make a plan.
3. Generate new ideas.
4. Organise your ideas.
5. Know the needs of your reader.
6. Transform writer-based prose into reader-based prose.
7. Review your paper and your purpose.
8. Test and edit your writing.
9. Edit for connections and coherence.

Steps 7 – 9, assigned to the ‘Revision’ box in the Flower–Hayes model of writing processes, are also useful as a framework for considering the process whereby a person who is not the author of the text revises. Indeed, three of the six strategies that Flower recommends to accomplish the three revision steps are editorial; in Figure 2.1 (next page) I have indicated them in bold type.

In 1996, Hayes presented a new version of what he called ‘the Hayes–Flower writing process model’, which he designated ‘an individual–environmental model’. It contained no explicit mention of revision, nor of any of the other terms previous versions of the model had used to indicate the process of rereading plus emending the text (e.g. ‘reviewing’, ‘editing’); Hayes (1996: 5) explained that ‘revision has been replaced by text interpretation’. He justified this by explaining that he wanted to model the
Chapter 2

Chapter 242

Figure 2.1 The strategies Flower recommends an author should follow to implement the revision steps in her model (see Flower et al., 1986)

revision process as a composite of text interpretation, reflection, and text production, i.e. as a process allied to reading, rather than to writing. His early attempts to formulate an appropriate model of revision had assumed that the key to revision was reading comprehension, in the sense of ‘constructing a representation of the text’s meaning by integrating many sources of knowledge’. This ‘knowledge’ comprised knowledge of grammar and syntax, knowledge about the text’s topic, and knowledge about ‘the writer’s intent’. What is significant for this thesis, is that Hayes’s viewpoint (though he does not say so explicitly) allows us to go beyond considering that revision is what a writer does to an early draft during the process of producing a final draft (the standpoint of the writing process model); instead, we may consider revision as a process applied by external readers at some stage during a text’s journey from the author’s computer screen to the printed page. The shift is from introspection, assuming that the reviser is the author, to the more realistic assumption that the reviser is a critical reader with no emotional attachment to the text and relying exclusively on the printed word and any accompanying illustrative material to infer meaning (i.e. not drawing on an intimate knowledge of the author’s intentions obtained, for example, in conversation). As pointed out in chapter 1 (Figure 1.1), the latter person could be called a language reviser, or corrector, or authors’ editor, though, as shown earlier in the present chapter, he or she could also be a translator, revising a draft translation.

Once revision is seen as a reading process that can be applied by someone other than the author, it then becomes important to explain how reading primarily to ascertain a text’s content interacts with reading primarily with the purpose of improving a text. This distinction can be summed up as being between reading to comprehend versus reading to correct. There is a
tension between these two, but there may also be an alternation between them. As Hayes notes (1996: 14-15):

...when we read to comprehend, we do not attend much to text problems. That is, we try to form a clear internal representation of the text’s message, but we are rarely concerned with stylistic issues. When we have problems in comprehending a text, we try to solve these problems and then, most usually, forget them. ...However, when we read to revise, we treat the text quite differently. We are still concerned with the text’s message, but now we are also concerned with bad diction, wordiness, and poor organization – features of the text that we may not have attended to when we were reading for comprehension. In revision tasks, people read not only to represent the text’s meaning but more importantly they read to identify text problems. With the extra goal of detecting problems, the reviser reads quite differently than does the reader who is simply reading for comprehension, seeing not only problems in the text, but also opportunities for improvement that do not necessarily stem from the problems.

Reading to revise, i.e. to correct, is therefore reading with the intention of detecting problems. Hayes’s interest is primarily in the cognitive processes underlying revision, and his article goes on to develop a hierarchical model of these, topped by the ‘control structure’ (i.e. the task schema: the reader’s goal and capabilities). This top level interacts with a deeper level of three fundamental processes: text processing (critical reading), reflection (problem solving and decision making), and text production. In turn, these interact with the deepest level: the resources (working memory and long-term memory). For this thesis, it is not so much the cognitive processes that interest us, but rather the textual problems that trigger a revision action, as the latter are what generate an annotation to a text.

In an early model of the revision process (Hayes et al., 1987) three categories of textual problems were specified: spelling faults, grammar faults and errors of fact. They were depicted vertically, as if in a geological profile, with spelling faults near the surface, grammar faults a little deeper, and errors of fact as much deeper. In an accompanying model of the cognitive processes of reading to evaluate text, Hayes and his colleagues expanded the possible problems to nine, showing their corresponding solutions (e.g. the solution for spelling faults is ‘new diction’) and linking each problem/solution pair to a specific cognitive process.

Another characterisation of the types of textual problems that are dealt with in text revision was developed by James (1998), who presented a
model of levels of error that serves as a template for guiding specialist readers (ESP or EAP teachers) in the error analysis of texts written by NNSs. James’s starting point was the errors NNSs typically make, and thus, given the topic of this thesis, his approach is very appropriate. Figure 2.2 is a simplification of his model.

<table>
<thead>
<tr>
<th>Errors of SUBSTANCE</th>
<th>Errors in process</th>
<th>Phenomenon</th>
</tr>
</thead>
<tbody>
<tr>
<td>encoding in writing</td>
<td>misspellings</td>
<td></td>
</tr>
<tr>
<td>decoding in reading</td>
<td>miscues</td>
<td></td>
</tr>
<tr>
<td>composing written text</td>
<td>miswriting</td>
<td></td>
</tr>
<tr>
<td>understanding written text</td>
<td>misreading</td>
<td></td>
</tr>
<tr>
<td>formulating written discourse</td>
<td>miscomposing</td>
<td></td>
</tr>
<tr>
<td>processing written discourse</td>
<td>misinterpretation</td>
<td></td>
</tr>
</tbody>
</table>

Figure 2.2. Levels of error in writing/reading (modified after Figure 5.1 in James, 1998)

Both Hayes’s early (Hayes et al., 1987) model of the revision process and James’s model of levels of error in writing and reading have in common a top–down progression from noticing and reacting to superficial textual problems, to doing likewise for deeper textual problems. Both start off with errors in individual words (misspellings). James calls these ‘errors of substance’ because his model also applies to speech. The next two, deeper, levels in James’s model – text level and discourse level – accommodate respectively the grammar/syntax errors within sentences, and the errors in formulation. The latter are to do with the style being inappropriate for the particular genre.

The simplified tripartite form of the Hayes model of triggers of revision is thus spelling – grammar – errors of fact, whereas that of the James model is substance – text – discourse. (James assumes that writers get their facts right – or perhaps that ESP teachers are unable to identify factual errors in specialist texts.) Grabe and Kaplan offer another tripartite approach (1998: 163):

The examination of science writing – indeed, of any writing – normally should occur at three levels: the surface structure level; the rhetorical level; and the level of assumption – in this case, scientific assumptions and their potential instability.
Grabe and Kaplan’s third level will accommodate certain textual revisions suggested by representatives of the discourse community (in our case, peer reviewers and journal editors): the emendations relating to the presentation of claims and arguments.

Hayes’s model assumes that the author initiates and implements the revisions. James’s model, however, assumes an external reviser: a language expert (a teacher), whose corrections may initiate revision from the author. The external reviser could also be a senior member of the discourse community, as in Gosden’s (1995) study. To provide a conceptual framework for his analysis of the differences between seven Japanese doctoral candidates’ first drafts of research papers and the final drafts incorporating their supervisors’ comments, he presented a model of textual revisions in scientific research articles. The model rests on the three metafunctions of language identified by Halliday (see e.g. Halliday and Hasan, 1989): ideational, interpersonal and textual. The ideational metafunction is the relationship between the author and the subject matter of the text, the interpersonal metafunction is the relationship between the author and the audience, and the textual metafunction is the relationship between the author and the options of text structure that are appropriate for the situation. Put simply, text communicates effectively when the author has written down his thoughts on a subject for his target audience in an appropriate style.

Gosden’s model of textual revisions drew on Knorr-Cetina’s (1981) case study of the evolution of a co-authored biochemistry research article from first to final draft. She had identified three major categories of revision: the deletion of redundant (in the sense of being ‘obvious’) or weak (and therefore ‘dangerous’) statements; the reshuffling of statements, which resulted in reorganised paragraphs; and changes in the modality of statements, to tone down the claims made. The revisions in Knorr-Cetina’s study were made by the senior, more experienced author. The revisions Gosden examined were made by Japanese supervisors (not co-authors) who were initiating novices into the scientific discourse community. Gosden found that in addition to changes in text organisation, they also suggested that more technical detail be added or deleted. Relating all the revisions to the ideational, interpersonal and textual troika, Gosden arrived at a model in which deletions and insertions of technical detail were attributed to the ideational metafunction, whereas the rhetorical adjustment of claims and of expressions of purpose was attributed to the interpersonal metafunction, and the reshuffling of technical detail and the adjustment of rhetoric were attributed to the textual metafunction. The model ignores what Gosden calls ‘the polishing of language’, defined as emendations made within clauses, that formed the uppermost level of revision/correction in the Hayes and James models discussed above. Gosden used it to explain the categories of revision.
he identified (Gosden, 1995), but did not provide any examples of these revisions.

From the foregoing it is clear that none of the conceptual models of revision developed to date have explicitly attempted to relate revision to more than one type of reviser. A model accommodating the various actors depicted in Figure 1.1, who emend the scientific text at some stage prior to publication, would clearly be useful in indicating how much these actors are likely to intervene in a text. It would also underline the point that the published text is the product of negotiation and collaboration between the author, representatives of the discourse community and language and publishing professionals. The metaphor of depth is useful to incorporate in such a model, as it allows us to categorise minor interventions as superficial, and more drastic interventions (e.g. reordering paragraphs, inserting new text) as being deeper. Thinking in terms of a vertical column allows us to accommodate the ‘levels’ that James and also Grabe and Kaplan use (see above), and also the vertical zonation in the Hayes models of revision discussed above. Before elaborating on this further, however, I propose to consider how professional revisers of texts have attempted to characterise the interventions they make in texts (particularly science texts) prior to publication, as the model should accommodate their coalface experience. The professionals and practitioners I have in mind are practising editors, specifically those working in the sciences. Prior to examining what they have to say, I will discuss the confusing terminology of revision, because it must by now be clear that the terms ‘revision’ and ‘editing’ are often applied interchangeably and there is a difference between how theoreticians and practitioners define and use them.

**Revising versus editing**

Composition researchers’ use of the term ‘editing’ to describe revision techniques (see Flower et al., 1986; Flower, 1989), has already been noted. Translators use the term ‘editing’ not only to describe the process of stylistically improving a draft translation, but also for the process of rectifying errors. For example, in their handbook for Dutch to English translators, Lemmens and Parr (1995) include sections headed *redactie* (editing) consisting of fragments of English text containing Dutch interference, which the reader is expected to correct. Elsewhere (Burrough-Boenisch, 2000b) I have explained the semantic confusion between ‘editing’ (as used by professionals in the publishing industry), ‘*editen*’ (the word currently used by Dutch translators as an equivalent to revision), ‘revision’ in the sense of what only the author can do to the text, (see e.g. Flower, 1979) and ‘proofreading’
(the word UK-based translators use to describe the amending of their draft translations.

Haugen (1990) had earlier attempted to disentangle the semantic confusion surrounding revision and editing. Writing from the viewpoint of an academic, he noted that whereas the importance of revision as an integral part of generating texts was not made explicit until writing theory and research moved from product to process, professional publishing had long used editors to improve texts. He pointed out that what composition researchers call ‘revision’ is what professional editors call ‘substantive editing’, and contended that the distinction is between whether the process is self-inflicted or carried out on texts written by others. For him, the self-inflicted variant is ‘revision’, the ‘other person’ variant is ‘editing’. Commendable as this distinction is, it is not followed universally (see e.g. Hannay and Mackenzie, 1996, who use the term ‘self-editor’ to describe an author revising his own text) and nor is it likely to be. The problem is that very many people in a wide range of disciplines and professions write and amend texts and few of them pause to wonder when and whether they are revising or editing or even emending.

Bearing the disparity in terminology in mind, it is useful to consider how professional editors define what they do. This will reveal a viewpoint that can be tested against the theoretical framework erected by the composition researchers.

The practitioners’ viewpoint: editors on editing

In a manual aimed primarily at American students aspiring to be editors of technical documents, the authors define an editor and editing characteristically succinctly:

An editor is someone who changes, alters, amends, improves other people’s writing.

…The goal of editing is to make documents more understandable for readers, who are clients and customers …

(Bush and Campbell, 1995: 1)

Compare the explanation of the goal of editing given more recently by Alley (2000: 2):

to improve the document as much as can be expected, given the constraints, such as deadlines, under which the document exists.
The career editors Bush and Campbell have in mind work in companies in which customer satisfaction (and hence the company’s profit) is seen to rest on understandable and effective product documentation. The editing techniques they present therefore focus on improving readability by, for example, shortening sentences, removing jargon and redundancies, changing passive constructions into the active voice and converting running prose into bulleted sentences wherever appropriate. Drastic editing verging on ghost writing is justifiable in this case because, unlike papers destined for scientific journals, the target readers are not the author’s peers. In contrast to this approach that emphasises the power of editors to change texts, Alley attaches importance to editors’ accountability:

In revising your own work, if you see a change that will improve the work, you usually just make it. In editing, though, if you see a change that will improve the work, you assess the effect of that change on the author, the other editors who will follow you, and the remainder of the writing.

(Alley, 2000: 7)

It can be seen that he also implicitly endorses the distinction between revision (a process inflicted on one’s own writing) and editing (a process inflicted on others’ writing) advocated by Haugen (1990).

O’Connor outlines the intensity of editing that can be expected in scientific publishing, and defines the range of activities covered by the term ‘editing’ as follows (1978: 41):

Manuscript editing can be separated into three processes – creative, substantive and technical – each of which shades into the next. One person, the editor, may do all types of work; or a copy-editor (sometimes called a subeditor, a manuscript editor or a technical editor), may be responsible for substantive and technical editing after the editor and referees have finished their creative editing work.

Two of the components of her category ‘creative editing’ are not relevant here. They are the acquisition of work to be published and the determining of the aims and scope of a publication. The third (ibid.) is

…pointing out to authors how and where they might reorganize, expand or condense their manuscript to produce a more logical progression of ideas or give a more effective account of their work. In this educational part of their calling editors may have the help of referees…
Creative editing, in the sense of pointing out where and how scientists should improve their manuscript, is, according to O’Connor, intended to elicit revision by the author. (Once again, the distinction is between external editing and author revision.) Because it is primarily intended to ensure that the text reports science in a way that satisfies the discourse community, it can be positioned on Grabe and Kaplan’s (1996) social constructionist level (see above), especially when the editor functions as the mouthpiece of journal reviewers. Moreover, creative editing is instructional, because authors (especially novices in the discourse community) are implicitly assumed to learn from it.

The second process of manuscript editing O’Connor (1978) refers to is ‘substantive editing’, a term widely accepted by editors in Europe and America. She argues that this type of editing is driven by editors’ perceptions of the information needs of the discourse community and by understanding that members of that community need to be able to access information quickly and efficiently. From this, derives the rationale that it behoves the editor to infer what the author means and, if necessary, to ‘translate’ on behalf of the target reader:

Substantive editing means ensuring that authors have said what they want to say as clearly and correctly as possible. It is usually done at the same time as technical editing and includes correcting the grammar and spelling, making minor suggestions about the reorganization, expansion or condensation of the text, and suggesting how titles, key terms, abstracts, statistics, tables and illustrations might be better presented and how style might be revised to give greater clarity and precision.

(O’Connor, 1978: 41)

The third process of manuscript editing – technical editing – is, according to O’Connor, preparing the manuscript for the printer. It therefore involves only minor, superficial revisions to the text. It covers aspects such as standardising spelling, indicating the categories of headings to be used and checking that references are presented accurately. These are ‘mechanical’ changes and corrections, which are copy-editing tasks (Butcher, 1992). Although copy-editing has traditionally been the last stage of editing applied to manuscripts before they are sent to the printer, authors are nowadays able to incorporate some aspects of copy-editing into their revision, thanks to the software available to PC users (particularly the spelling checkers and reference management programs).

It will be clear that in relation to the vertical representation of textual ‘problems’ and ‘errors’ proposed by Hayes (1996) and James (1998) and
discussed above, O’Connor’s (1978) classification of editing processes goes from bottom to top (starting with content and ending with surface detail). Alley (2000) advocates a similar approach, beginning with editing for content (looking at the appropriateness of the information), followed by editing for style (looking at text organisation, transitions, etc.), and finally, editing for form (grammar, punctuation, spelling, etc.). It will be recalled that when I discussed reading theory, I noted that the bottom–up text-driven approach contrasted with the top–down reader-driven approach. The paradox is that editors operate as surrogate target readers by allowing themselves to be text-driven.

The proposed model: a revision continuum

From the foregoing discussion of the theoretical and practical views on the revision and editing of texts, and given the discussion in chapter 1 of the interventions made to a text prior to publication, it can be seen that there are few crisply definable revision and editing tasks. Instead, it is better to envisage a continuum of revision, extending from the superficial copy-editing of texts, through progressively more substantive editing which, at its most drastic, ends up as complete rewriting: ghost writing. In this continuum are the domains of various actors: the author, who is more likely to be involved at the substantive/rewriting end of the continuum, colleagues and supervisors, the copy-editor who operates at the top (i.e. superficial) level of the continuum, and the editors and language revisers based largely in between, though sometimes venturing higher or lower.

Crisp lines cannot be drawn around the domains of the various actors, for two reasons. First, because people vary in their intrusiveness when editing. O’Connor (1978: 29) talks of ‘interventionist’ editors, who ‘…tend to transform as much prose as possible into …simple style’. Webster (1990; Webster and Yaalon, 1994) is an example of this type (see [6a] and [6b] in chapter 1). The second reason that the various roles in editing and revising are difficult to delimit is cultural: it is to do with the mandate a particular culture gives to the reviser. This can be seen even within the anglophone world. American editors operate under the assumption that it is their prerequisite to edit drastically and tend to advocate stringent editing (Eron, 1995; Wardropper, 1995; Weingartner, 1995: ‘Only in paradise do editors get perfect manuscripts’). The distinguished American historian Jacques Barzun begins his diatribe against the level of editing applied by American copy-editors (Barzun, 1986) as follows: ‘One of the main differences between British and American publishing lies in the role assigned to the copyeditor’ and goes on to describe ‘the misconceptions, intellectual and literary, that underlie the present extensive revision of works that do not need it’. His
contention is that American copy-editors ill-advisedly venture into the more substantive part of the revision continuum more than their British counterparts.

The difference between American and British perceptions of the editor’s mandate illustrate that culture may affect how an external reviser sees his or her role vis-à-vis the author, and thus how far he or she intervenes in a text. In chapter 1, the minimal role assigned to revisers/editors in Japanese culture was mentioned: in Japan the author bears more responsibility for the text than is the case in anglophone cultures. The implications of this were noted in chapter 1, when discussing the path a text follows from author to publication (Figure 1.1). Thus, cultural perceptions of appropriate writing style (a cultural preference for inductive over deductive argumentation, for example, or for author backgrounding) and of the reviser’s remit and perceived responsibilities (to the author? to the readers – also taking account of their culture and mother tongue?) will be influential. Impinging on this is the socio-cultural setting of the revision: the status of the reviser vis-à-vis the author and the author’s seniority and scientific status, for example. Culture may also affect revision when there is a disparity between the background knowledge and experience of the author and reviser that is cultural: for example, if the author writes with the (very ethnocentrically Dutch) implicit assumption that nature management hinges on controlling the water table. In such cases, the reviser is only able to suggest a revision (in this case, by formulating the assumption explicitly) if she shares the culture-specific knowledge. How much should be made explicit? In a forestry science text destined for an international readership, is it necessary for the readers to know that all forest in the Netherlands is planted, and that the Dutch definition of ‘forest’ refers to what is a very small area of land by the standards of forest-rich countries such as Canada?5

A further aspect of culture, the language associated with a culture, also plays a role in the degree of intervention in a text, especially in relation to whether the language of the manuscript is the mother tongue or a foreign language of the author or reviser. It seems highly likely that the reviser’s mother tongue influences which linguistic, semantic, lexical and orthographic ‘errors’ or infelicities that reviser detects and remedies in a text. Furthermore, extrapolating from the research (implicitly on NS revision of NS texts) reported in the review paper by Butterfield et al. (1996) and augmenting it with the findings reported by Broekkamp (Broekkamp, 1995; also Broekkamp and van den Bergh, 1996), it seems probable that compared with their NNS.

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5 Note that in his schematic representation of the systems and structures that control what a writer writes, Gosden (1995: 41) depicts genre as being unequivocally in the context of culture.
colleagues, revisers and editors working in their mother tongue devote less of their working memory to text processing, which frees up their long-term memory and enables them to detect and diagnose (more) higher-level textual problems. Inserting the NNS factor into the conceptual model of revision introduces an additional dimension. If the paper is NNS-authored, then it can be hypothesised that there will be more revisions to improve readability. But if the reviewer is NNS, there may be fewer changes to improve readability and more focus on content and genre appropriateness.

On the basis of all these considerations, it is possible to synthesise a very schematic model that can be used when considering the alterations critical readers make to texts (Figure 2.3). For simplicity, only the most general types of revision are depicted. This revision continuum model represents the range of intrusiveness in revision: from superficial and mechanical to drastic and creative. Its extremes are copy-editing and ghost writing. Its terminology is primarily that current in the publishing industry, as my aim is to make practitioners (i.e. the actors depicted in Figure 1.1) more aware of the range of textual interventions. However, by relating these interventions to the interventions mentioned by authors such as James, Hayes, and Gosden, I hope to demonstrate the link between reading/writing/revision theory and practice. Which stretch of that continuum a person operates in depends on that person’s role (e.g. author, language reviser, editor), their culture (in terms of their perception of the duties of an editor or reviser, and of a text’s appropriateness), their language proficiency (e.g. NS versus NNS) and the socio-economic constraints (e.g. tight deadlines, status vis-à-vis author). Thus the continuum must be embedded in a cultural and socio-economic context.

Having established a theoretical context for this research, I now propose to examine concrete issues. The first of these is the nature of Dutch scientific English. When characterising this variety of NNS writing, some of the theories discussed in this chapter will come in useful, particularly those on genre and contrastive rhetoric.
Figure 2.3 The revision continuum
Chapter 3

Towards a characterisation of Dutch scientific English

Before describing the study conducted to examine readers’ response to texts written in English by Dutch scientists, which forms the core of this thesis (chapters 5 – 8), it is useful to attempt to identify some of the generic features of Dutch-authored English in general and of Dutch scientific English in particular. This will indicate how readers expecting English-language science texts to adhere to anglophone norms might react to such texts that are Dutch-authored. The underlying assumption is that Dutch writers are likely to transfer linguistic, stylistic and discourse features from their mother tongue and native culture to their writing in English. There is ample evidence that this happens (for example, see Burrough-Boenisch, 1998; Hannay, 1994; Kellerman, 1995; Lemmens and Parr, 1995; Bongaerts and Poulisse, 1989 give examples of transfers into spoken English).

In this chapter, I will first briefly outline how a Dutch scientist acquires proficiency in English today. Then, I will discuss some of the research done on differences between Dutch and English writing styles, before going on to consider scientific writing and differences in the Dutch and Anglo research article genre. To augment the conclusions drawn from reviewing the literature, I will present and discuss a small-scale study in which I compared extracts from Dutch and English scientific journals. The chapter will end with conclusions about the features that Dutch scientists might and do transfer into their English writing.

How Dutch scientists acquire proficiency in English

Dutch children are first taught English as a foreign language in the last two years of primary school, when they are aged ten to twelve. English is a compulsory foreign language in pre-university secondary education (VWO), where pupils are taught speaking, writing, listening and reading skills. At university, science students are expected to be able to use English-language university textbooks¹, though lectures and seminars are generally in Dutch.

¹ Reassuringly, Vendel’s (1982) study of the ease with which first-year Dutch students of psychology and physics read and understood English-language textbooks in their subject compared with Dutch-language textbooks in the other subject revealed that they scored better when reading the English-language texts. In other words, they were better able to understand textbooks in their own subject written in English, than textbooks on the alien subject in their mother tongue.
English writing courses are not mandatory for science students studying for their first degree, but if these students write research reports in English (for example, on a work placement abroad), their Dutch science lecturers usually correct the English as best they can, though not trained to do so.2

After graduating, those who go on to do the PhD-equivalent degree (a ‘Doctor in …’) are appointed as trainee researchers (known as AIOs or OIOs) for four- or five-year contracts, during which they are expected to fulfil some teaching duties as well as do their doctoral research. The AIO and OIO appointments give doctoral candidates the status of university contract employees; they are not ‘students’. Since the AIO/OIO system was introduced in the late 1980s, university departments have begun to introduce compulsory courses on academic writing in English. In Nijmegen, for example, the science faculty first ran such a course in 1989, and the same course has been given ever since. Doctoral candidates in the Netherlands Centre for Geoscience (biologists and geographers at Amsterdam and Utrecht universities) are required to attend a course on academic writing skills in English. Similarly, in Groningen University, doctoral candidates in biology are expected to take the Publiceren in Engels (publishing in English) course given several times a year by the university’s language centre.

Most doctoral theses written by Dutch scientists are in English. (Though for Amsterdam University’s Palynology and Paleo/Actuo Ecology chair group, the professor estimated that 95% of the theses are in English, the remainder are in Spanish). Unlike the practice in anglophone countries, however, these theses are published in book form before the thesis defence (which is conducted in public), but after approval of the board of examiners3. The print run is at least 50, for distribution to Dutch university and institute libraries. Many theses have a larger print run, however, are issued with an ISBN number and marketed commercially4. Nowadays, many science doctoral theses in the Netherlands are not in the classic monograph format of an overarching line of argument developed over a series of chapters. Instead, the thesis consists of a compilation of research articles that the doctoral

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2 The information in this section is based on an informal survey (conducted by e-mail in February 2001) in which I elicited information from Dutch biology professors in Amsterdam, Groningen, Leiden, Nijmegen, Utrecht and Wageningen universities and the Vrije Universiteit

3 For an overview of international differences in thesis requirements and PhD practices see Hartley (2000).

4 For overviews of such publications, see, for example, http://www.agralin.nl/wda/ (Wageningen University: click on ‘view last month’s dissertations’) and http://pablo.ubu.ruu.nl/~proefsch/biol.html (Utrecht University biology theses in electronic form: click on a title to call up summary and table of contents).
candidate has written or co-authored (usually with the supervisor) and that have been submitted to or published in English-language journals. These are sandwiched between introductory and concluding chapters; in the former the doctoral candidate provides the background to the research and in the latter he or she draws general conclusions and suggests avenues for future research. The minimum number of articles in these compilation theses varies slightly between universities. Compilation theses are the norm in Utrecht’s Faculty of Veterinary Sciences (which requires a minimum of four articles that have been accepted for publication) and Wageningen (a minimum of five articles, one or two of which must already have been accepted for publication). The doctoral theses by PhD candidates researching in Groningen University’s Centre for Ecological and Evolutionary Studies are a mix of monographs, compilations of articles and ‘intermediate forms’. The informal requirement for the Groningen compilation thesis is a minimum of four chapters written in article form (published or publishable), plus an extensive Introduction and a substantial review-type Discussion/Synthesis. At Amsterdam University, PhD candidates in Palynology and Paleo/Actuo Ecology are encouraged to produce compilation theses, containing at least four but possibly up to seven articles (again, published or accepted for publication).

The widespread adoption of compilation theses has repercussions on the writing style and skills of young Dutch scientists. Given a thesis structure of independent, self-contained chapters, they do not have to develop and sustain an argument across a span of more than a few pages. The format encourages redundancy and inconsistency. Thus, if the articles are reproduced exactly as they were published there is often much repetition – for example, if the articles describe the results of field experiments, each article may include the description of the same site. And reproducing articles from a mix of American and British journals results in successive chapters switching between British and American spelling and (if there has been intrusive copy-editing) style. Compilation theses have many advantages, however. An important advantage for NNS authors is that manuscripts are screened and emended by NS reviewers and copy-editors, to the benefit of both the science and the language. In effect, the doctoral candidate is benefiting from external supervision of the thesis work and language correction. Furthermore, learning to write research articles is more useful to a career in science than learning to write a magnum opus. Few scientists outside the German tradition have to write more than one long thesis during their lifetime, but all scientists need to master the research article genre. The pragmatic Dutch practice of requiring doctoral candidates in the sciences to write a series of research articles is, therefore, efficient and useful. According to Professor F. Berendse of Wageningen University’s Nature Conservation and Plant Ecology chair group, it also ensures that research data are disseminated widely and that the
publication of articles does not take time away from writing the thesis. Professor K. Vrieling (Plant Ecology, Leiden University) noted that though the monograph often contains ‘more detail and unpublishable information that may be interesting’, the compilation thesis is efficient and obviates having to rework text into an article. Professor H. Hooghiemstra (Palynology and Paleo/Actuo Ecology chair group, Amsterdam University) listed the advantages of the compilation thesis as:
- the candidate becomes familiar with the review process of journals
- he/she learns to present the components of a study separately
- he/she has a publications list (useful when applying for jobs)
- he/she finds it easier to plan, because parts can be completed
- if the doctoral work is not completed, he/she (and the supervisor) has something to show
- there is more stimulation and inspiration during the four-year AIO/OIO appointment
- there is more inducement for the candidate to read the literature
- there is more reason for him or her to contribute to a conference

Another important advantage of the compilation thesis (though not mentioned by the professors) is that the thesis supervisor is usually given as a co-author, and therefore each completed thesis contributes to his or her publications list.

A doctoral candidate in Utrecht University (biology) who also contributed her views felt that the disadvantage of the monograph thesis was that it forced you to do everything twice, ‘because in biology, publishing your research in the form of articles in international journals is a natural part of a researcher’s work. Monograph theses have a limited circulation, so the audience for whom you do this extra work is very small.’ But she also saw some limitations to the compilation thesis: ‘When writing articles you’re often constrained by the journal’s rules on length, style, format and area of interest. This isn’t always negative, because it forces you to write compactly and relevantly… The general discussion chapter in the compilation thesis does allow you to place the articles in a broader perspective, and there you can usually give your creativity free rein’.

In chapter 1 I noted that before submitting articles to journals for publication, many Dutch scientists (including doctoral candidates) enlist the services of NS experts for language correction (see Burrough-Boenisch, 1985; McNab, 1988). Even if the published articles comprising a compilation thesis have not been corrected before submission but are corrected during the journal publishing process, the introductory and concluding thesis chapters (the only chapters not to have been published separately) do usually undergo
such professional language correction. Authors undoubtedly learn from the linguistic and editorial amendments made by NSs working as correctors and translators in the Netherlands, especially if they discuss the emendations with the corrector (Burrough-Boenisch, 2001).

A Dutch scientist therefore acquires writing skills in English via a mix of formal and informal means. He or she has been taught English formally for some eight years in school and has used English skills at university to read textbooks, perhaps to listen to lecturers and to write short reports on work placement abroad and certainly to write several research articles. This knowledge of English is reinforced informally by reading scientific journals (there is anecdotal evidence that many doctoral candidates prepare themselves for writing a research article by reading articles from the target journal) and by exposure to English in everyday life. The ambient exposure includes advertising, pop music and subtitled (never dubbed) British and American television and films. (According to the NRC Handelsblad of 3 February 2001, ninety per cent of the films shown in Dutch cinemas in 2000 were American.) That this formal and informal exposure to English results in scientists who are well able to function internationally in English can be seen from the statistics: in 1995-1996 1.9% of the articles in international technical and scientific journals had a Dutch author, almost 30% of academic and scientific publications by a Dutch author are co-authored with one or more persons from outside the Netherlands (statistics from Tijsen et al., 1998). The citation impact of Dutch authors is third in the world (Tijsen et al., 2001a, b).

In his review of the scientific performance of nations as revealed by their publication record, May (1997) noted that the Netherlands ranked 10 in terms of share of world’s papers in science, technology and engineering (preceded by Germany, France and Italy), had the third highest citation impact in astrophysics and materials science, the fourth highest in chemistry, microbiology and physics, the fifth in agriculture and mathematics and the sixth in ecology and environment. In terms of number of research papers published per head of the population, Netherlands ranked fifth.

As the opening pages of this thesis suggest, however, in spite of their extensive formal and informal acquisition and use of English, few Dutch scientists are able to write English that has no learner errors or shows no rhetorical or linguistic interference from Dutch. At this point, therefore, I propose to discuss some of the linguistic and rhetorical differences between these two languages.

Linguistic and rhetorical differences between Dutch and English

The contrastive research on differences between Dutch and English can be divided into two types: that which has examined generic grammatical and
linguistic differences (in terms of the semantics and pragmatics) between the languages and that which has compared particular genres in the two languages. Products of the former type of research include the contrastive grammar textbook by Aarts and Wekker (1993) and the English grammar textbook for Dutch learners of English by Mackenzie (1997). Research of the second type applies the differences between the two languages to explicate discourse and rhetorical features of Dutch-authored English.

A good example of the detailed contrastive semantic/pragmatic research that is relevant to this thesis is Cornelis’s (1996) investigation of the form and function of the passive voice in the two languages. Cornelis has argued that the differences in the form of the passives in the two languages lead to a difference in meaning, which, in turn, accounts for differences in usage. She focuses on the passives formed using the auxiliaries *worden* (literally ‘become’), which she calls the only ‘real’ passive in Dutch, and ‘be’, which is the only passive auxiliary used in English. She demonstrates that the Dutch *worden* passive is processual and always evokes the idea of an animate or inanimate ‘causer’. By contrast, in English the ‘be’ passive indicates the existence of a state, and a causer is not inevitably evoked. Cornelis contends that though both Dutch and English manuals of writing advise against overusing the passive, the risk of incoherence from ‘passivitis’ is greater in Dutch than in English. She notes that corpus studies in Dutch and English have found the incidence of passives in written discourse to be about 14% in Dutch ‘argumentative scientific’ prose (Vandenbosch, 1992), compared with 32% in English ‘learned science’ (Svartvik, 1966). However, almost 40 years separate the corpus studies she cites, and it is questionable whether, given the advice in style manuals (for Dutch, see Lamers, 1984: 127; Overbeke et al., 1999: 29-30; for English, Albert, 2000: 137-138) many editors in the 21st century allow passive-laden prose into their journals. Indeed, Kirkman’s (2001) review of 500 sets of instructions to authors has shown that English-language scientific journals advocate using the active voice.

The contrastive research done by Hannay and colleagues goes one step further, by relating differences between Dutch and English to features of Dutch-authored English. Thus, an examination of the available options for positioning adjuncts in the two languages revealed that the lack of certain equivalent options in English predisposes Dutch authors to fall back on clause-initial and clause-final positions when they write (or translate into) English (Hannay, 1994). But by opting for these positions, Dutch authors affect the rhetorical impact (also called the focus) of the sentence. This can

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5 According to Cornelis, the form using the auxiliary *zijn* (= be) is merely a ‘passive-like’ construction.
result in the phenomenon called ‘frontal overload’ (Hannay, 1994: 86), which is best illustrated using Hannay’s examples (ibid.: 87):


[2] By Western civilization the American way of life is meant.

[3] What is meant by Western civilization is the American way of life.


In an attempt to explain differences in the writing styles of the two languages, Hannay has also done syntactic analysis of argumentative texts in Dutch and in English, (Hannay, 1997). As a speaker of both languages he must have been aware of the very different ‘flavour’ of the standard writing styles for argumentative prose in Dutch and English. However, with a view to teaching advanced Dutch learners of English, he was primarily concerned with finding out what, in addition to grammatically correct sentences, makes for coherent text in both languages.

Hannay’s general hypothesis was that in argumentative texts, Dutch style is more forceful and ‘syntactically fragmented’ than English style. He argued that the structural properties of English seem to favour combining clauses to produce complex sentences (e.g. single-message sentences with several clauses, or multi-message sentences). The two specific hypotheses he tested were that ‘written Dutch makes more use than written English of structures which serve to make individual messages prominent’ and ‘written English makes more use of combining structures than written Dutch’. The corpus Hannay analysed comprised 34 (17 Dutch, 17 British English) direct mail charity fund-raising letters and 18 (9 Dutch and 9 British English) political commentaries from quality daily newspapers. Looking at sentence length, because this ‘provides a general backdrop against which to consider syntactic complexity’, Hannay found a major difference in average sentence length in the fund-raising letters: the Dutch sentences were much shorter (10.97 words, compared with 18.50 words for the English sentences). In the political commentaries, the difference in average sentence length was minor: in both languages the average was around 20 words. Only when the sentences were assigned to classes based on their length and re-examined did significant differences emerge. There were statistically significantly more Dutch sentences in the 11–20 word class (p<.05), and statistically significantly more English sentences in the class containing the longest sentences (>31 words). Here, I propose to concentrate on Hannay’s findings about the political
commentaries, as these argumentative and yet also persuasive texts are more similar to the research article genre than are fund-raising letters.

The only ‘construction types’ whose frequency Hannay found to be significantly different between the Dutch and English political commentaries were sentence fragments, colon climaxing devices, comma splicing and interrogatives. All these devices were more common in the Dutch texts. When he analysed the features that help make individual messages in the sentences prominent, Hannay found a statistically significant (p < .001) difference: the Dutch texts contained more of these devices. The high incidence of prominence devices meant that even though the combining style (i.e. complex sentences) was dominant in this genre in both languages, it was less dominant in the Dutch political commentaries.

From his analysis, Hannay concluded that both Dutch text types exhibited a ‘chopping style’. By this, he presumably means that a reader’s impression is of the text’s message being transmitted in short, forceful bursts. (A style usually referred to as ‘punchy’ and – in English genres – common in advertising, tabloid journalism and ‘easy read’ fiction.) In the argued texts, this choppiness was achieved by using sentence fragments, climaxing devices, relatively short sentences, and comma splices. By contrast, the English texts made more use of long and very long sentences, initially combined structures, coordination and final subordinate clauses. These characterisations of texts in the two languages bore out the contention (Hannay and Mackenzie, 1996: 42) that written Dutch is closer to spoken Dutch than written English is to spoken English. The contrast is particularly obvious from the higher incidence of questions and sentence fragments (i.e. sentences without verbs) Hannay found in written Dutch.

Hannay’s choice of the term ‘chopping’ to describe Dutch writing style could be seen as culturally pejorative: the implication is that British English writing style is smooth and ‘flows’. Indeed, when advising advanced Dutch learners how to write effective argued texts in English, Hannay and Mackenzie (1996: 177) say ‘There should be a smooth progression from one message to the next…’. The contrast between prototypical ‘choppy Dutch’ and ‘smooth English’ writing styles is reinforced by cultural differences in the use made of rhetorical devices to manipulate impact on the reader. Of relevance here is the contrastive research done by Geluyckens and colleagues on a corpus of Dutch and English business letters (100 NS Dutch, 100 NS English and 100 Dutch-authored English). These letters were analysed against the background of the politeness theory developed by Brown and Levinson (1987), which holds that writers (and speakers) mitigate their utterances to avoid threatening the face of their readers (or listeners). Geluyckens (1996) reports that in the Dutch NS corpus there was a much higher frequency of ‘bald-on-record’ requests (i.e. requests that were not accompanied by
politeness markers, such as ‘please’); in the NS English letters, only 1 out of 100 requests were of this type. Other differences between the Dutch NS and English NS writing were that in the Dutch NS letters there were more passives, fewer modals, more performative verbs (i.e. verbs like ‘ask’, ‘propose’, which ‘explicitly mark the speech act status of the request’, and far fewer ‘off-record strategies’ (i.e. using implication or vagueness). As the interlanguage letters (Dutch-authored English) were intermediate between the NS Dutch and NS English (i.e., the Dutch authors appeared to be transferring their ‘Dutch’ norms to their English writing), Geluyckens notes (several times) that because of this, the interlanguage correspondence risks being perceived as too direct (i.e. verging on the impolite) by NS readers.

One striking cultural difference between Dutch and English style conventions that is immediately apparent from a cursory comparison of printed texts in the two languages is the difference in paragraphing. The only attention this aspect has received to date has been in the context of warning Dutch authors and translators not to transfer the Dutch conventions into English (Burrough-Boenisch, 1994b, 1998; Hannay and Mackenzie, 1996; Lemmens and Parr, 1995). There have been no attempts to explicate the difference, although this has implications for rhetoric and for the schemata of Dutch and English writers and readers. Thus, NSs will know the English paragraphing conventions and the rhetorical signal conveyed by a printed paragraph (i.e. an orthographic paragraph). They will not understand the signalling function of Dutch paragraphing, however. In order to communicate effectively in both writing cultures, the Dutch author must therefore know the functions of paragraphs in both Dutch and English.

Both in English and in Dutch the paragraph (called an *alinea* in Dutch) is often defined as a cohesive unit of discourse, usually comprised of more than one sentence, and ‘…essentially a unit of thought, not of length’ (Gowers, 1986:70; Burrough-Boenisch, 1998: 12). The English and Dutch conventions for signalling a paragraph on the printed page (i.e. an orthographic paragraph) vary, however. In his review of the development of the paragraph in English, Lewis (1894) noted that in the 15th century, indentation became a method of marking the beginning of a new paragraph. This is still the most usual way to mark the start of a paragraph in English – certainly in academic texts (McArthur 1992: 748). Tschichold (1988) notes that in the early 20th century (some time, therefore, after Lewis’s history of the English paragraph), certain printers in England dispensed with the indentation. Though this practice did not catch on in England, it was adopted by German printers. Tschichold (1988: 57) notes that in the United Kingdom, France, Scandinavia and America, the unindented paragraph has remained unusual and has only become widespread in Germany and Switzerland. His Dutch translator has, however, added a footnote that in the Netherlands it is
also common. Renkema (1995: 37) notes that paragraph indentation is becoming rare in Dutch. Thus, here we have an example of German and Dutch publishing practice being different from Anglo publishing practice.

The orthographic convention Dutch writers and publishers use to give a paragraph visual prominence on the printed page is important because the concept of the alinea is more complex than the English paragraph. Confusingly, the word alinea is used to refer to a small unit of text that forms a train of thought or line of reasoning, and also to an assemblage of these alinea’s, which together form a larger unit. The distinction between a long paragraph and the smaller paragraphs embedded within it is not conceptually alien to English. Harris (1990) has pointed out that in English the conceptual paragraph or paragraph bloc sometimes comprises two or more physical (i.e. orthographic) paragraphs; there is, however, no tradition of making this distinction visual by orthographic means. The only device possible in English publishing is to use a double blank space to mark an abrupt or unusual paragraph break (a ‘spaced paragraph’, in Lewis’s (1894) typology). This is rarely used. Lewis (1894: 15) noted that in the 17th and 18th centuries, English paragraphs were often separated by wide spaces ‘…but this is a printer’s convenience, and has no connection with the modern way of double spacing before an unusual break in the sense’ (my italics).

The Dutch convention is to use blank lines to mark the boundaries of the conceptual alinea (van der Horst, 1997: 74; Burrough-Boenisch, 1998: 12-13). The alinea’s that together make up that larger unit are marked typographically by beginning on a new line – usually unindented. This visually differentiates between the conceptual paragraph and its component parts. The Dutch orthographic signalling of cohesion has implications for reading and writing. I will elaborate on these in chapter 4, when discussing the paragraphing experiment I conducted on Dutch and English readers, and again in chapter 6, in the discussion of the cohesion of Dutch-authored English.

The foregoing brief review of differences between Dutch and English discourse and rhetoric has shown that in the genres studied so far, Dutch style is more punchy and more direct than English style and that Dutch has an

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6 When drawing attention to this practice, NS authors living in the Netherlands and writing in English have used the term ‘subparagraph’ for these smaller alinea’s (Burrough-Boenisch, 1998; Hannay and Mackenzie, 1995). This is misleading, as it suggests subparagraphing is an option in English. It is not, which is why ‘subparagraph(ing)’ is not referred to in standard style manuals (e.g. Hart’s Rules for Compositors and Readers and reference books (e.g. McArthur, 1992) aimed at NS readers.

7 Hatim (1997: 58-59) notes that the existence in written Arabic of orthographic and conceptual paragraphs that do not necessarily coincide, often confuses translators.
orthographic device for signalling cohesion. The question now arises of whether similar differences exist between Dutch and English scientific style, specifically in the research article genre. Unfortunately, to date there has been no contrastive research on this. To remedy this, I will now discuss some of the ways the genre differs between the two cultures. This leads up to an exploratory analysis of extracts of Dutch and English research article texts, to establish whether, as in the case of the genres examined by Hannay and colleagues and Gelykens and colleagues, there are quantifiable differences between the two cultures.

Differences between English and Dutch scientific writing

Differences in the evolution of scientific writing

The first thing to note when comparing English and Dutch scientific writing are the similarities and differences in the way the writing traditions have evolved in the two cultures. Bazerman (1988) has traced the evolution of the English-language research article in science by looking at several hundreds of years of Philosophic Transactions of the Royal Society of London, the articles on stereoscopy in the Physical Review from 1893-1980, and three modern psychology journals Philosophische Studiën (founded 1883), American Journal of Psychology (1887) and Psychological Review (1894). His study of the articles in Philosophic Transactions revealed that from 1665 to 1800 there was a shift in the epistemology of science: the ‘experiment’ moved from any made or done thing, to intentional investigation, to test of theory, to proof or evidence for a claim. As experiments acquired an argumentative function, there was a need for more detail to be given on methods. The early experiments were demonstrations for communal witnesses at the Royal Society, who verified that experimental events had indeed taken place. In later years, when reporting research, the researcher had to establish his credibility via his rhetoric. The scientific rhetoric was thus shaped by the need to establish the plausibility and the replicability of the experiment. These remain the tenets underlying the reporting of science in research articles today (see Kaplan and Grabe, 1991: 209-213; Swales, 1990: 117-127).

The English-language research article transcended national boundaries and is now universally known and used by the global scientific community. In Britain and the United States, the language in which the scientific article was and is written has never been an issue. This has not been the case in non-anglophone cultures. Herein lies a fundamental difference between the development of the ‘Anglo’ (American/British) research article and the development of the genre in the Netherlands – or, indeed, in those countries whose language has long been known and used by European
intellectuals in the arts and sciences. Examples of the latter countries are France and Germany; both have a long tradition of publishing in the national language, which continued until the mid-20th century. The assumption was that educated and interested scientists outside France and Germany would be able to read French and German. Obviously, in the case of a minority European language, no such assumption can be made, which is why the language in which Dutch scientists have published has changed over the centuries, reflecting the lingua franca of the discourse community. At this point, therefore, I propose to sketch the language shifts Dutch scientists have made in the last 400 years when reporting their research and ideas.

There has long been a linguistic tension in the Netherlands, between using and promoting the language of national identity – Dutch – and the need to communicate internationally for trade, diplomacy or science. Van Berkel et al. (1999) have described how in the fifteenth and sixteenth centuries, when Brussels was the cultural capital of the Low Countries, Dutch intellectuals used French for international communication. But in the 16th century the struggle for independence was accompanied by a resurgence in the use of the Dutch language, with a key protagonist being the mathematician Simon Stevin (1548-1620). According to Van Berkel et al. (1999: 20), Stevin believed that 'because of its special structure', Dutch was the language 'best suited for serving as the vehicle of science', especially because of ‘the way in which compounds and compound words were formed in Dutch’. At the end of the 16th century, patent applications were being written in Dutch, and students at the Leiden engineering school founded by Stevin in 1600 (but defunct by 1679) were taught in Dutch. However, from its foundation in 1575, Leiden University used Latin (which was the language of instruction in all Dutch universities until deep into the 19th century). Meanwhile, the language of diplomacy and at court remained French. For these reasons, the mathematician, astronomer and physicist Christiaan Huygens (1629-1695), whose family was closely associated with the House of Orange, wrote in Latin and French rather than in Dutch.

Although the advent of printing presses increased the dissemination of Dutch via printed books, French continued to be important. The publications of Hollandsche Maatschappij der Wetenschappen (18th century) and the Royal (Netherlands) Academy of Arts and Sciences (19th century) were in that language. In the 19th century, Dutch scientists were also publishing in German, and at the end of that century popular scientific periodicals in Dutch proliferated. Overbeke (2000) has noted how, in 1856, the Dutch medical journal Nederlands Tijdschrift voor Geneeskunde (of which he is the editor) was formed as a fusion of five of the nine Dutch-language medical journals in existence in the 1850s.
In the early decades of the 20th century, Dutch science became more international: Dutch scientists attended congresses abroad and some took up posts in Germany and the United States (Rupp, 1997). But it was not until the mid-20th century that English succeeded German as the language used by Dutch scientists to communicate internationally.

The shifts in the language Dutch scientists have preferred for communicating internationally must have had some impact on the evolution of Dutch scientific discourse and rhetoric. It is beyond the scope of this thesis to investigate this fascinating topic in detail; suffice it to say that in the course of the 20th century, the discourse and rhetoric underlying scientific Dutch moved from German to English – more particularly, to American English (Rupp, 1997; van Els, 2000). It is for other researchers to investigate which – if any – vestiges of the German (and possibly even French) intellectual traditions remain in scientific Dutch, and to look for evidence of the anglicisation of Dutch scientific discourse since the mid-20th century. What I hope to have made clear here, is that rhetorically, scientific Dutch is a hybrid of several European discourse traditions, augmented most recently by a major input from America. By contrast, scientific English has had negligible input from writing cultures other than anglophone ones.

**Differences in the organisation of English and Dutch research articles**

In English, experimental research is typically reported in IMRAD (Introduction, Methods, Results and Discussion) format (Swales, 1990; Burrough-Boenisch, 1999a), and the resulting articles also have an Abstract and References. The headings in these articles are therefore standardised, as is the order in which they appear. (Though Methods sections are sometimes relegated to the end of the article: Berkenkotter and Huckin, 1995a.) In Dutch scientific writing there is an exact equivalent of IMRAD: *Inleiding – Methoden – Resultaten – Beschouwing* (Overbeke et al., 1999: 23, 86-88). However, Lamers (1993:72) contends that there are two variants of the research paper that Dutch authors may choose from: the Anglo-Saxon and the European. The difference is in where the discussion takes place. On the basis of an examination of numerous research articles in Dutch and English (Lamers, personal communication, 1999) he maintains that in the European model the discussion is included with the results (after tables, graphs, diagrams and interpretation). The main parts of the article are therefore Introduction, Materials and Methods, Results, Conclusions, and Application.

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8 Bazerman (1988) refutes the popular belief that the influx of German-speaking scientists into America before and after World War II resulted in Germanic features such as noun clusters and complex sentences entering American scientific English.
and Recommendations. In the Anglo-Saxon model the discussion is kept out of the Results section (which merely contains graphics and interpretation) and appears in its own section: the Discussion. The Anglo-Saxon model is therefore Introduction, Materials and Methods, Results, Discussion, Application and Recommendations.

Lamers’s conclusions about the water-tightness of the contents of Results and Discussion sections of ‘Anglo-Saxon’ type papers are questionable. There is evidence of ‘leakage’ into other paper sections. For example, based on a study of American-authored articles in five sociology journals, Brett (1994) suggested that the Results sections of sociology articles contain more discussion than the Results sections in the hard and applied sciences. (The implication being that there is some – but not as much – discussion in the Results sections of hard and applied sciences.)

The rhetorical route a research article follows, as signposted by the standardised IMRAD headings, was discussed above. But the rhetorical thread running through the individual sections of a paper is also important. In chapter 2, Swales’s (1990) CARS (Create A Research Space) paradigm for describing the three rhetorical moves that typically occur sequentially in the Introduction section of an English-language research paper was mentioned. It will be recalled that the three moves were: ‘establishing a territory’, ‘establishing a niche’ and ‘occupying a niche’. Each can be broken down into one or more steps. For example, to establish a territory an author claims centrality and/or makes topic generalisations and/or reviews items of previous research. By contrast, Dutch research article Introductions go further and generally conclude with metadiscourse or forward referencing. Thus, Overbeke et al. (1999) characterise the Introduction to a biomedical research article in terms of meeting three aims. The first two, which more or less coincide with Swales’s moves, are: providing background to the current research (usually, by referring to previous literature) and describing the scientific problem that was the goal of the research. However, the third is formulating that problem as a series of questions or issues and outlining how these were tackled.

A contrastive study of scientific Dutch and English

Faced by a lack of contrastive Dutch/English research on other linguistic and rhetorical features of scientific writing, in 1998 I conducted a small-scale exploratory study. The aim was to ascertain whether there are measurable differences between the features of Dutch and English scientific writing. This information is useful for two reasons: first, because traits identifiable as ‘Dutch’ would be helpful when deciding whether ‘un-English’ features of Dutch-authored English science texts are ‘learner English’ or have been transferred from Dutch. Secondly, examining the writing of scientific research
For this small-scale orienting study I took extracts from the introductions of landscape ecology (a subdiscipline of biology) articles in refereed Dutch-language publications and compared them with comparable introductions from British-authored articles in refereed English-language publications. When comparing science journals in a minority European language such as Dutch with science journals in English – the language of global science communication – there is inevitably a problem of journal status, because Dutch scientists obtain more kudos for publishing in international refereed journals than in Dutch-language journals. Furthermore, the fact that Dutch-language journals in a specialised branch of science have a readership restricted to Dutch-speaking, Flemish-speaking and possibly Afrikaans-speaking readers (and contributors), whereas British-English science journals are read worldwide, means that there are far fewer Dutch journals to choose from for a study such as this. Nevertheless, there are two reputable refereed Dutch-language journals in ecology published in the Netherlands: Landschap and De Levende Natuur. Both carry articles by academics and researchers. Their readership largely overlaps (personal communication from the editors), but De Levende Natuur targets biologists working in land management and nature conservancy (for municipalities, consulting engineers, or research institutes) rather than those in academia. Nevertheless, the articles in De Levende Natuur are often by academics.

Initially, two refereed English-language journals were used as sources of texts: Journal of Applied Ecology and Journal of Ecology. Both are published by the British Ecological Society (but have different Editorial Boards). As its title implies, Journal of Applied Ecology focuses more on the practical application of ecological research: according to its editor, papers submitted to Journal of Applied Ecology must ‘demonstrate relevance to applied issues’ (personal communication M. Pienkowski, 1998). After a preliminary analysis of the data had revealed that there was much less difference between the Journal of Applied Ecology and Journal of Ecology texts than between the Landschap and De Levende Natuur texts, however, I decided to add a British-based applied ecology journal more comparable with De Levende Natuur, i.e. aimed at land managers as well as at academics. On the advice of members of the European Association of Science Editors, I chose Biological Conservation.

The British journals were much more international than the Dutch; they carried many articles by non-British (American, Commonwealth and European) authors. The volumes of the Dutch journals I consulted (for the
Four criteria were used when selecting the articles from the five journals:

2. At least one author affiliated to a university or research institute. (in the UK for the English texts; in the Netherlands for the Dutch texts).
3. Article based on empirical work, i.e. not describing policy
4. Subject matter preferably vegetation science

Criterion 1 was to ensure the sample reflects writing style of the late 1990s. Criteria 2 and 3 were to ensure that the texts would be examples of the research article genre. Criterion 4 was aimed at obtaining a subject matter match with texts used for the planned reception study involving journal readers and reviewers, which forms the core of this thesis.

The final corpus was as follows (the articles are listed in Appendix 3.1):

6 from Biological Conservation (all published in 1998)
5 from Journal of Applied Ecology (ditto)
6 from Journal of Ecology (ditto)
7 from Landschap (publication years 1996, 1997 and 1998)
5 from De Levende Natuur (ditto)

Each text extract analysed comprised the first 500 words of the actual article (rounded up to the end of a sentence), excluding the Abstract or Summary. Not included in the word count were headings, author names and/or dates appearing in parentheses, the article title and any introductory heading. The Dutch texts all began with a typographically distinct lead-in that functions similarly to the Abstract or Summary in the English texts (personal communications from the editors of these journals). These lead-ins were ignored and the sample was taken from the first 500 words of the true article (effectively, the Introduction). When counting the words, I took both closed compounds (e.g. farmland, silvoarable, blauwgraslandvegetatie, grondwatermodel) and hyphenated forms (e.g. well-advanced, self-compatible, fosfor-beschikbaarheid, model-interface) to be instances of single words. I also treated notions such as m², °C, 1996 as if they were single words.

The data collected can be grouped under three, not necessarily exclusive, headings: genre attributes, rhetorical features and linguistic features.
Genre attributes

To confirm that the texts in both languages were indeed sampled from the same genre, I counted the number of **instances of parenthetical references**. These are common in the Introduction section of a research article, where their function is to substantiate claims (Swales, 1990).

A rhetorical device that is also an attribute of the research article genre (Hyland, 1998a; Myers, 1992; Ventola, 1997) is hedging. It has been defined by Mauranen (1997) as the deployment of ‘expressions which within their context reduce the certainty or precision of propositions’. As hedges and the theory on hedging are discussed at length in chapter 7, suffice it to say here that the **instances of hedges** collected for this contrastive analysis were words and phrases signalling reduced commitment to the strength of a claim. Thus, they included: phrases with modal adverbs or adjectives (e.g. mogelijk [possible], vaak [often], waarschijnlijk [apparently]); expressions including modal verbs (e.g. may contribute, kan geschieden [may occur]; lexical verbs (e.g. werden geacht [were considered], are thought to be). 9 In a few cases, the Introduction section was very short and therefore the 500-word sample extended into the next section (usually a section describing the methods, fieldwork area or experimental set-up). This may have influenced the data collected on hedging, as hedging is rare in Methods sections (Hyland, 1996).

Though academic texts in general and scientific texts in particular are characterised by a high incidence of passives (Biber, 1988; Grabe and Kaplan, 1996: 159), in view of Cornelis’s (1996) contention that there is a difference between the Dutch and English passive forms (see earlier in this chapter), I decided not to collect data on this textual feature.

Linguistic features

According to Grabe and Kaplan (1996: 159), one of the characteristics of scientific writing is long sentences. But ‘long’ is a relative concept and might

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9 The two instances of the Dutch verb blijken (van der Hoek and Braahekke, 1997) were considered carefully, because though this verb can mean ‘appear’ (a hedge) it is often best translated as the assertive ‘be shown’ or ‘prove’ Donaldson (1990:15). Thus, the options for translating ‘*Uit historische-floristische gegevens blijkt dat er in de laatste decennia een verschuiving is opgetreden van plantensoorten…* (van der Hoek and Braahekke, 1997) are ‘From historical floristic data it appears/has been shown that in recent decades there has been a shift in species’. Similarly ‘Het verwijderen van voedingstoffen blijkt echter op langere termijn niet altijd tot het gewenste resultaat te leiden…’ (van der Hoek and Braahekke, 1997) are ‘The removal of nutrients appears not always to lead to the desired result in the longer term, however”. In both cases, I opted for the connotation ‘appears’ (i.e. a hedge).
vary between cultures. Hypothesising that there might be a cultural difference in preferred sentence length similar to the one reported by Hannay (1997), which I discussed earlier in this chapter, per text extract I therefore collected data on number of sentences and sentence length (number of words). Hannay (personal communication, January 1999) did not take any account of the Dutch predilection to clump words to form closed or hyphenated compounds such as ‘plantsoort’, ‘NH3-emissie’ that in English would be expressed in separate words (‘plant species, ‘NH3 emission’). Suspecting that science texts, whether Dutch or English, would contain many more compound words than the newspaper articles and fund-raising letters Hannay analysed, I counted the number of solid and hyphenated compounds in the Biological Conservation, Journal of Applied Ecology, Journal of Ecology, Landschap and De Levende Natuur text samples. To ascertain the effect on mean sentence length of making allowance for the compounds, I did a second estimate of sentence length, assuming that each compound word is equivalent to two words. So, I increased the total number of words in each text sample by the number of compounds and then recalculated the mean number of words per sentence. This recalculated – longer – sentence length is henceforth referred to as adjusted sentence length.

Given the difference in paragraphing conventions between Dutch and English, I wondered whether there would be shorter paragraphs in the Dutch texts. I therefore counted the number of paragraphs per text extract.

Rhetorical features

Above, I noted that data on hedging were collected as a genre attribute rather than as a rhetorical feature. The class ‘rhetorical features’ comprised data on rhetorical questions, occurrence of personal pronouns and presence of forward referencing. I counted the rhetorical questions because Hannay (1997) had noted a Dutch predilection to use rhetorical questions in discourse. There is also indirect evidence for this practice, in the form of the admonishments directed at Dutch students to avoid rhetorical questions when writing formal academic English (Hannay and Mackenzie, 1996: 329; van der Laaken et al., 1991: 38). Yet rhetorical questions are said to be scarce in scientific English (Grabe and Kaplan, 1996: 159).

I counted instances of authors using personal pronouns (I/we, ik/wij) to refer to themselves, partly because the use of personal pronouns is controversial in science writing and partly because I expected to find a difference between the Dutch and English texts. The view that because the reporting of science is objective, personal pronouns must be avoided, is challenged in the leading textbooks on writing scientific English authored by practising scientists and/or editors (e.g. Day, 1995; Matthews et al., 1996;
O’Connor, 1991). However, many (conservative) scientist-authors continue to use strategies that avoid personal pronouns (one such strategy is to use passives). Biber’s (1995) concordance analysis of texts from a variety of genres demonstrated that restrained use of personal pronouns is a feature of academic writing, so scientific research articles, which are a subset of the ‘academic writing’ genre can be expected to show the same trait. But given the contention (Hannay, 1997; Hannay and Mackenzie, 1996) that written Dutch is more like the spoken form of the language (e.g. more use of rhetorical questions, sentence fragments), one might expect more use of ‘ik/wij’ in Dutch science writing.

Clyne (personal communication, February 2000) contends that academic Dutch writing has more forward referencing (i.e. text reflexivity) than comparable German writing and that its linearity (sensu Kaplan, 1966) is even more marked than that of English writing. An example of the former is the synopsis that almost invariably concludes the introductory chapter to a Dutch doctoral thesis (it is usually headed ‘Structure of this thesis’ and is, in effect, an extended Table of Contents) and that is frequently incorporated as the last paragraph of an article Introduction. For each text extract, I recorded whether such a synopsis was present.

**Analysis of the data**

Descriptive statistics for all the data except forward referencing (for which ‘presence/absence’ was recorded) are presented in Table 3.1a. Table 3.1b summarises the results of an ANOVA with language as an independent variable (thus with df = 1). The ANOVA revealed that the effect of language on number of references in parenthesis was not statistically significant, confirming that these sets of texts were from an academic genre. No effect of language was found for rhetorical questions either: the low frequencies of occurrence must have played a role.

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10 Hannay and Mackenzie (1996: 44) and van der Laaken *et al.* (1991: 20) advise Dutch advanced learners of English to avoid personal pronouns when writing academic English.

11 Or, ‘Organisation of this thesis’. As noted in chapter 1, this thesis does not follow the Dutch convention.

12 All statistical analyses in this thesis were performed using SPSS software.

13 Though the numbers are small, it is worth noting that four of the 12 Dutch texts contain rhetorical questions, compared with only one (of 11) English text. Note too that in the single English text exhibiting this feature, the questions were actually the three research questions the research set out to answer, i.e. the questions were not purely rhetorical.
Table 3.1a Descriptive statistics for eight genre, linguistic and rhetorical attributes of the English and Dutch text extracts

<table>
<thead>
<tr>
<th>Text attribute</th>
<th>English texts</th>
<th>Dutch texts</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N = 17</td>
<td>N = 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>References</td>
<td>9.18 3.94</td>
<td>6.75 1.51</td>
<td>2 11</td>
<td>1 4</td>
</tr>
<tr>
<td>Hedges</td>
<td>3.76 1.92</td>
<td>1.92 1.51</td>
<td>1 4</td>
<td>0 4</td>
</tr>
<tr>
<td>Sentence length</td>
<td>27.27 3.53</td>
<td>20.03 3.71</td>
<td>20.30 24.90</td>
<td>18.00 24.90</td>
</tr>
<tr>
<td>Adjusted ditto</td>
<td>27.93 3.60</td>
<td>21.71 4.06</td>
<td>20.40 27.60</td>
<td>20.03 27.60</td>
</tr>
<tr>
<td>Compound words</td>
<td>14.76 10.85</td>
<td>47.08 11.77</td>
<td>0 38</td>
<td>24 60</td>
</tr>
<tr>
<td>Paragraphs</td>
<td>4.35 1.06</td>
<td>1.68 3.80</td>
<td>3 8</td>
<td></td>
</tr>
<tr>
<td>Rhetorical questions</td>
<td>0.18 0.73</td>
<td>0.42 0.67</td>
<td>0 2</td>
<td></td>
</tr>
<tr>
<td>Personal pronouns</td>
<td>1 1.27</td>
<td>0.92 1.62</td>
<td>0 5</td>
<td></td>
</tr>
</tbody>
</table>

Table 3.1b Results of ANOVA run on the eight genre, linguistic and rhetorical attributes of the English and Dutch text extracts shown in Table 3.1a, with text language as independent variable (thus df = 1)

<table>
<thead>
<tr>
<th>Text attribute</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>References</td>
<td>3.40</td>
<td>0.076</td>
</tr>
<tr>
<td>Hedges</td>
<td>7.72</td>
<td>0.010</td>
</tr>
<tr>
<td>Sentence length</td>
<td>28.32</td>
<td>0.000</td>
</tr>
<tr>
<td>Adjusted ditto</td>
<td>18.93</td>
<td>0.000</td>
</tr>
<tr>
<td>Compound words</td>
<td>58.21</td>
<td>0.000</td>
</tr>
<tr>
<td>Paragraphs</td>
<td>4.40</td>
<td>0.045</td>
</tr>
<tr>
<td>Rhetorical questions</td>
<td>0.82</td>
<td>0.374</td>
</tr>
<tr>
<td>Personal pronouns</td>
<td>0.02</td>
<td>0.878</td>
</tr>
</tbody>
</table>

The ANOVAs revealed a highly significant (p< .001) effect of language on sentence length, on adjusted sentence length, and therefore also on number of compound words. The effect of language on the number of hedges and the number of paragraphs was significant (p< .050).

Although only four of the 12 Dutch texts contained personal pronouns, compared with nine of the 11 English texts, the ANOVA did not reveal a significant effect of language on this feature.

The presence/absence data on forward referencing revealed that this was rare in the English articles. Though several of the English-language articles alluded to what had been the aim of the research described, only one (Griffiths et al., 1998) contained synopsis-type forward referencing: [4] (the last paragraph of the Introduction).
In this paper we describe changes in the number of slugs trapped in the agroforestry experiment for a 4-year period beginning 3 years after the trees were planted. We then describe more detailed comparisons of slug numbers during one season and relate these to the levels of damage sustained by a pea crop.

By contrast, five of the 12 Dutch text extracts contained a sentence summarising the article (usually beginning with the Dutch equivalent of ‘This article describes…’). A further three contained synopses. An extreme example is shown in [5] (Kemmers, 1996). The citation is preceded by two sentences that explain ‘the central question’ (de centrale vraag) of the article.

Eerst zal kort worden stilgestaan bij enkele kwaliteitsaspecten van het oppervlaktewater. Vervolgens worden de mogelijk aangrijpingspinten van deze waterkwaliteitsvariabelen op ecosysteem processen in de bodem aangegeven. Hierna worden humusprofielkenmerken geïntroduceerd. Vervolgens worden enkele relevante chemische eigenschappen van het humusprofiel besproken. Via de analyse van bestaand onderzoeksmateriaal wordt voor vier ecotooptypen een verdrogingsreeks van humusprofieltypen gepresenteerd. Tenslotte worden richtlijnen geformuleerd ...

[First, a few words will be devoted to some aspects of the quality of surface water. Then, possible applications of these water quality variables on ecosystem processes in the soil will be given. After this, humus profile characteristics will be introduced. Then, some relevant chemical properties of the humus profile will be discussed. Via the analysis of existing research material, a ‘droughting’ series of humus profiles is presented. Finally, guidelines are formulated …]¹⁴

I would argue that this small sample suggests that, in accordance with Clyne’s contention, there is a tendency for Dutch authors to favour forward referencing.

As all the text extracts were from published articles and therefore had undergone editing, I wondered whether the textual features I had examined might reflect not only an Anglo versus Dutch difference but also editorial policy. To check, I reran the ANOVAs, but this time used journal as the independent variable (thus df = 4). In this run the dependent variables

¹⁴ In my translation, in order to give a flavour of the rhetoric I have deliberately not refocused sentences, nor have I combined clauses.
examined were number of hedges, adjusted sentence length, number of paragraphs and number of personal pronouns. The descriptive statistics are shown in Table 3.2a, the ANOVA results in Table 3.2b.

**Table 3.2a** Descriptive statistics for four of the text attributes, by journal. BC = Biological Conservation; JAE = Journal of Applied Ecology; JE = Journal of Ecology; L = Landschap; LN = De Levende Natuur. To assist identification, the information on the Dutch journals is given in bold italics.

<table>
<thead>
<tr>
<th>Text attribute</th>
<th>Journal</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hedges</td>
<td>BC</td>
<td>6</td>
<td>4.17</td>
<td>1.83</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>JAE</td>
<td>5</td>
<td>4.20</td>
<td>2.59</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>JE</td>
<td>6</td>
<td>3.00</td>
<td>1.41</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>L</td>
<td>7</td>
<td>2.14</td>
<td>1.86</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>LN</td>
<td>5</td>
<td>1.60</td>
<td>0.89</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Adjusted sentence length</td>
<td>BC</td>
<td>6</td>
<td>27.33</td>
<td>4.13</td>
<td>21.80</td>
<td>31.70</td>
</tr>
<tr>
<td></td>
<td>JAE</td>
<td>5</td>
<td>27.98</td>
<td>2.78</td>
<td>26.00</td>
<td>32.60</td>
</tr>
<tr>
<td></td>
<td>JE</td>
<td>6</td>
<td>28.48</td>
<td>4.16</td>
<td>20.40</td>
<td>32.30</td>
</tr>
<tr>
<td></td>
<td>L</td>
<td>7</td>
<td>23.50</td>
<td>3.40</td>
<td>18.40</td>
<td>27.60</td>
</tr>
<tr>
<td></td>
<td>LN</td>
<td>5</td>
<td>19.20</td>
<td>3.81</td>
<td>15.90</td>
<td>23.70</td>
</tr>
<tr>
<td>Paragraphs</td>
<td>BC</td>
<td>6</td>
<td>4.17</td>
<td>0.75</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>JAE</td>
<td>5</td>
<td>5.20</td>
<td>1.30</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>JE</td>
<td>6</td>
<td>3.83</td>
<td>0.75</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>L</td>
<td>7</td>
<td>5.00</td>
<td>1.53</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>LN</td>
<td>5</td>
<td>6.00</td>
<td>1.87</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Personal pronouns</td>
<td>BC</td>
<td>6</td>
<td>0.17</td>
<td>0.41</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>JAE</td>
<td>5</td>
<td>2.20</td>
<td>1.64</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>JE</td>
<td>6</td>
<td>0.83</td>
<td>0.75</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>L</td>
<td>7</td>
<td>0.43</td>
<td>1.13</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>LN</td>
<td>5</td>
<td>1.60</td>
<td>2.07</td>
<td>0</td>
<td>5</td>
</tr>
</tbody>
</table>

**Table 3.2b** Results of ANOVA run on the four text attributes shown in Table 3.2a, with journal as independent variable (thus df = 4).

<table>
<thead>
<tr>
<th>Text attribute</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hedges</td>
<td>2.341</td>
<td>0.084</td>
</tr>
<tr>
<td>Adjusted sentence length</td>
<td>5.995</td>
<td>0.002</td>
</tr>
<tr>
<td>Paragraphs</td>
<td>2.416</td>
<td>0.077</td>
</tr>
<tr>
<td>Personal pronouns</td>
<td>2.374</td>
<td>0.081</td>
</tr>
</tbody>
</table>
At this level of analysis there were significant effects of journal on the adjusted sentence length only. A post hoc test (Tukey) revealed that *De Levende Natuur* differed significantly from *Biological Conservation* \( (p = .011) \), *Journal of Applied Ecology* \( (p = .008) \) and *Journal of Ecology* \( (p = .003) \). We may therefore conclude that its shorter sentences (see Table 3.2a) were significantly shorter than those of the other journals.

**Discussion of the results**

The statistical analysis using language as the independent variable suggested that there are indeed Anglo versus Dutch cultural differences in hedging, sentence length and paragraph length, with the Dutch texts exhibiting less hedging, and shorter sentences and paragraphs. This would seem to confirm the findings of research on other Dutch and English genres that I discussed earlier in this chapter, and my contention that the existence of the *alinea* (i.e. ‘subparagraph’) option in Dutch predisposes Dutch authors to use shorter paragraphs.

It is interesting to compare the findings on sentence length with sentence lengths reported in other analyses of scientific research articles. As Table 3.1a shows, the mean number of words per sentence was 27.3 for the English texts and 20.0 for the Dutch. The mean sentence length Bazerman (1988) found for the articles he analysed in *Physical Review* was 23.7 words. Ventola (1991) reports a study by Nwogu (1990: 116) that found a mean sentence length of 25.8 words for 15 native English medical articles; in her own contrastive analysis of Abstracts from a medical journal (four German NS Abstracts and their English (i.e. NNS) versions) Ventola found a mean sentence length of 20.6 words for the German texts and only 14.9 words for the NNS English texts.

At first sight, the finding that there was a significant effect of language on the number of compound words in the texts is trivial, as compound words are much more common in Dutch than in English (see Hannay and Mackenzie, 1996: 284). However, it is clear that much of the information in the Dutch texts in this corpus is conveyed via compound words. This affects the appearance of the text (lots of long words) and, presumably, the readability, as the incidence of ‘long’ words is a feature of readability assessments such as the Gunning-Fog index. One way of compensating for the high density of information carried in these long compound words could be to reduce sentence length, which might be a factor driving editorial policy – especially if the targeted readership are practitioners rather than scientists (as is the case for *De Levende Natuur*). This does indeed seem to be the case: in all the post hoc Tukey tests, when the five journals
were grouped into homogeneous subsets (for adjusted sentence length, number of paragraphs and number of hedges) *De Levende Natuur* was always at one extreme, with either *Journal of Applied Ecology* or *Journal of Ecology* at the other.

To ascertain possible editorial influence on the text features I examined, in November 1998 I contacted the journal editors and asked them about aspects of their editing policy. All five confirmed that their practice was to edit manuscripts to improve style. As regards sentence length, the *Journal of Ecology* editor edited to join up ‘short jerky sentences’ but split up ‘long complicated sentences’. The *Biological Conservation* editor also shortened ‘overlong’ sentences (which he defined as sentences of 30 – 40 words). The *Journal of Applied Ecology* editor encouraged short sentences (‘They are easier to read and lead to greater comprehension’), as did the editors of *Landschap* and *De Levende Natuur*. The statistically significant effect of language on sentence length I found (Tables 3.1b and 3.2b), however, suggests that the English ‘short’ sentence is longer than the Dutch short sentence.

The *Journal of Ecology* and *Biological Conservation* editors reported that they occasionally added hedges; the *Journal of Applied Ecology* editor tended to discourage hedging in Results and Discussion, but encouraged it ‘where some provisos are necessary’ – usually in the Discussion. The *Journal of Ecology* and *Biological Conservation* editors respected the author’s decision about whether or not to use personal pronouns, as did the *Landschap* editor; the *Journal of Applied Ecology* editor encouraged personal pronouns (again, because this ‘makes for easier reading’), but the *De Levende Natuur* editor aimed to remove all personal pronouns, so as to relegate the author to the background and allow all attention to focus on the science (but Table 3.2a shows that personal pronouns did slip through).

The editors’ responses show that editorial influence should not be ignored when presenting the results of analyses of published research articles. Of course, in this case the editors themselves belong to one of the language groups, so may be seen as reinforcing a cultural attitude regarding desirable textual features.

The tentative conclusion about forward referencing must also be qualified in terms of how the Dutch and English journals prepare readers for the main body of the article. Though articles in the two Dutch journals are not preceded by a clearly labelled Summary, distinctive lead-in texts ‘prime’ the reader about the article’s content. In both Dutch journals, the lead-in is about 75 words long; in *Landschap* it is set in bold type, in *De Levende Natuur* it is printed in a larger font. The journal editors instruct authors to write a ‘*pakkende inleiding*’ (attention-grabbing introduction). In both journals, the entire article is set in columns (two per page for *Landschap*, three for *De*
Levende Natuur) and there is no mandatory heading ‘Introduction’. The lead-in is therefore distinctive because of its typography and its attention-grabbing style. In all three English journals the convention is to begin with a Summary (Journal of Applied Ecology, Journal of Ecology) or Abstract (Biological Conservation), which in Journal of Applied Ecology and Journal of Ecology is a centred block of text. In the latter two journals the Summary is a series of numbered points (as prescribed by the British Ecological Society). In Biological Conservation the Abstract is italicised. All three English journals also clearly label the beginning of the main body of the article with the heading ‘Introduction’, and all have two columns of text. It could be argued that the formal, standardised ‘Abstract/Summary, Introduction’ sequence of headings makes it less likely that authors will include synopsis paragraphs in their Introductions (and increases the probability that the journal editors will edit out such synopses because they repeat the Abstract/Summary). Thus, what seems to be driving the apparent Anglo versus Dutch difference in incidence of forward referencing by means of a synopsis is journal policy and house style – but these are also products of the respective writing cultures.

Conclusions from this study

Though small-scale, this reconnaissance study indicates that there are measurable differences between Dutch and English scientific discourse. The clearest cultural attributes that emerged were sentence length and use of hedging. The finding that short sentences characterise Dutch writing is interesting on two counts: first because it suggests that the move in the 20th century of Dutch academia, science and business from German as the preferred international language to English has been reflected in a change in style norms in Dutch. Thus, at the start of the 21st century, arguably under the influence of American advice on writing for improved readability, many genres of written Dutch (including scientific) feature short sentences – shorter than what is the norm in equivalent German or English genres. Whatever the reason for the current Dutch favouring of short sentences, empirical evidence for this (as reported above, but also by Hannay, 1997) allows us to attribute this feature, when it occurs in Dutch-authored English, to current Dutch writing culture. In the case of Dutch writers, then, short sentences in English cannot be attributed solely to learner English (see Hayes, 1996: 24: ‘writers who are learning a new language would be expected to produce short sentence parts’). The study I report above has also shown that idiosyncratic editorial policy and journal layout affect the incidence of certain textual features (e.g.  

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15 The editor of Biological Conservation reported that he would edit out such ‘mini synopses’ (B.K. Davis, personal communication, February 2001).
marked forward referencing and the occurrence of personal pronouns). This reinforces the point made in chapter 1, that in the published scientific text the author’s voice has been changed by input from language professionals.

**Features of Dutch scientific English**

After the foregoing contrastive review of Dutch and English writing in general and of scientific writing in particular, it is now possible to suggest features that a Dutch scientist might transfer into written English. Three groups of transfers come to mind: surface features, rhetorical devices and linguistic transfers. The candidate **surface features** for transfer are paragraph orthography (*alinea’s*) and sentence length (short). The candidate **rhetorical devices** are hedges (fewer) and forward referencing (more). The contrastive study described above justifies distinguishing these as cultural traits, rather than as ‘language learner’ traits (i.e. the outcome of strategies to avoid writing long sentences and using ‘difficult’ modal verbs).

The **linguistic transfers** are language-learner errors. They have been described in detail elsewhere (Burrough-Boenisch, 1998). At word level, they include many of the errors described by James (1998). One example would be false cognates (or ‘false friends’) such as ‘eventual’ and ‘consequent’ (see Baxter, 2001; Burrough-Boenisch, 1998; Bongaerts and Poulisse, 1989). Another is the influence of Dutch devoiced consonants on ways Dutch authors spell English words (‘extent’ instead of ‘extend’, for example; see Burrough-Boenisch, 1998; compare James, 1998: 148).

As Hannay (1991) has noted, individually, the English sentences written by Dutch authors may be in correct English, but in their textual context they fail rhetorically. In his analysis of 65 texts written in English by Dutch academics, the three ‘rhetorical sentencehood errors’ Hannay discussed were to do with inadequate anaphoric reference, ‘frontal overload’ (see [1], [2], [3]) and whether an utterance, given its context, merits sentence status (i.e. should it be incorporated into the preceding or following sentence). Shortcomings like this are, however, also a feature of poor NS writing.

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[6] Rescue dogs are often specially trained. They work in areas where a bomb or earthquake has buried people. There *sic* job is to locate where the persons are buried. Rescuers can dig them out before they suffocate or die from other injuries. The dog must guide rescuers to the spot and be willing to sit and bark until help comes….

Flower (1989: 245) uses the text of which [6] is an extract, to illustrate the effect of a string of ‘list-like sentences’ when she explains how novice NS writers should edit to combine their sentences into a cohesive (and thus
coherent) whole (see also Figure 2.1). But list-like sentences are also a feature of learner English. Compare [7], the opening of the Introduction section of a scientific article written in 2001 by a Dutch ecologist.

[7] Cyclic succession may be defined as reciprocal replacement of (series of) developmental stages, species or communities. Desynchronised cycling generates shifting mosaics. The term ‘mosaic cycling’ coined by Remmert points to pattern and process. Cyclic succession may be inferred from mosaics or repeated observation. Mosaic cycling is an important topic for nature conservation, because it links successional dynamics to heterogeneity and biodiversity.

The incoherence of both [6] and [7] can be explained in terms of Hannay’s rhetorical sentencehood errors; as generically poor writing, not as language-learner traits. However, [8] is an extract from an experienced writer: the Dutch-born (but now domiciled in the UK) essayist Ian Buruma (2000: 78)

[8] Barthélemy Faujas de Saint-Fond was a naturalist with a passion for volcanic rock. In 1778, he published a classic folio volume on the extinct volcanoes of the Auvergne. There was a fierce debate at the time in scientific circles about the origin of basalt. ‘Vulcanists were pitted against ‘Neptunists’: was basalt the product of volcanic eruptions or of a chemical process in the sea? Faujas argued for the former.

Buruma’s writing is coherent, but the short sentences that characterise his style recall the choppiness Hannay (1997) referred to as characterising Dutch argumentative style. This style certainly pervades [7].

So far I have not discussed whether Dutch-authored text – in Dutch or in English – tends to be explicit or implicit, deductive or inductive (these terms are explained in chapter 2). If, as my contrastive text analysis has suggested, Dutch writers do indeed hedge less than English writers, their English style will be more direct. And if they use more forward referencing than their English counterparts, their texts will seem more explicit (i.e. reader-oriented). This fits in with the culture of the Netherlands being more low-context (to use Hall’s (1976) terminology: see chapter 2) than the cultures of the UK and US (see also ITIM, 1995; Victor, 1992: 143). However, if Dutch authors also use un-English ‘subparagraphing’, they are using implicit cohesion where NS authors would use explicit connectives: this is reader-unfriendly (to non-Dutch readers). To characterise Dutch scientific English as either explicit or implicit is thus to oversimplify.
Kaplan (1966) characterised written English as direct. Ulijn and Strother (1995: 260) state that the English line of thought is ‘linear, focused and direct without digressions’, and posit that Dutch line of thought is similar. This being so, in this aspect Dutch scientific English will not differ markedly from NS English.

Finally, an interesting cognitive aspect of culture transfer from Dutch to English deserves mention, although of indirect importance in the linguistic, discourse and rhetorical aspects of Dutch-authored English. It is cultural myopia. A Dutch biologist’s scientific paradigms or concepts often result from the peculiar geography (soft geology, no relief, no ‘natural’ streams or rivers) of the Netherlands, referred to in chapter 1. In this case, the ‘cultural’ transfer is the implicit assumption that the Dutch situation is ‘the norm’ or generally known. Culturally myopic writing can lead to misunderstanding. (Burrough-Boenisch, 1994b). In Text A in the reception study described in chapter 5, for example, the author implies that in species succession the early stages are nutrient-rich and later stages are nutrient-poor. Though typical of Dutch systems that are overfertilised and are now being managed to diminish the soil nutrients, this is the reverse of what happens in other countries and other ecosystems (personal communication, J. van Groenendael, 1999).

In conclusion

This contrastive examination of Dutch and English writing styles and the evolution of scientific writing in the two cultures has revealed a few ways in which cultural differences manifest in Dutch scientific English. How readers from various linguistic backgrounds cope with some of these differences will be examined in detail in chapters 6 – 8, when data from the reception study are analysed. First, however, in chapter 4 in preparation for the reception study, two small-scale studies will shed more light on several of the attributes of Dutch scientific English and the reactions these elicit from Dutch and English NS readers.
Chapter 4

Two reconnaissance studies using Dutch and English subjects to investigate cohesion

In the preceding chapters it has been argued that cultural background (in the sense of a person’s mother tongue and schema of genre and style conventions) influences how writers write and how readers read. In chapter 3 I demonstrated that the cohesion in written Dutch and the English written by Dutch authors differs from that of comparable prose written by English NSs. The Dutch style favours shorter sentences and relies heavily on the *alinea* as a device to signal cohesion. The corollary to this is that Dutch and NSs differ in their perception of text cohesion, in terms of the signals of cohesion they expect a text to have. In the present chapter, I therefore further explore aspects of Dutch and English perceptions of text cohesion, in two small-scale studies using Dutch and English participants. One study was a rerun of a test originally given by Mauranen in Finland (Mauranen, 1993: 163-168), to investigate NS versus NNS intuition about the appropriate use of connectives (conjunctions and adverbs used to link clauses and sentences physically or conceptually: see Hannay and Mackenzie, 1996:16) in an NS text. In this rerun, however, attention was also paid to the participants’ paragraphing preferences. The other study, using three very short Dutch-authored English text extracts, was to ascertain the ease of inferring cohesion from jumbled sentences. In both studies the NNS readers were Dutch and the NS readers comprised UK residents and NSs of English resident in the Netherlands.

*Inferring cohesion: NSs and NNSs restoring connectives and paragraphing*

*The Mauranen study*

For her study, Mauranen used an extract from a published psychology research paper written by an English NS. She removed the connectives\(^1\) that she deemed were not structurally essential to the text and submitted it to her subjects, asking them to insert connectives where they felt necessary. They were not told that the text had been modified. Later, she showed them the authentic text and elicited their opinion of it. Her explicit aims were to ascertain:

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\(^1\) Mauranen used the term ‘connector’. I use Hannay and Mackenzie’s (1996) terminology.
1. whether the deletion of connectives would change the propositional content of the text and impair its readability
2. how native speakers of English would react to the appropriateness of alternative versions of a text with and without connectives.

Contrary to her expectations, Mauranen’s subjects were unanimous in not wishing to add to the modified text. Indeed, they had strong opinions about the inappropriateness of tampering with text that they perceived as adequate. However, when they were shown the authentic version they conceded that the restored connectives added authority, logic and plausibility to the text. From this, Mauranen concluded that although the connectives did not make a difference to her readers’ perceptions of readability and coherence, they seemed to have a rhetorical effect and to contribute to the text’s total meaning. She defined ‘total meaning’ to include a perception of the functional relationships between a text’s parts.

Mauranen used a very small (eight) group of subjects selected as representative of NSs of English. Two of them were Finnish, but Mauranen described their English as being of near-native standard. All were resident in Finland, lecturing on English and doing language revisions of technology reports written in English by Finns. The core assumption implicit in her ‘informal experiment’ (her description) is that NSs resident in a non-anglophone country behave the same way as NSs resident in an anglophone country.

One reason for rerunning Mauranen’s (1993) ‘experiment’ was to examine the effect of substituting Dutch for Finnish as the NNS culture, thereby giving insight into the ‘Dutch’ concept of what is appropriate cohesion in an English text. Another reason was to examine the effect of expanding the NS group to include NSs living in Britain as well as NSs living in the NNS culture, i.e. out of mainstream English. My hypothesis is that immersion in a different culture will have diluted the core ‘nativeness’ of the participant, making his or her response intermediate between that of the NNSs in that culture and NSs immersed in their mother tongue culture.

The rerun of the ‘experiment’

A workshop in Maastricht in 1996, organised by the London-based Institute of Translation and Interpreting for translators of Dutch/English, provided an opportunity to rerun Mauranen’s test on a larger group of subjects. It was attended by over 40 translators, who were resident in the UK, Ireland, Germany, Netherlands and Belgium. When preparing the test, on the basis of the contrastive analysis of Dutch and English texts described in chapter 3 I assumed that the Dutch preference would be for shorter paragraphs. I wondered whether expatriate NS translators who can be expected to encounter Dutch alinea’s daily
Two cohesion studies

might be more tolerant of shorter paragraphs and fewer connectives in English than their compatriots living in the UK.

The volunteers who agreed to do the test (which is given in Appendix 4.1) completed it in their own time and without consultation. It was basically the same test as that used by Mauranen, except that the paragraph indicators had been removed. There were two reasons for doing this. The first was to ensure that even if – like Mauranen’s subjects – the participants did not take up the option to insert connectives because they deemed the text to be perfectly acceptable without, they would annotate it to indicate paragraphing, and this would provide clues about their perception of text cohesion. The second reason for removing the paragraph indicators was the expectation that a cultural (i.e. English versus Dutch) difference would emerge – in the paragraphing, if not in the insertion of connectives.

For the test, the subjects were instructed to paragraph the text, adding extra words if deemed necessary. The instructions were carefully worded so that the participants would not be primed to insert connectives (even assuming they would know what this term means): it was felt that using terms like ‘coherence’ or ‘cohesion’ would bias their response. The participants were specifically told that the test was not aimed at assessing their language competence.

In all, 21 persons did the test. Table 4.1 shows the breakdown into mother tongue/country of residence. The country of residence indicates in which writing culture the translator in question worked, the crucial distinction being between translators totally immersed in their mother tongue culture and those living in the L2 culture. For convenience, one NS resident in Ireland (arguably, also an anglophone culture) was classified as resident in UK, and one NNS and two NSs living in Flemish-speaking parts of Belgium were classified as resident in the Netherlands.

Paragraph breaks and insertion of connectives were collected and analysed. Descriptive statistics were calculated and an ANOVA was run to look for the effect of mother tongue and country of residence (henceforth referred to in the tables in this chapter as MT/country) on number of paragraphs.

Table 4.1 Participants in the Maastricht test

<table>
<thead>
<tr>
<th>MT/country</th>
<th>N subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>English/UK (EN/UK)</td>
<td>8</td>
</tr>
<tr>
<td>Dutch/UK (DU/UK)</td>
<td>1</td>
</tr>
<tr>
<td>English/Netherlands (EN/NL)</td>
<td>5</td>
</tr>
<tr>
<td>Dutch/Netherlands (DU/NL)</td>
<td>7</td>
</tr>
</tbody>
</table>

* this subject was only included in analyses that examined the performance of all Dutch speakers, regardless of country of residence
Results

The test instructions primed the subjects to use paragraphing as the first option for imposing structure (and cohesion) on the text, the second option being the insertion of additional words. In a result that parallels Mauranen’s findings, most (76%; 16) of the subjects made no attempt to insert connectives. One of the five who did so was EN/UK; this subject inserted two connectives in all, both within one sentence ("The commitment in that case, though informal, is still binding"). The other four were DU/NL; they all inserted connectives at the beginning of sentences. Details are given in Table 4.2, which also shows where they made paragraph breaks. From the table it can be seen that the connectives were used to improve the flow of text within the paragraphs. Only once did a subject insert a connective at the start of a sentence and begin a paragraph with that sentence. The sentence involved was sentence 6. Two of the DU/NL subjects inserted a connective at the start of that sentence but did not start a paragraph with it. There were two instances of a connective being inserted at the start of sentence 3. This position, and also the beginning of sentence 6, was where connectives appeared in the authentic text. These were the only two instances when subjects agreed with the text’s author about where to position a connective. Although two of the DU/NL subjects inserted connectives at the start of sentence 7, the authentic text had no connective here.

Table 4.2 Where the four DU/NL subjects who inserted connectives did so, and where they made paragraph breaks. (All connectives were inserted sentence-initially.)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Sentence allocated a connective¹</th>
<th>Sentence(s) assigned paragraph-initial position¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>6, 9</td>
</tr>
<tr>
<td>3</td>
<td>3, 6</td>
<td>4, 8</td>
</tr>
<tr>
<td>4</td>
<td>3, 5, 6, 7</td>
<td>4, 9</td>
</tr>
</tbody>
</table>

¹ the number refers to the number (from 1 to 10) assigned to the sentences in the test (see Appendix 4.1): the single instance of a connective being used to introduce a new paragraph is highlighted in bold.

All 21 subjects indicated where they thought the text should have paragraph breaks. One DU/NL subject, however, drastically altered the sentence order as well, and was therefore excluded from the final analysis. For the remaining 20 subjects, the minimum number of paragraphs was two and the maximum was six. The mean for the entire sample was 3.8. As Table 4.3 shows, comparing
the total NS group with the total NNS group reveals that, contrary to expectations, the NSs tended to form more paragraphs. The standard deviations show that there was more variation within this group. When the classification was refined into EN/UK, EN/NL and DU/NL, however, the EN/NL group was intermediate between the EN/UK and DU/NL groups in terms of mean number of paragraphs. The EN/NL group was more homogeneous than the DU/NL group; the EN/UK group exhibited the most variation. (The solitary DU/UK subject made three paragraphs.)

An ANOVA found that there was no effect of mother tongue on number of paragraphs ($F = 1.847, \text{df} = 1, p = 0.191$).

Table 4.3 Number of paragraphs, for subjects classified by native-speakerhood and by MT/country of residence

<table>
<thead>
<tr>
<th>Subjects</th>
<th>N</th>
<th>Mean number of paragraphs</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>All NSs (English)</td>
<td>13</td>
<td>4.08</td>
<td>1.12</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>All NNSs (Dutch)</td>
<td>7¹</td>
<td>3.43</td>
<td>0.79</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>3.85</td>
<td>1.04</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>EN/UK</td>
<td>8</td>
<td>4.25</td>
<td>1.28</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>EN/NL</td>
<td>5</td>
<td>3.80</td>
<td>0.84</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>DU/NL</td>
<td>6</td>
<td>3.50</td>
<td>0.84</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Total²</td>
<td>19</td>
<td>3.89</td>
<td>1.05</td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

¹incl. the DU/UK subject, but excluding the NNS who altered the sentence order
²excl. the DU/UK subject and the NNS who altered sentence order

Figure 4.1 shows where the English and Dutch readers made the paragraph breaks. Note that each sentence in the text was allotted a paragraph-initial position by at least one reader. In this figure, the Dutch values have been adjusted to be comparable with the English values by multiplying them by 1.8572. This takes account of the difference in sample size (13 English versus 7 Dutch). The figure shows that more Dutch than English readers agreed with the author’s break at the end of sentence 3, but that more English than Dutch readers agreed with the author’s break after sentence 4. Though the author’s break at the end of sentence 8 was less popular among the readers, similar proportions (about 39%) of the Dutch and English subjects also made a paragraph break there.
The two most popular paragraph breaks were at the end of sentence 3 (which is where the author also ended a paragraph) and the end of sentence 7. Each was chosen by 50% or more of the total readers.

Only one of the connectives that had been removed from the text had occurred sentence initially. It was ‘However,’ at the start of sentence 2. Only five readers (four of them English native speakers, divided equally between UK and Netherlands residents) started a paragraph with that sentence. None of the 21 readers reinstated a connective there.

At the end of the Maastricht workshop the subjects were shown the authentic text and asked which version (authentic or modified) they preferred. Only six responded. Their replies are summarised in Table 4.4 (and discussed on page 91).

Figure 4.1 Positioning of paragraph breaks by English (N = 13) and Dutch (N = 7) readers. On the x axis, 1 marks the end of sentence 1, 2 the end of sentence 2, and so on. Solid circles = English readers, solid triangles = Dutch readers. The numbers of Dutch readers have been adjusted in proportion to the English readers, as explained in the text. The arrows indicate the original paragraph breaks.
Table 4.4 Six subjects’ preferences for the authentic and modified texts and their justification for their choice

<table>
<thead>
<tr>
<th>MT/country</th>
<th>Preferred Text</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN/UK</td>
<td>Modified</td>
<td>‘For this type of text (factual) I prefer enumerated paragraphs. I don’t need the ‘joining’ words: they get in the way’</td>
</tr>
<tr>
<td>EN/UK</td>
<td>Modified</td>
<td>Authentic text ‘has more verbiage’</td>
</tr>
<tr>
<td>EN/NL</td>
<td>Authentic</td>
<td>Authentic text ‘flows better and is not so staccato’</td>
</tr>
<tr>
<td>DU/NL</td>
<td>Authentic</td>
<td>Authentic text ‘is clearer, readable, more rhythmic’</td>
</tr>
<tr>
<td>DU/NL</td>
<td>Modified</td>
<td>‘connectors and paragraphing underline author’s thesis’</td>
</tr>
</tbody>
</table>

Discussion

It is interesting to compare the results reported above with the results of a paragraphing experiment involving Dutch and American English students, reported in Ulijn and Campbell (1997). The subjects in that study were American and Dutch engineering students. They were asked to paragraph a popular science text from which the paragraphing had been removed. The original English version was read by 19 Dutch and 19 American students; a ‘literal translation’ into Dutch was read by another group of 19 Dutch students. The findings were that the Dutch, who took longer to read the text, scored better on paragraph restoration. They used more paragraph breaks in Dutch than in English and made more such breaks in English than the Americans did. It was suggested that the ‘alinea effect’ was responsible and it was concluded that the Dutch write and prefer shorter paragraphs. The findings from the Maastricht test, which was conducted on language professionals rather than students, not only challenge this conclusion but also contradict the results of the contrastive analysis of science texts reported in chapter 3, where it was found that the published Dutch texts had shorter paragraphs than the published English texts. To explain this inconsistency, we need to consider what motivates a person to decide to make a paragraph break. Previous research on paragraphing decisions is enlightening here.

Bond and Hayes (1984) conducted a systematic study in which they compared two hypotheses: that a paragraph is held together by semantic relations (Halliday and Hasan, 1976), and that a paragraph is a grammatical unit (their own hypothesis). They performed five paragraphing experiments,
using a different batch of student readers each time. The first two were replicates of experiments by Young and Becker (1966), which tested ability to reinstate an author’s paragraph; this included the condition of fewer lexical clues. The lexical clues were removed by converting the text into nonsense words: ‘Blog was, moked by grol nards, the wilest nerg of the Liver Molk…’.

In their third experiment, Bond and Hayes substituted ‘XXX’ for content words in the original text, and in the fourth they additionally substituted pronouns. In the final experiment, readers were presented with sentence clues without any text – merely squiggly lines indicating sentence length. Computer simulations of random paragraphing were used to compare the readers’ performance in the latter two experiments.

On the whole, the readers in the first three Bond and Hayes experiments tended largely to agree on paragraph breaks and though they tended to produce more paragraphs than the original author, they peaked markedly at that author’s paragraph breaks. Bond and Hayes concluded that ‘the consistent paragraphing’ of their readers supported the assertion that the paragraph is a psychologically real unit of discourse. They used their findings to create a model of paragraphing decisions. Its basic assumptions are that paragraphing decisions are influenced by the strength of the paragraphing cues in the text and the length of the current paragraph. The primary paragraph cues include major topic shifts and certain strong fronted rhetorical predicates (e.g. ‘In conclusion’). Secondary cues are similar, but less marked. The secondary cue rhetorical predicates include ‘However,’ and ‘As a result’.

In the Maastricht study, the readers were disadvantaged because the cues that were connectives had been removed. One of the connectives removed, from sentence 2, was a secondary paragraphing cue: ‘However,’. Nobody reinstated a connective there and yet five readers (four of them NS) did start a new paragraph with that sentence. That resulted in the first paragraph being a single sentence – a daring strategy, given that some authorities believe that one sentence does not make a paragraph². Presumably, their paragraphing decision was motivated by considerations of topic. Indeed, that must have been the chief motive in this study, given that the paragraphing response must also have been constrained by the shortness of the text: it was only ten sentences. To be significantly different, NS versus NNS differences would therefore have had to have been very great. Even though no statistically significant effect was found, it is interesting that the NSs living in the Netherlands behaved intermediately between NSs in the UK and NNSs (Table 4.3); the ramifications of this deserve further study. It seems unlikely that the ‘Britishness’ of the NSs in the Maastricht study (there was only one

² ‘As a rule, single sentences should not be written or printed as paragraphs.’ (Strunk and White, 1979).
Two cohesion studies

American) accounts for the results differing from the Ulijn and Campbell study noted above, which used American NSs.

One factor that might have been important in the Maastricht study was the diversity of the subjects. They were not a cohort of students, but a mix of adults ranging in age from late twenties to sixties. And because they were professional translators, unlike the subjects in the Ulijn and Campbell study they were familiar with each other’s language and culture.

Some other previous research on paragraphing has shown that when asked to paragraph text, subjects rarely agree with the original paragraphing. Harris (1990) has reported that over 50 of his students had been asked to reinstate the paragraphing in a 21-sentence passage ‘from a well-known history of the English language’ and that none had succeeded in matching the author’s original paragraphing. Dubois (1996) presents evidence from earlier studies by Stern (1976) – whose subjects were teachers of English – and Stark (1988) that readers do not agree perfectly on paragraphing, either with the original author or with each other. The Maastricht results complement those findings.

That both the ‘Mauranen’ and Maastricht subjects were reluctant to insert connectives suggests that – at least in a short text extract like the one used for the test – readers are able and willing to infer cohesion. The Maastricht subjects’ response suggests that the Dutch idea of appropriate cohesion in an English text is more connectives than the NSs require: most of the readers who inserted connectives were NNSs (i.e. the Dutch). What should one make of the finding (Table 4.4) that the six subjects who volunteered their text preferences were split equally between the authentic version (with connectives) and the modified version (without connectives)? It seems likely that the length of the test text played a role: readers who tolerated ten successive sentences without connectives would have baulked at a connectiveless text running to ten pages. In retrospect, this small study might have produced more and sounder results if the test text had been longer. The results on connective use suggest that these Dutch subjects preferred more, overt, connectives than Mauranen’s Finnish subjects. The results on paragraphing indicate that NSs living outside their culture – backwater NSs – tend towards the practices of the culture they are living and working in.

A general conclusion in relation to paragraphing is that in a text with few fronted connectors, readers asked to insert paragraph breaks agree only reasonably well on where to make the breaks. This finding could be turned around and be interpreted as indicating that when a text does not have many connectives, the reader relies on the author’s paragraph breaks to reinforce topic shifts. It could be argued that this is what Dutch alinea’s achieve. I will return to this aspect in chapter 6, which investigates more aspects of text cohesion.
Chapter 4

Inferring cohesion: NSs and NNSs restoring sequences of sentences

In the Maastricht test the text was written by an NS. In the second small-scale study I conducted, I used three very short NNS texts that had not been corrected by an NS. All were Dutch-authored and were seven-sentence extracts from manuscripts that were intended for publicity brochures. They were selected because the English exhibited problems of Dutch interference and learner ineptitude. A typical feature of such texts is that individual sentences are grammatically correct, but the sequence of sentences is not coherent. Hannay (1991) has noted this feature in English texts written by Dutch academics. Characterising the problem as being one of ‘rhetorical sentencehood errors’, he explains that one of the keys to being able to infer coherence from texts is the ease of inferring how sentence is to be interpreted in the light of sentence. He comments ‘Any doubt on the part of the reader as to the meaning of a particular sentence in the light of the previous one will create a sense of incoherence’ (Hannay, 1991: 115). In coherent text an author links successive sentences grammatically, lexically, or by reference; the result is relational coherence (James, 1998: 162).

I was interested in the ability of NSs and NNSs to reinstate the sentence sequence after the sentences had been jumbled, as this indicates two things: the relational coherence of the texts and the readers’ ability to ignore NNS errors and shortcomings and to focus on intended meaning. Again, the subjects recruited for the test were language professionals whose mother tongue was Dutch or English. The NNS (Dutch) group all resided in the Netherlands; the NSs were divided into those resident in the UK and those resident in the Netherlands; the motive for so doing was again curiosity to see whether NSs immersed in the L2 culture behave just like NSs immersed in the mother tongue culture, in terms of the perception of textual properties (cohesion, but also grammatical acceptability and thus of ‘errors’). I shall refer to these two groups of NSs as backwater and mainstream NSs, respectively.

Material and methods

The text extracts, shown below as [1], [2] and [3] (note that I have reproduced any alinea’s that occurred) will be referred to respectively as Coasts, Rainforest and College. The Coasts and Rainforest texts comprise the opening seven sentences of the manuscripts in question; the College text is the beginning of that part of a general publicity brochure that deals with a certain educational institution’s catering services. Below, each text ([1], [2] and [3]) is preceded by a brief description of its features and shortcomings.
Two cohesion studies

The Coasts text is notable for its alinea’s. It does not ‘flow’ well, though individually the sentences do not appear to be obviously ungrammatical. One reason why the text fails to flow is that the subordinate clauses are not always in the best order for optimal rhetorical impact. Sentence 1, for example, suffers from ‘frontal overload’ (see chapter 3). The most obvious error is the omission of the definite article in sentence 3, in front of ‘southwestern’. The referential cohesion between the first sentences, which is supplied by the repetition of ‘water’ is false: it is not sensible to link ‘dependence on water’ either with coastal water movement (sentence 1), or with storm surge (sentence 3), unless ‘depends on water’ is changed to ‘depends on protection from water’. The cohesion between sentence 3 and the following single-sentence alinea is covertly referential: the reader must infer a causal relationship between dikes breaking, and flooding and loss of life.

[1] Studying the impact of coastal water movement on the environment has been a geographical necessity for the Netherlands throughout its history. The Netherlands is a country that depends on water. Many people still remember vividly the storm surge disaster of February 1st, 1953, when the dikes in southwestern part of the Netherlands broke. A total of 136,000 ha of land was inundated and almost 2000 people lost their lives. Accurate predictions of storm surges for the entire Dutch coast are therefore of importance. They indicate whether dikes are at risk and whether the storm surge barrier in the Eastern Scheldt should be closed. Unnecessary closing of this barrier can cause damage to the fragile environment of the Eastern Scheldt.

The Rainforest text contains several NNS errors: a wrong preposition (‘by’ in sentence 3) and three instances (in sentences 4 and 5) of simple present tenses that probably should be present continuous. The cohesion is variable: explicit between sentences 1 and 2 (the referential ‘They’), but implicit between the last three sentences. Once again, alinea’s are distinctive.

[2] Tropical rain forests are among the most species-rich ecosystems in the world. They are a habitat for people and wildlife as well as a vital source of livelihood for indigenous and other population groups. The future existence of this ecosystem is under severe pressure by socio-economic developments. The disappearance of tropical forests leads to the irreversible loss of biological diversity and natural resources and jeopardizes forest dwelling communities.
Political awareness and support to curb these negative trends are building up. Forest companies become aware of the finiteness of their renewable resources and the need for sustainable harvesting methods and management plans. Forest policy and overall land-use planning are to be adjusted in an effective way.

The College text displays two clear errors of transfer from Dutch. They are the abbreviation ‘a.o.’ (used by Dutch authors when writing in English as an abbreviation for ‘among other’: Burrough-Boenisch, 1998: 44) and the hyphenation (ibid: 52-53). The second ‘sentence’ is incomplete (cf. Hannay’s (1997) contention that Dutch prose uses more sentence fragments than English prose). The ‘compile’ in sentence 3 is a lexical misselection (should be ‘comprise’). In sentence 4 there are two instances of ‘break’ that should have been plural, and the clause order in the sentence is not correct. The omission of ‘for’ before ‘staff members’ in sentence 5 is very infelicitous. In sentence 6 there is a punctuation error (comma omitted after ‘Besides’). These errors are compounded by misselections such as ‘scope of’, ‘tuning in’, ‘taken care of’ and the infelicity of the text is compounded by inappropriate register: the formal word ‘luncheon’ contrasts with the informal, jocular (and sexist) ‘lovely assistants’. The paragraphing is not intrusive, however, and cohesion is achieved by repetition (‘horeca-services’, ‘restaurant’).

Apart from the scientific departments a number of central services also work within the scope of the college. A.o. things accounts, purchasing, internal service, technical services, cash and sales, students’ affairs, personnel affairs, and the horeca-services (hotel-restaurant-café). The horeca-services compile a self-service restaurant in the main building and the operation of the college guesthouse, the ‘Smits Hall’. The restaurant has 275 seats and caters for drinks and meals during coffee break, luncheon and tea break for staff and students. A great assortment of snacks (for the main part staff members) and a great variety of meals are offered, tuning in as much as possible to the international character of the students. Besides both halls, together forming the restaurant, are used for all kinds of festivities, lunch-specials and, not to be forgotten, the International Buffets. The kitchen is manned by ‘le chef’ and his men, whereas the restaurant is taken care of by some five lovely assistants.
In common with the Maastricht study, the subjects for this study were language professionals, not students. They were recruited and tested during meetings of societies for editors. Details are in Table 4.5. Four of the NNSs in the Wetenschappelijk Redacteurenkring/STIC session reported that in their work as editors they rarely edited English-language texts. Though subjects were not asked to state their age and sex, I noticed that most of the NS group were women, whereas most of the NNS group were men. The age range seemed to be from late twenties to late fifties. The EN/NL subjects were asked how long they had lived in the Netherlands (as this could indicate habituation to Dutch rhetoric and Dutch English).

Table 4.5 Characteristics of the subjects in the jumbled sentences study, grouped by MT/country. EN/UK = NSs resident in UK, EN/NL = NSs resident in the Netherlands, DU/NL = NNSs resident in the Netherlands

<table>
<thead>
<tr>
<th>MT/country</th>
<th>N in group</th>
<th>Society</th>
<th>Date of test</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN/UK</td>
<td>10</td>
<td>Society of Freelance Editors and Proofreaders</td>
<td>February 1997</td>
</tr>
<tr>
<td>EN/NL</td>
<td>16</td>
<td>Society of English-Native-Speaking Editors</td>
<td>November 1996</td>
</tr>
<tr>
<td>DU/NL</td>
<td>31</td>
<td>Wetenschappelijk Redacteurenkring/STIC</td>
<td>January 1997</td>
</tr>
</tbody>
</table>

For the test, I colour-coded the texts by printing their sentences out individually (beginning each sentence on a new line), using white paper for Coasts, green for Rainforest, and purple for College. Per text, each sentence was given a unique identifying symbol in the left-hand margin: !, #, $, %, +, ^, ~. The texts were then cut up into sentences, and the resulting strips were jumbled up and put in envelopes, so that each envelope contained the jumbled sentences of all three texts. Each envelope was assigned a code. The same code appeared on the reply form in the envelope.

At the test sessions, the envelopes were handed out to the subjects, who were asked to examine each sentence individually and rate its acceptability ‘in terms of its grammar’ as ‘acceptable’, ‘tolerable’ or ‘unacceptable’. They were given 15 minutes to arrange the sentences in their preferred order, per text. They recorded their answers (using the sentence symbols) on the reply form. They were then told the authentic sequences and shown the authentic texts. They were invited to take home print-outs of the texts, edit them and return them to me. Ten did so (five EN/NL and five DU/NL).
To provide a benchmark against which subjects’ acceptability ratings of the individual sentences could be compared, the grammatical acceptability of each sentence was also rated independently by an expert: the functional grammarian Dr M. Hannay, an NS in the English Department, Vrije Universiteit of Amsterdam.

As mentioned above, this study was to examine the relational coherence of the texts and the ability of NS and NNS readers to look beyond superficial NNS errors and shortcomings and to infer deeper cohesion. I therefore investigated the texts and the readers’ responses. For the texts, I examined:

- whether the texts differed in terms of sentence acceptability
- whether the texts differed in terms of the subjects’ success in restoring sentence order (this being an indication of a text’s relational coherence)
- whether the grammatical acceptability of sentences influenced the subjects’ success in reinstating the sentence order

For the readers’ responses I examined:

- the effect of native-speakerhood on assessments of sentence acceptability
- the effect of the ‘mother tongue + country of residence’ combinations on success of restoring sentence order (this to identify possible differences between backwater and mainstream NSs).

To score for restoring sentence order I counted how many sentences per text each reader slotted into the same place as in the original text. For example, the authentic order of sentences in Coasts was # $ * + ^ ! %, so a subject who produced the sequence $ # * + ^ ! % scored 5 (the third, fourth, fifth, sixth and seventh sentences were in their original slots).

For the statistical analysis I used univariate General Linear Model (GLM) analysis, as this enables interactions between variables to be examined.

**Results**

Table 4.6, which compares the expert’s and subjects’ assessments of the grammaticality of the texts’ sentences, shows that the texts differed in their sentences’ acceptability, i.e. in the grammatical (and lexical) errors they contained. In terms of acceptable sentences, Coasts scored best and College worst. All things being equal, then, it should have been easier to unjumble the sentences of Coasts than of College.
Table 4.6 Grammatical acceptability of the individual sentences in the three texts (each text comprised seven sentences), expressed as percentage of the total number of sentences per text assessed by the given reader category. Legend: Ac = acceptable, Tol = tolerable, Un = unacceptable

<table>
<thead>
<tr>
<th>Reader category</th>
<th>Coasts</th>
<th>Rainforest</th>
<th>College</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ac</td>
<td>Tol</td>
<td>Un</td>
</tr>
<tr>
<td>Expert</td>
<td>71</td>
<td>29</td>
<td>0</td>
</tr>
<tr>
<td>EN/UK (N = 10)</td>
<td>70</td>
<td>21</td>
<td>9</td>
</tr>
<tr>
<td>EN/NL (N = 16)</td>
<td>59</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>DU/NL (N = 31)</td>
<td>64</td>
<td>20</td>
<td>15</td>
</tr>
</tbody>
</table>

Though the table shows some agreement between the expert’s and the subjects’ assessments of sentence acceptability (the expert and the EN/UK group both rated circa 70% of the sentences in Coasts as acceptable), there were differences between the groups. For example, compare the ‘acceptable’ ratings for College. More detail on the differences is given in Table 4.7.

Table 4.7a gives descriptive statistics for the ‘acceptable’ ratings per text for the subjects classified by native-speakerhood, while Table 4.7b does likewise, but groups the subjects by native-speakerhood and country of residence. It can be seen that compared with the NSs, the Dutch subjects rated more sentences in the College text as acceptable: 1.77 versus 0.38. The standard deviations show that there was more variation in the Dutch group.

Table 4.7a Descriptive statistics for number of sentences (N sentences per text = 7) rated ‘acceptable’, by text and native-speakerhood class

<table>
<thead>
<tr>
<th>Native-speakerhood</th>
<th>Text</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS</td>
<td>Coasts</td>
<td>4.46</td>
<td>1.68</td>
<td>26</td>
</tr>
<tr>
<td>NS</td>
<td>Rainforest</td>
<td>3.65</td>
<td>1.38</td>
<td>26</td>
</tr>
<tr>
<td>NS</td>
<td>College</td>
<td>0.38</td>
<td>0.57</td>
<td>26</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>2.83</td>
<td>2.19</td>
<td>78</td>
</tr>
<tr>
<td>NNS</td>
<td>Coasts</td>
<td>4.48</td>
<td>1.52</td>
<td>31</td>
</tr>
<tr>
<td>NNS</td>
<td>Rainforest</td>
<td>4.10</td>
<td>1.81</td>
<td>31</td>
</tr>
<tr>
<td>NNS</td>
<td>College</td>
<td>1.77</td>
<td>1.54</td>
<td>31</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>3.45</td>
<td>2.01</td>
<td>93</td>
</tr>
<tr>
<td>Total</td>
<td>Coasts</td>
<td>4.47</td>
<td>1.58</td>
<td>57</td>
</tr>
<tr>
<td>Total</td>
<td>Rainforest</td>
<td>3.89</td>
<td>1.63</td>
<td>57</td>
</tr>
<tr>
<td>Total</td>
<td>College</td>
<td>1.14</td>
<td>1.38</td>
<td>57</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>3.17</td>
<td>2.11</td>
<td>171</td>
</tr>
</tbody>
</table>
Table 4.7b Descriptive statistics for number of sentences (N sentences per text = 7) rated ‘acceptable’, by text and MT/country of residences

<table>
<thead>
<tr>
<th>MT/country</th>
<th>Text</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN/UK</td>
<td>Coasts</td>
<td>4.90</td>
<td>1.52</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Rainforest</td>
<td>3.50</td>
<td>1.27</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>College</td>
<td>0.20</td>
<td>0.42</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2.87</td>
<td>2.30</td>
<td>30</td>
</tr>
<tr>
<td>EN/NL</td>
<td>Coasts</td>
<td>4.19</td>
<td>1.76</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Rainforest</td>
<td>3.75</td>
<td>1.48</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>College</td>
<td>0.50</td>
<td>0.63</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2.81</td>
<td>2.14</td>
<td>48</td>
</tr>
<tr>
<td>DU/NL</td>
<td>Coasts</td>
<td>4.48</td>
<td>1.52</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Rainforest</td>
<td>4.10</td>
<td>1.81</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>College</td>
<td>1.77</td>
<td>1.54</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.45</td>
<td>2.01</td>
<td>93</td>
</tr>
<tr>
<td>Total EN/UK</td>
<td>Coasts</td>
<td>4.47</td>
<td>1.58</td>
<td>57</td>
</tr>
<tr>
<td>Total EN/NL</td>
<td>Rainforest</td>
<td>3.89</td>
<td>1.63</td>
<td>57</td>
</tr>
<tr>
<td>Total DU/NL</td>
<td>College</td>
<td>1.14</td>
<td>1.38</td>
<td>57</td>
</tr>
<tr>
<td>Total</td>
<td>Total</td>
<td>3.17</td>
<td>2.11</td>
<td>171</td>
</tr>
</tbody>
</table>

To ascertain the effects of native-speakerhood (with and without country of residence) and of text on sentence acceptability, I performed univariate GLM, with ‘number of acceptable sentences’ as the dependent variable. Unless mentioned, no interactions were found. In the first run, the fixed factors were native-speakerhood and text. There was a very significant effect of native-speakerhood (F (1, 165) = 7.303, \( p = 0.008 \)) and of text (F (2, 165) = 83.578, \( p = 0.000 \)) but there was also a significant interaction between language and text (F (2, 165) = 3.123, \( p = 0.047 \)). The significant effect of native-speakerhood reflects the NSs’ more critical response to the Dutch-English sentences; overall, they rated fewer sentences as ‘acceptable’ (Table 4.7a). The post hoc analysis (Tukey) revealed that the lower number of acceptable sentences in the College text differed significantly (\( p < .05 \)) from the number of acceptable sentences in the Coasts and Rainforest texts. The interaction between text and native-speakerhood is attributable to the difference between the acceptability ratings for the College text noted above.

To see whether the NS response differed according to country of residence (and thus to test for the effect of backwater NSs’ exposure to Dutch and to Dutch English) I repeated the GLM univariate analysis, but instead of native-speakerhood as a fixed factor, I used the three MT/country classes EN/UK, EN/NL and DU/NL. Again, text had a very significant effect (F (2, 162) = 79.137, \( p = 0.000 \)); Table 4.6 shows that far fewer sentences in the
College text were rated acceptable than in Coasts. There was indeed a significant effect of MT/country combination \((F (2, 162) = 3.638, p = 0.028)\) but there was no significant interaction between MT/country combination and text. The post hoc analysis (Tukey) revealed that the significance of the MT/country combination was attributable to a significant difference at the .05 level between the EN/NL and the DU/NL in mean number of acceptable sentences (2.81 versus 3.45: Table 4.7b).

A similar approach was used to test the effects of native-speakerhood, country of residence and text on success of reinstating sentences in their authentic position. The descriptive statistics are in Table 4.8.

*Table 4.8a Descriptive statistics for number of sentences (N sentences per text = 7) correctly reinstated in their authentic slot, by text and native-speakerhood class*

<table>
<thead>
<tr>
<th>Native-speakerhood</th>
<th>Text</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS</td>
<td>Coasts</td>
<td>3.04</td>
<td>2.31</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Rainforest</td>
<td>4.15</td>
<td>1.74</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>College</td>
<td>3.69</td>
<td>1.85</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.63</td>
<td>2.01</td>
<td>78</td>
</tr>
<tr>
<td>NNS</td>
<td>Coasts</td>
<td>3.74</td>
<td>1.77</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Rainforest</td>
<td>4.51</td>
<td>1.98</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>College</td>
<td>3.52</td>
<td>1.86</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.92</td>
<td>1.90</td>
<td>93</td>
</tr>
<tr>
<td>Total</td>
<td>Coasts</td>
<td>3.42</td>
<td>2.04</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>Rainforest</td>
<td>4.35</td>
<td>1.87</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>College</td>
<td>3.60</td>
<td>1.84</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.79</td>
<td>1.95</td>
<td>171</td>
</tr>
</tbody>
</table>

In the first run of this GLM univariate analysis the fixed factors were native-speakerhood and text. This time there was no significant effect of native-speakerhood, but there was again a significant effect of text \((F (2, 165) = 3.759, p = 0.025)\). There was no significant interaction between native-speakerhood and text. The post hoc analysis (Tukey) revealed that the effect of text was again attributable to a significant difference at the .05 level between the Coasts and Rainforest texts: on average, more sentences in the Rainforest text were reinstated correctly (4.35, versus 3.42 for Coasts).
Table 4.8b Descriptive statistics for number of sentences (N sentences per text = 7) correctly reinstated in their authentic slot, by text and MT/country class

<table>
<thead>
<tr>
<th>MT/country</th>
<th>Text</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN/UK</td>
<td>Coasts</td>
<td>1.70</td>
<td>2.36</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Rainforest</td>
<td>4.70</td>
<td>1.77</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>College</td>
<td>4.10</td>
<td>2.02</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.50</td>
<td>2.39</td>
<td>30</td>
</tr>
<tr>
<td>EN/NL</td>
<td>Coasts</td>
<td>3.88</td>
<td>1.89</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Rainforest</td>
<td>3.81</td>
<td>1.68</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>College</td>
<td>3.44</td>
<td>1.75</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.71</td>
<td>1.75</td>
<td>48</td>
</tr>
<tr>
<td>DU/NL</td>
<td>Coasts</td>
<td>3.74</td>
<td>1.77</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Rainforest</td>
<td>4.51</td>
<td>1.98</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>College</td>
<td>3.52</td>
<td>1.86</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.92</td>
<td>1.90</td>
<td>93</td>
</tr>
<tr>
<td>Total EN/UK</td>
<td>Coasts</td>
<td>3.42</td>
<td>2.04</td>
<td>57</td>
</tr>
<tr>
<td>Total EN/NL</td>
<td>Rainforest</td>
<td>4.35</td>
<td>1.87</td>
<td>57</td>
</tr>
<tr>
<td>Total DU/NL</td>
<td>College</td>
<td>3.60</td>
<td>1.84</td>
<td>57</td>
</tr>
<tr>
<td>Total</td>
<td>Total</td>
<td>3.79</td>
<td>1.95</td>
<td>171</td>
</tr>
</tbody>
</table>

When the GLM univariate analysis was repeated, but instead of native-speakerhood as a fixed factor the three MT/country classes were used as fixed factors, the significant effect of text (Rainforest versus Coasts: see above) was even stronger (F (2, 162) = 5.010, *p* = 0.008). This time, there was a significant interaction between MT/country combination and text (F (4, 162) = 2.929, *p* = 0.023). As Table 4.8b shows, the EN/UK had little success in matching authentic sentence slots in the Coasts text (a mean of only 1.70, compared with 3.88 and 3.74 for the EN/NL and DU/NL, respectively), but in the other texts they achieved most matches (means of > 4); as a group, the EN/NL performed worst, matching the fewest sentences in the Rainforest and College texts.

A correlation analysis performed to check whether number of acceptable sentences was related to success of reinstating sentences found no such correlation.

**Interpreting the results and refining the analysis**

The demonstrated effect of native-speakerhood on the number of sentences deemed to be acceptable is not unexpected; one would expect that NNSs would be more likely to accept sentences that are grammatically or lexically
Two cohesion studies

This effect would have been intensified, given that the NNSs included editors and copywriters who admitted that they rarely edited English sentences. It is the NS response that is interesting, however: when the NSs were subdivided according to country of residence, the effect of native-speakerhood was seen to be accounted for by the significant difference between the NNSs (DU/NL) and the backwater NSs (the EN/NL). This suggests that the latter— all of whom were professional correctors and revisers of Dutch-authored English—were more critical (or less tolerant) of the Dutch-authored sentences.

Given that the College text contained significantly fewer acceptable sentences than the other two texts, it is striking that when the effects of text on the ability to restore sentence order were examined, the significant difference between texts was not accounted for by that text (per subject, the mean number of matched sentences in College was 3.6). In other words, the results suggest that though the sentences in that text were ungrammatical, contained Dutch interference and exhibited learner ineptitude, they contained sufficient cues to allow readers to infer the relational coherence, i.e. the way in which successive sentences fit into a logical sequence (James, 1998: 163). This enabled the readers to slot most of the sentences into their original positions. The significant difference between texts in terms of success in reinstating sentences into their original slots (sentence matching) was accounted for by the difference between Coasts—which had the fewest matched sentences (mean 3.4) and Rainforest (mean 4.4). Both of these texts had far fewer grammatically unacceptable sentences than College (Table 4.6). This result, coupled with the failure to find a correlation between number of matched sentences and number of acceptable sentences, appears to demonstrate what editors and revisers of NNS texts often find in their work: that a text’s coherence can shine through grammatically incorrect and infelicitous sentences. The finding that there was no effect of native-speakerhood or of combination of native-speakerhood/country of residence on the success in matching the authentic sentence order indicates that good editors and language revisers are able to infer cohesion regardless of whether they are working in their mother tongue.

The possible reasons for all three subject groups having difficulty in matching the Coasts sentences, even though that text had the most acceptable sentences (see Table 4.6), will be discussed presently. First, however, I will look more critically at what the sentence matching actually revealed.

Implicit in the discussion so far is that a matched sentence is a sentence that has been replaced in its authentic slot. In fact, individual instances of matching say little about a text’s cohesion; for that, it is necessary to examine how many correct runs of sentences were achieved. In a tightly cohesive text, the cohesion would be so clear that when faced with the
jumbled sentences, readers would be able unerringly to reinstate the full authentic sentence order. In the present study, let us take as a criterion of text cohesion a correct run of over half of the text’s sentences (i.e. a run of four or more correctly sequenced sentences). In other words, the sequence must contain a block of at least four sentences in their correct order, for example: 1234675, 2173456, 1345672, etc. The data for this, shown in Table 4.9, reveal that using this approach, Coasts emerges as the most cohesive text (at least 50% of each reader group achieved a correct run of at least 4 sentences). Overall, the subjects had least success in inferring the cohesion of the College text, though the lowest proportion of readers achieving a correct run of sentences was the 10% (= one person) for the EN/UK group and the Rainforest text. In all three texts, the EN/UK group performed the worst of the three groups. It is surely significant that it is this group that can be assumed to have the least knowledge of Dutch and the least experience in editing Dutch English.

Table 4.9 Success of MT/country subject groups in achieving runs of at least 4 sentences in the correct sequence, as a percentage of all sequences for that group. In brackets, the number of times all the sentences in the given text were matched perfectly

<table>
<thead>
<tr>
<th>Text</th>
<th>EN/UK (N = 10)</th>
<th>EN/NL (N = 16)</th>
<th>DU/NL (N = 31)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coasts</td>
<td>50 (0)</td>
<td>62 (0)</td>
<td>61 (0)</td>
</tr>
<tr>
<td>Rainforest</td>
<td>10 (1)</td>
<td>37(1)</td>
<td>48 (8)</td>
</tr>
<tr>
<td>College</td>
<td>20 (1)</td>
<td>37(1)</td>
<td>23 (3)</td>
</tr>
</tbody>
</table>

To augment the conclusions drawn from Table 4.9 it would be useful to know which sentences/strings of sentences were most likely to be slotted into their correct (i.e. authentic) position and into correct runs, and why, because the degree to which the authentic sentence order is matched reflects the subject’s skill in inferring cohesion and also the relational coherence – i.e. the author’s ability to write coherent text. To reveal the concordance between subjects’ performance vis-à-vis the authentic sentence order I used a technique from geography: cartograms. A cartogram is a diagrammatic grid map. Cartograms are used in raster mapping, to depict changes in spatial variation by changes in shading. To use cartograms to show sentence sequencing, the author’s sentence sequence (1, 2, 3, 4, 5, 6, 7) was depicted as a sequence of seven contiguous squares in a row, each with its own distinctive shading code, going from white (sentence 1) to black (sentence 7). This benchmark
Two cohesion studies

sequence appears as the top row of the cartogram of a particular text. The subsequent rows underneath are the sequences made by the subjects in the study.

The cartograms were constructed using a standard Excel sorting program to sort the subjects’ sequences. The software compares each reconstructed sequence with the benchmark sequence, sorting them so that the sequences most like the benchmark sequence are placed in the upper part of the cartogram. The criteria for similarity were the matching of the sentence code numbers, going from left (sentence 1 in the benchmark sequence) to right (sentence 7). The sorted Excel data were converted to ASCI format and the cartograms were then drawn using the PC raster cartographic program. Figure 4.2 shows the cartograms for Coasts, Rainforest and College, for the EN/NL subjects, which is a conveniently sized group \((N = 16)\) to depict here; the smaller EN/UK group gives less idea of the pattern that can emerge, and the DU/NL group gives very long cartograms. The trends discernible in the EN/NL group were reflected in the other two groups too.

Figure 4.2 Cartograms of the reconstructed sentence sequences produced for the three texts by the EN/NL subjects \((N = 16)\). In each cartogram, the top row is the authentic sequence and is shown to establish the ideal sequence of shading.
If all the EN/NL readers had perfectly matched the authentic sentence sequence, the cartograms would look like ‘college scarves’, with unbroken longitudinal stripes that darken in shade as the sequence progresses from left to right. They do not. The Coasts cartogram has the most ‘unbroken stripe’ pattern, but it is clear that most subjects assigned sentence 2 to the sentence 1 slot: 71% (i.e. 44 people) of all the subjects in this study began their sentence sequence for Coasts 2,1 instead of 1,2. Only two EN/NL subjects matched sentence 1 correctly in Coasts; one achieved a matched string of 1, 2, 3, 4, 5, but the other mismatched all sentences except for sentence 1.

As Figure 4.2 shows, in Coasts there were 14 instances of sentence 2 being assigned to the sentence 1 slot, and ten persons (63% of the EN/NL) actually correctly sequenced sentences 3, 4, 5, 6, 7. What caused so many to reverse sentences 1 and 2, thus producing the striking pattern in the cartogram was the problem of covert cohesion referred to earlier, when discussing [1].

The first alinea of the Coasts text is shown below:

[4] Studying the impact of coastal water movement on the environment has been a geographical necessity for the Netherlands throughout its history. The Netherlands is a country that depends on water. Many people still remember vividly the storm surge disaster of February 1st, 1953, when the dikes in southwestern part of the Netherlands broke.

From [4] it can be seen that sentence 2 is difficult to relate to either of the sentences around it. Earlier (when introducing the text as [1]) I pointed out the false cohesion provided by the repetition of the word ‘water’ in sentence 2. Even if that problem is addressed by emending to ‘depends on protection from water’, overt cohesion still needs to be supplied by, for example, merging the first two sentences and inserting ‘because’ (…throughout its history, because the Netherlands is…’).

It is instructive to see how the ten editors (of the total of 57 who participated in the study) who returned edited versions of the texts dealt with this lack of cohesion between sentences 1 and 2. Their edited versions of [4] are presented in Appendix 4.2, roughly in order of increasing editorial intervention.

From Appendix 4.2 it can be seen ([2]-[6]) that five subjects (two EN/NL and three DU/NL) left the two problem sentences almost intact, though two of the DU/NL formalised the lack of cohesion, by starting a new alinea with sentence 2. Their responses could indicate that these subjects tolerate lack of cohesion, or that they had no quick and easy solution to the problem, or that they failed to understand what the author was trying to say – or all of these reasons. Other possible explanations could be that these editors have grown accustomed to such incoherence in the texts they edit, or that they
feel that it is not their job to be copywriters and that they should merely correct obvious errors of punctuation, grammar and spelling and leave the author to bear responsibility for what appears to be faulty logic. The solution I proposed (see text accompanying [1], earlier in this chapter), of emending ‘depends on water’ to ‘depends on protection from water’ requires the editor to go beyond the writing on the page and to draw on knowledge of the real world 3.

Figure 4.2 clearly shows that the sentence matching in the College text was the least successful. Though most of the EN/NL subjects correctly sequenced sentences 1, 2 and 3, the sequence in which they ordered the last four sentences varied greatly: though individual sentences may have been slotted into their correct position, there were few runs of correct matches. By contrast, the ‘more stripy’ cartogram of the Rainforest text shows that more readers agreed on certain runs of sentences, though these were not necessarily matches with the authentic run. In that text, 19 out of the total of 57 subjects (i.e. 33%) produced a sentence sequence that included the run 1, 2, 4, 3: see [5] below. Looking at this sheds more light on the clues readers use to infer cohesion.

[5] Tropical rain forests are among the most species-rich ecosystems in the world. They are a habitat for people and wildlife as well as a vital source of livelihood for indigenous and other population groups. The disappearance of tropical forests leads to the irreversible loss of biological diversity and natural resources and jeopardizes forest dwelling communities. The future existence of this ecosystem is under severe pressure by socio-economic developments.

A possible explanation for the transposing of sentences 3 and 4 is that the occurrence of the phrase ‘tropical forests’ early in sentence 4 encouraged the subjects to put that sentence third, so that it echoes the sentence-initial ‘tropical rain forests’ of the first sentence.

The refined analysis presented above, in which correct runs of sentences were examined and cartograms were used to visualise the data lead to the following conclusions about the texts’ cohesion and the subjects’ performance. The College text, with its preponderance of grammatically unacceptable sentences, turns out after all to be the text with the most jumbled attempts to restore sentence sequence. Yet in its authentic form ([3]) it is not

3 This could be described as an instance of interactional coherence (see chapter 6), i.e. of using specialist knowledge to pick up covert cohesion.
incoherent. When the sentences are jumbled, however, it seems that the errors they contain make it much more difficult for readers to infer the relational cohesion. Even the Dutch readers found this text problematic (Table 4.9). By contrast, the Coasts text, which had the fewest unacceptable sentences (Table 4.6) had the best matching runs of sentences (the most stripy cartogram), though poor cohesion between sentences 1 and 2 caused most readers problems.

When examining text cohesion in terms of success in unjumbling sentences, it would be useful to have an appropriate analytical technique that takes account of the success in achieving runs of matching sentences. Statistical techniques that examine concordance in ranking are inappropriate because the sentences that comprise a text cannot be assumed to have an equal probability of being assigned a certain rank. It is necessary to weight the sentences for their probability of being slotted into their ‘correct’ sequence. To be able to do this, one would have to develop a method for weighting that took account of the strength of the signal of cohesion with the preceding sentence. This would appear to be relatively easy in the case of referential cohesion (for example, the ‘They’ of sentence 2 in [15] is a strong reference to ‘Tropical rain forests’ in sentence 1). But as shown by the transposition of sentences 3 and 4 discussed above (and of sentences 1 and 2 in the Coasts text, discussed earlier), it is difficult to be objective about the strength of cohesion. The cartogram method provides a striking and simple visualisation of sentence sequencing that allows useful conclusions to be drawn about a text’s referential coherence.

**General conclusions from both studies**

A general conclusion from the two small-scale studies presented above is that mature readers who professionally edit and revise text exhibit differences in their ability to infer coherence and to emend cohesion by inserting connectives, by paragraphing, and by attempting to restore sequences of sentences. In English texts that contain transfers from Dutch (whether obvious, as in the case of the use of the abbreviation ‘a.o.’ or subtle, as in the case of using *alinea’s* to signal cohesion) or learner ineptitude, familiarity with Dutch appears to be an advantage when inferring cohesion.

In both the studies, the backwater NS subjects performed differently from the mainstream NSs. It could be that the greater tendency for backwater NSs to rate Dutch English sentences as unacceptable compared with their EN/UK counterparts is an overreaction brought about from being under the obligation to perform professionally as NSs while daily encountering NNS English and also speaking Dutch and therefore being subjected to second language interference. Two previous studies have suggested that prolonged
immersion in an NNS culture results in mother tongue attrition. In Puerto Rico, Nash (1983) found that there was a relation between the duration of stay of NSs (Americans, primarily working in the business community) in Puerto Rico and their acceptance of sentences in ‘Englañol’ (the interlanguage English spoken by Puerto Ricans). More recently, Porte (1999) found that NS English language teachers resident in Spain were susceptible to desensitisation to NNS errors because of ‘the pervasive influence of the L2’ and to ‘the kind of defective L1 input normally received in language-learning contexts’.

The results of the second study I conducted suggest that influence from the foreign language need not necessarily be disadvantageous: compared with the EN/UK editors, the EN/NL editors were much better able to reinstate strings of sentences. I argued that this might be attributable to their being able to infer the implicit ‘Dutch’ cohesion. Of course, if ability to infer ‘Dutch’ cohesion leads EN/NL editors to be complacent about this arguably ‘inadequate’ cohesion, then the inadequacy survives the language revision stage and will probably cause problems to readers further down the line, who have no experience of coping with Dutch cohesion. For this reason, in studies purporting to examine stereotypical NS reaction to NNS texts, it is advisable to use NS subjects who are ensconced in their mother tongue culture.

The response of the Dutch and English subjects to the three Dutch-authored texts in the second study suggests that if scientists who are not professional language revisers or editors and have no knowledge of Dutch are confronted with Dutch English research articles containing Dutch interference and cohesion, they will have great difficulty in inferring cohesion. It is therefore interesting to see how such scientists react to authentic Dutch-authored texts that are considerably longer than those used in the study described above, and to ascertain which textual problems are important to them, as done in the reception study described in the next three chapters.
Chapter 5

The reception study on Dutch scientific English: design, readers’ assessments, reading times, and proofreading and epistemic annotations

In the second study described in chapter 4, I showed that readers had difficulty inferring the authentic order of jumbled sentences because of poor relational coherence that may have been the result of learner (i.e. NNS) writing, or to reliance on the implicit cohesion favoured by Dutch authors (see chapter 3), or unskilled writing – or all of these reasons. I argued that when poor cohesion between sentences was accompanied by numerous NNS syntactic and lexical errors, readers found it more difficult to restore sentence order, i.e. to infer coherence. That errors in writing bring about errors in reading was shown earlier, in Figure 2.2, which showed the three levels of errors of writing postulated by James (1998). These levels were the within-sentence ‘errors of substance’ (i.e. spelling errors), the errors associated with strings of sentences (text-level errors) and thirdly, the errors at what James calls the deepest level: discourse level. The figure shows that each level of writing error is associated with a corresponding error in the reading process. The text level is the level at which the two studies in chapter 4 were situated; in this chapter we will move on to the level of discourse, which is the level at which a text is experienced holistically, as an example of a genre.

James’s paradigm and the conceptual model I developed from it (Figure 2.3) can be applied to different NS/NNS combinations, depending on whether the text or the readers – or both – are NS or NNS. The studies in chapter 4 explored the interactions between NS text and NS plus NNS readers, and between NNS text and NS and NNS readers, with NNS being Dutch. But in the real world, a Dutch English research article (the NNS text type this thesis focuses on) is intended for the international scientific community and is therefore read by various NSs (American, British, Australian, for example) and NNSs (French, Spanish, German, Japanese, for example – but also Dutch compatriots). Because the discourse community is international, these readers will share part of the author’s content schema (i.e. knowledge of a particular science) and formal schema (knowledge of the research article genre). However, except for the Dutch or Dutch-speaking readers, the readers will not share ‘Dutch’ aspects of the author’s formal schema: the ideas current in Dutch academia and Dutch science of what is

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1 Schemata were discussed in chapter 2.
appropriate writing style. And, as demonstrated in chapter 3, some of these do differ from English, and Dutch authors often transfer them to their scientific English. As argued in chapters 1 and 3, these are cultural transfers and they often result in a mismatch of conventions. Similarly, the schemata of non-Dutch NNS readers will be culturally coloured. This will influence what these readers expect from a Dutch English research article and how they interpret its English. (They will infer it is Dutch-authored from the author’s name and affiliation.) Meanwhile, NS readers who are monolingual can be expected to have little appreciation of the existence of other, different, conventions for reporting science and of transfer from other language systems. The reception study whose implementation and general findings are described in this chapter was intended to explore these aspects. For this study it was therefore decided to recruit readers from scientists with different mother tongue backgrounds, to achieve a mixture of NSs and NNSs reflecting some of the diversity in the scientific discourse community.

In this chapter, I propose not only to describe the design and implementation of the reception study, but also to present and discuss the findings of its first part: the readers’ global assessment of the test texts. This paves the way for an examination of the general issues raised by Part 2 of the study in which readers read and annotated the texts. After evaluating the time readers spent annotating, I discuss the challenge of classifying the annotations and of deciding which classes merited treatment in separate chapters. The findings on only two types of annotation are presented in this chapter. They represent the two extremes of revision depicted in Figure 2.3: superficial and content-based. First, however, I explain and justify the design of the study.

The design of the reception study

Aims

- To find out what aspects of Dutch scientific English are noticed by real readers, i.e. fellow biologists from diverse linguistic backgrounds (NS and NNS).
- To see whether the linguistic and textual features the readers in the study commented on or altered could be attributed to generic English-learner error, or specifically to linguistic transfer\(^2\) from Dutch, or to transfer of Dutch writing style.

\(^2\) Linguistic transfer was explained in chapter 3: page 80.
The general hypotheses to be tested

Three general hypotheses can be derived from the foregoing:

1. **The readers’ assessment of a (scientific) NNS text containing learner errors and stylistic features transferred from the mother tongue is coloured by their cultural (as defined in chapter 1) and linguistic background.** The most obvious corollary is that a reader’s assessment of (and alterations to) such a Dutch-authored text will vary, depending on whether that reader is an NS or an NNS. By virtue of their NS status, the NS readers are likely to identify more shortcomings in the text than the NNS readers. The response of individuals within the NNS group will vary, depending on proficiency in English and on degree of similarity between the conventions in their science writing culture versus Dutch science writing culture.

2. **Readers unfamiliar with the culture and mother tongue of the author of the NNS text will experience more problems with the text than readers sharing the author’s NNS background.** This implies that Dutch readers will experience fewer problems with Dutch scientific English than the other NNSs and the NSs.

3. **Reviewers, i.e. scientists with experience of reviewing English language research papers for journals, will read texts more critically (i.e. make more alterations) compared with the non-reviewers, who – as argued in chapter 1 - can be assumed to be more ‘normal’ readers.** The critical reading will relate not only to aspects of the English but also, and more importantly, to the scientific calibre of the text and the text’s adherence to the conventions of the research article genre.

The approach

Readers would be invited to comment on extracts from authentic Dutch-authored research papers. By ‘authentic’ is meant that the texts had been written with an eye to publication, by Dutch scientists who had not been forewarned that their texts would be used for linguistic research. Furthermore, the texts had not been corrected by an NS, though they had been revised by their authors in the light of critical comments from Dutch colleagues (compare Knorr-Cetina 1981). They could therefore be assumed to represent a generic Dutch perception of what is appropriate style for a research paper.

**Three texts** were used, to make it easier to identify generic problems in Dutch scientific English. And because it was concluded that the Maastricht study described in chapter 4 would have been more useful if the text had been longer, it was decided to use texts of several pages that were entire sections of research papers. This also had the advantage of better mimicking what a
scientist would read in real life. So as not to overtax the volunteer readers’ patience and goodwill, the text extracts were to be no longer than 1500 words.

Assuming a research paper is written in the classic IMRAD (Introduction, Methods, Results and Discussion) format, which of these four sections is best to use as a text extract in a reception study like this? In the survey I conducted among delegates to an international conference for science editors (Burrough-Boenisch, 1999a) I found that the Introduction was not important to all readers – especially not to NNSs. The 67 respondents’ reading strategies were analysed to find their reading strategies when reading in different roles: as scientists, journal reviewers and journal editors. I found that for NSs and NNSs alike, the Results and Discussion – the two most news-rich sections – were important to all three reader roles. Of these two sections, it is the Discussion that requires particular rhetorical skills from the author, who must present an argument convincingly, write persuasively and display scientific integrity (Bazerman, 1988). It is, together with the Introduction, a section in which the writer may opine (Mauranen, 1993) and therefore must be able to deploy English appropriately (verb tenses, register, hedging devices). Gosden (1995: 46) even goes so far as to say that Results and Discussion sections ‘are the crux of a scientific RA’s [research article’s] contribution to the state of current knowledge’. For these reasons, I opted to use Discussion sections, and to supply the research article titles and Abstracts, to provide context.

The texts were to be on biology, specifically on vegetation science. Since 1976, I had done many editing assignments in this field, so was confident I would be able to find test texts easily. Furthermore, as pointed out in chapter 1, there is a basis of previous research done by other applied linguists (notably Berkenkotter and Huckin, 1995b; Gosden, 1996, Hyland, 1997 and Myers, 1985) on aspects of biologists’ writing and reading.

The study to ascertain readers’ responses to the test texts was to have two parts. In Part 1, readers would be e-mailed a single text, plus questions to ascertain their global assessment; after receiving their response, I would send the second text plus the questions, and so on. In Part 2, they would be sent print-outs of all three texts together, for annotation.

The three test texts

In 1998, I began to look for suitable texts that met the criteria described above. Eventually, from new clients that year, I selected three texts, henceforth referred to as A, K and R (the coding was arbitrary). They are reproduced in Appendix 5.1, and some details on them are shown in Table 5.1. The table shows that after the English had been revised, two of the texts
Table 5.1 Details on the texts and authors used in the reception study

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<th>Attribute</th>
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</tr>
</thead>
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</tr>
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</tr>
<tr>
<td>Author age</td>
<td>44 years</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
</tr>
<tr>
<td>N previous publications</td>
<td>2</td>
</tr>
<tr>
<td>in English¹</td>
<td></td>
</tr>
<tr>
<td>Destination of text</td>
<td>Publication in</td>
</tr>
<tr>
<td></td>
<td>international journal,</td>
</tr>
<tr>
<td></td>
<td>chapter in doctoral</td>
</tr>
<tr>
<td></td>
<td>thesis</td>
</tr>
</tbody>
</table>

¹ including co-authored ones

were to be submitted to international journals and were subsequently to be published in a doctoral thesis. The third text (K) was submitted by an author who had initially sent me another manuscript for English revision on an appropriate topic but not in IMRAD format. Having passed the scrutiny of Dutch academics and editors prior to being published as a chapter in a thesis with an ISBN number, Text K can be assumed to represent scientific English that is acceptable to the Dutch scientific community.

When I selected the texts, I had not met the authors and did not know their age. The only contact I had had was by telephone. When they supplied details on their age and previous publications, I discovered that all three were middle-aged. Knowing that two were doing doctoral research and one had just been awarded his doctorate, I had assumed they would be younger. Their publications record (Table 5.1) suggests that two were novice writers in English, but that author K was not. The fact that the texts were sent to me for language revision indicates that the authors (or their superiors) recognised that the English was not optimal. It seems justifiable to assume that the texts are
therefore examples of the English written by Dutch scientists who are not among the most proficient in English. They were not examples of the worst Dutch scientific English: several authors’ editors working in the Netherlands confirmed my suspicion (and experience) that Dutch authors’ proficiency in scientific English is not age-related.

The dry run

Before the readers were recruited, in autumn 1998 the materials to be used in the study were tested on five NS authors’ editors resident in the Netherlands. The aim was to check that the questionnaire and instructions accompanying the texts were clear, and to obtain an indication of how long readers might spend annotating the text. The text assessments produced by this dry run are summarised in Table 5.2.

Table 5.2 Summary of text assessments in the dry run with five NS editors

<table>
<thead>
<tr>
<th>Text</th>
<th>Reading time</th>
<th>Readers’ reactions to text</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>15-25 minutes</td>
<td>Generally rated highly in terms of communication, text flow and development of argument. Sentence length judged to be from ‘about right’ to ‘too long’. Minor to moderate editing needed.</td>
</tr>
<tr>
<td>K</td>
<td>5-20 minutes</td>
<td>Generally rated moderate to poor in terms of communication, style, flow of text and development of argument. Minor to moderate editing needed.</td>
</tr>
<tr>
<td>R</td>
<td>10-15 minutes</td>
<td>Produced wide range in responses (scores on communication, style, flow, etc. ranged from good to poor; editing required ranged from minor to substantive).</td>
</tr>
</tbody>
</table>

In the light of the comments from the five dry-run readers, I revised the wording of the test questionnaire (for Part 1 of the study) and instructions (for Part 2 of the study). The final versions are given as Appendices 5.2 and 5.3.

The readers

The aim was to recruit readers from a range of mother-tongue backgrounds. This was to find out to what extent there is international agreement about features of Dutch scientific English and also to reflect the diversity of the discourse community. I wanted readers representing mother tongues and writing cultures varying in their similarity to and familiarity with the Netherlands. The readers would comprise NSs and NNSs, with the NSs from the UK and the US. The NNSs would include a Dutch group (to act as the control), but also readers from Scandinavia and northern Europe, plus readers...
Reception study

from southern Europe, and readers from at least one non-European country. The ‘country’ affiliation would thus represent a particular combination of mother tongue and writing culture.

Another way in which the sample of readers could reflect the real-life readers of Dutch scientific English would be to ensure that it included the two types of readers of scientific journals. These are the ‘normal’ readers (scientists who read to gain information) and the reviewers: the latter are scientists who have served the discourse community by vetting scientific articles for publication, and who can therefore be expected to be more critical because of their experience in acting as gatekeepers to scientific publication (see Berkenkotter and Huckin, 1995b; Burrough-Boenisch, 1999, and also chapter 3 of this thesis). The study design therefore envisaged equal-sized groups of readers for each country, with each group subdivided into equal numbers of reviewers and non-reviewers.

To recruit the readers, I initially sought assistance from the editors of three respected international English-language biology journals that publish articles in vegetation science: Journal of Ecology and Ecology (both published in the UK) and Oikos (published in Sweden). I was fortunate in being given access to these journals’ lists of reviewers, which yielded candidate readers from the UK, US, Netherlands, Sweden and Japan. Wishing to include readers from Germany and from at least one Romance-language country, I enlisted the help of colleagues in the European Association of Science Editors, and Dutch academics. They provided me with names of biologists (vegetation scientists) who were known to them as journal reviewers.

The recruitment campaign started in February 1999, when I e-mailed or wrote to over 100 reviewers from the countries shown in Table 5.3, explaining the general aim of my research (to ascertain the response of mature, real-life readers to Dutch scientific English) and its two-part set-up, and inviting them to participate. In the recruitment letter, the reviewer was asked also to recruit a non-reviewer colleague (for the purposes of this study, reviewers were defined as persons who had reviewed at least one English-language paper for an international journal) and to supply an e-mail address of this colleague. In this way I hoped to achieve equal numbers of reviewers and non-reviewers. To ensure that the non-reviewers were not undergraduates (and therefore total novices in the discourse community) I specified that they should at least have a degree in biology.
Table 5.3 The countries from which readers were recruited for the reception study

<table>
<thead>
<tr>
<th>Country</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>NS: expected to be unfamiliar with NNS English in general and Dutch scientific English in particular</td>
</tr>
<tr>
<td>UK</td>
<td>Ditto</td>
</tr>
<tr>
<td>Netherlands</td>
<td>NNS: the control group (sharing mother tongue and culture of texts’ authors)</td>
</tr>
<tr>
<td>Germany</td>
<td>NNS: as German is linguistically close to Dutch, and the German scientific tradition was influential in the Netherlands until the mid-20th century (see chapter 3), expected to have affinity with Dutch scientific English</td>
</tr>
<tr>
<td>Sweden</td>
<td>NNS: Swedish, like Dutch, is a minority European language; Swedish science can be expected to be based on the Germanic scientific tradition</td>
</tr>
<tr>
<td>France</td>
<td>NNS: expected to differ strongly from the Dutch linguistically and in terms of the cultures of writing and of science</td>
</tr>
<tr>
<td>Spain</td>
<td>NNS: expected to share certain conventions in terms of linguistics and science reporting with the French (both Romance languages; neighbouring countries with a more Latinate than Germanic tradition)</td>
</tr>
<tr>
<td>Japan</td>
<td>NNS: important in the international scientific discourse community, but expected to have no linguistic or cultural affinity with Dutch science reporting and therefore to have major problems with Dutch scientific English</td>
</tr>
</tbody>
</table>

It soon became clear that the target of 20 readers per country (10 reviewers and 10 non-reviewers) was over-ambitious. Those who declined to participate usually gave as their reason pressure of research and academic work. I therefore extended the recruitment campaign by contacting botanists and vegetation scientists directly from university Internet pages. In all, over a hundred reviewers were approached in writing, via conventional post or e-mail. Regrettably, the target of having 10 reviewers and 10 non-reviewers per country class was not achieved. Only 35 reviewers enrolled in the study, and not all recruited a non-reviewer colleague: the final number of people enrolled was only 67.

The implementation of the study

The study ran from February 1999 to September 1999. Once a person had enrolled, I randomly allocated them a number between 1 and 6. This number indicated the permutation in which they would be sent the texts. The six sequences were:
I then e-mailed that person the first Discussion text (plus the paper title and
Abstract), plus the six standard questions to find out what readers thought of
the English and style of the text (Appendix 5.2a) and also a series of questions
asking for personal data such as age and languages spoken and read
(Appendix 5.2b). Once I had received their e-mailed replies to the six standard
questions and to the questions about personal details, I e-mailed the second
text plus the six standard questions. And when those questions had been
answered by e-mail, I e-mailed the third text plus the six standard questions.
A person who had returned answers to the standard questions for all three
texts had completed Part 1 of the study. I then e-mailed my thanks and
proceeded to Part 2 of the study.

In Part 2 of the study I sent the reader paper versions of the three
texts, stapled together in the same order he or she had read them in Part 1.
Again, the texts were accompanied by their titles and Abstracts. The actual
Discussion texts were printed out at 1.5 line spacing, to make it easier for
readers to annotate. The instructions for Part 2 of the study are in Appendix
5.3. Briefly, readers were asked to reread the texts, making changes that
‘would improve the English and the text’s effectiveness and appropriateness’.
They were also invited to make comments in the margin. To encourage
replies, I enclosed an pre-addressed envelope plus postage stamps or
international reply coupons. Once I had received the annotated texts, I e-
mailed my thanks. In July 2000 I sent all those who completed the study a
preliminary report of my findings.

As the study progressed, there were inevitably drop-outs. Of the 67
people who enrolled, seven (two Americans, one Briton, two Spaniards and
two Dutch) dropped out without returning an e-mail assessment of the first
text they had been sent. More dropped out during Part 1: only 53 people
completed Part 1 (the e-mail assessments of the three texts, sent separately)
and proceeded on to Part 2. When I noticed that readers in Part 1 who had sent
in responses to two texts were taking more than a few weeks to reply to the
third text, I sent e-mails gently chivvying them to complete. This achieved
some success. It was also necessary to chivvy readers to complete Part 2:
ultimately, however the number of readers completing both parts of the study
was only 45\(^3\) (see Table 5.4). This number is much smaller than the 160 foreseen in the experimental design described earlier but, in retrospect, it was optimistic to expect that busy scientists would be prepared to devote much time to such a study. The 45 readers who did complete both parts of the study provided me with a unique data set of assessments of and annotations to the same three texts, on which the remainder of this thesis is based.

**Table 5.4 Readers who completed both parts of the reception study\(^4\)**

<table>
<thead>
<tr>
<th>Country of residence</th>
<th>Reviewers</th>
<th>Non-reviewers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>5</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>UK</td>
<td>5</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Germany</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Sweden</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>France</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Spain(^1)</td>
<td>5</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Japan</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>28</strong></td>
<td><strong>17</strong></td>
<td><strong>45</strong></td>
</tr>
</tbody>
</table>

\(^1\)included 6 Catalan speakers

The final number of readers compares very favourably with the numbers of subjects used in other applied linguistics research (for example, the groups of less than ten studied by Mauranen (1993, 1997), or the class-sized groups of students used in other studies (e.g. Broekkamp and van den Bergh, 1996). The low numbers in the country classes meant that comparisons between countries would only be useful if differences between countries were large, but there were sufficient numbers in the native-speakerhood classes (14 NSs and 31 NNS) and reviewer classes (28 reviewers, 17 non-reviewers) for useful statistical analysis.

The statistical analyses of the data collected in both parts of the study were driven by the three hypotheses presented earlier in this chapter:

1. Readers’ assessment of a (scientific) NNS text is coloured by their cultural and linguistic background.

---

\(^3\) It would have been 46, but unfortunately I mislaid the annotated texts of one Dutch reviewer.

\(^4\) Note that in this Table and all others showing data for the country groups, these groups are presented beginning with the NS countries, followed by the Netherlands, and then by the other countries ordered roughly according to presumed affinity with Dutch language and culture.
2. Readers unfamiliar with the culture and mother tongue of the author of the NNS text will experience more problems with the text than readers sharing the author’s NNS background.

3. Reviewers, i.e. scientists who have reviewed English-language research papers for journals will read texts more critically (i.e. make more alterations) compared with non-reviewers.

In these analyses therefore the fixed factors used were:
- ‘native-speakerhood’ (hypothesis 1), i.e. NS versus NNS
- country (hypotheses 1 and 2 – the latter with reference to the distinction between Dutch and others NNSs)
- reviewer status (hypothesis 3)

The findings of the assessment by e-mail

Sociological characteristics of the readers

The sociological characteristics of the 45 readers are:
**Age:** mean = 38.4 years, range 24 – 60 years; NSs tended to be older than NNSs (means of respectively 39.7 years and 37.7 years) and the reviewers tended to be older than the non-reviewers (means of respectively 41.6 years and 33.0 years).

**Sex balance:** 35 males, 10 females (1 US, 2 UK, 1 Dutch, 1 German, 2 French, 3 Spanish)

**Science background:** 1 entomologist, 1 forester, 1 agronomist, 5 biologists and the remainder in plant sciences.

Except for the five Dutch biologists, none of the 45 readers had spent four months or more working in an academic environment in the Netherlands. They can therefore be assumed not to have been habituated to Dutch English.

The response to the questions asking about the language(s) the readers use to read and write research articles confirmed the importance of English as the language of science and showed that all the respondents used English actively. All read and wrote research articles in English, with one exception: a Dutch doctoral student who had not yet written a research paper. All the American and British readers wrote in English only. All the British and four of the Americans read English-language research articles only. The remaining two Americans sometimes read articles in Spanish and French.

Table 5.5 presents the data on writing and reading research articles, for the NNS readers only. It can be seen that over half of the NNSs read research articles in their mother tongue, but less than half wrote research articles in their mother tongue.
Chapter 5

Table 5.5 NNS readers’ use of mother tongue to read and write research articles

<table>
<thead>
<tr>
<th>Mother tongue</th>
<th>N using mother tongue</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To read</td>
</tr>
<tr>
<td>Dutch (N=5¹)</td>
<td>2</td>
</tr>
<tr>
<td>German (N=5)</td>
<td>5</td>
</tr>
<tr>
<td>Swedish (N=4)</td>
<td>2</td>
</tr>
<tr>
<td>French (N=4)</td>
<td>3</td>
</tr>
<tr>
<td>Spanish¹ (N=9)</td>
<td>3</td>
</tr>
<tr>
<td>Japanese (N=4)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Totals (N NNSs = 31)</strong></td>
<td><strong>18 (58%)</strong></td>
</tr>
</tbody>
</table>

¹ 1 Dutch respondent had not yet written a research paper
² Catalan was the mother tongue of 6 of the Spanish respondents, but only 1 Catalan read and wrote research articles in her mother tongue

Table 5.6 shows that seven readers read research articles in a language other than English and their mother tongue. The only two readers who wrote research articles in a language that was neither their mother tongue nor English were both Catalan NSs who wrote in Spanish.

Table 5.6 Readers’ use of languages other than English and their mother tongue, to read and write research articles

<table>
<thead>
<tr>
<th>Reader’s mother tongue</th>
<th>Using a foreign language that is neither English nor the mother tongue</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To read</td>
</tr>
<tr>
<td>US English (N=6)</td>
<td>2¹</td>
</tr>
<tr>
<td>UK English (N=8)</td>
<td>0</td>
</tr>
<tr>
<td>Dutch (N=5)</td>
<td>3¹</td>
</tr>
<tr>
<td>German (N=5)</td>
<td>0</td>
</tr>
<tr>
<td>Swedish (N=4)</td>
<td>2¹</td>
</tr>
<tr>
<td>French (N=4)</td>
<td>0</td>
</tr>
<tr>
<td>Spanish/Catalan (N=9)</td>
<td>2</td>
</tr>
<tr>
<td>Japanese (N=4)</td>
<td>0</td>
</tr>
</tbody>
</table>

¹ both read 2 foreign languages (French, Spanish)
² 1 Dutch reader had not yet written a research paper
³ 1 read French, 1 read German and French, 1 read French, Spanish and German
⁴ both read German
⁵ both Catalans, writing in Spanish
The global assessments of the three texts

Many readers made use of the ‘Comments’ option at the end of the six questions mailed with each text. The comments have been collated and are presented in Appendix 5.5.

The responses to the six questions (Appendix 5.2a) e-mailed with each text in Part 1 of the survey gave a preliminary indication of differences between the texts, and between the groups of readers. Question 1 was to elicit information about readers’ perception of the standard of English. Questions 2, 3 and 4 were to elicit their assessment of the texts’ style. Text flow and sentence length (questions 3 and 4) were singled out because, as argued in chapter 3) ‘choppy’ writing and short sentences are attributes of Dutch writing. The assumption underlying question 5 was that because of the short sentences and lack of cohesion (see chapter 5) and by contrast with other discourse styles (notably Spanish and French) which are characterised by ‘elaborate’ multi-clausal sentences (see Connor, 1996: 53), the style would be perceived as being plain and direct. Furthermore, by asking readers to choose between ‘appropriate’ and ‘inappropriate’, I hoped to ascertain whether the style was appropriate for the genre. Finally, through question 6 I wished to find out whether the readers agreed on the text’s suitability (linguistic and scientific) for publication.

To analyse the responses to questions 1 – 2 I allocated scores to the multiple choice options, as shown below, and performed statistical analyses on the resulting ordinal data, using univariate General Linear Models.

**Q 1: Choose ONE of the following to describe the English of this Discussion**

- 1 = very poor
- 2 = poor
- 3 = adequate
- 4 = good
- 5 = excellent

**Q 2: Choose ONE of the following to describe how the author presents and develops the Discussion:**

- 1 = very poorly
- 2 = poorly
- 3 = adequately
- 4 = well
- 5 = excellently
In question 3, only one reader (Spanish) responded that sentence flow was unimportant; he did so for all three texts. I therefore removed him from the data set, ranked the remaining three options as shown below and performed statistical analyses using univariate GLMs.

**Q 3: Choose ONE of the following to describe how the text flows from sentence to sentence:**

1 = jerkily
2 = unevenly
3 = smoothly

Table 5.7 gives the descriptive statistics for the scores to questions 1 to 3. The univariate GLM analyses I performed looked for significant interactions between effects (native speakerhood, reviewer status, text): none were found. The run for question 1, with fixed factors native-speakerhood (NS versus NNS), reviewer status (reviewer or non-reviewer) and text, found a significant effect of text \( (F(2, 123) = 6.850, p = 0.002) \). The post hoc analysis (Tukey) revealed that this was because Text A’s mean score was significantly lower than the mean scores for Texts K and R (recall that the readers could allocate a score between 1 (very poor) and 5 (excellent)). Text A’s poor rating also showed up when reader’s country was substituted for native-speakerhood as a fixed factor; the effect of text was significant \( (F(2, 90) = 4.861, p = 0.010) \). In this run, country also had a significant effect \( (F(7, 90) = 2.163, p = 0.045) \), though too small to be elucidated by post hoc (Tukey) analysis. The conclusion for this question, that the English of Text A (Table 5.7) was rated as significantly worse than the English of Texts K and R, runs counter to the assessments of the NSs in the dry run (Table 5.2). This suggests that language revisers and scientists have different expectations from the English of a scientific text.

I similarly analysed the scores for question 2 (which assessed readers’ views of how well the author presented and developed the Discussion). The run with fixed factors native-speakerhood (NS versus NNS), reviewer status (reviewer or non-reviewer) and text, found no interactions and no significant effects of the fixed factors. When the run was repeated, with country instead of native-speakerhood, there was a near-significant effect of reviewer status \( (F(1, 134) = 3.924, p = 0.051) \). From these results it can be concluded that there was general agreement that in all three texts the Discussion developed nearly adequately (Table 5.7).

The analysis of the response to question 3 revealed no significant differences. From this, and given the means shown in Table 5.7, we may conclude that the sentence flow in all three texts was generally perceived as being somewhat uneven.
Table 5.7 Descriptive statistics for responses to questions 1 and 2 (N readers = 45) and question 3 (N readers = 44: see text for explanation)

<table>
<thead>
<tr>
<th>Question</th>
<th>Text</th>
<th>Mean score</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>2.71</td>
<td>1.01</td>
</tr>
<tr>
<td>(evaluation of the English, from very poor (=1) to excellent (= 5))</td>
<td>K</td>
<td>3.47</td>
<td>0.97</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>3.27</td>
<td>0.78</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>3.15</strong></td>
<td><strong>0.97</strong></td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>2.96</td>
<td>0.98</td>
</tr>
<tr>
<td>(development of Discussion (very poor =1, to excellent = 5))</td>
<td>K</td>
<td>2.96</td>
<td>0.93</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>2.82</td>
<td>1.01</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>2.91</strong></td>
<td><strong>0.97</strong></td>
</tr>
<tr>
<td>3</td>
<td>A</td>
<td>2.36</td>
<td>0.65</td>
</tr>
<tr>
<td>(sentence flow: jerky = 1, uneven = 2, smooth = 3)</td>
<td>K</td>
<td>2.52</td>
<td>0.59</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>2.23</td>
<td>0.74</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>2.37</strong></td>
<td><strong>0.67</strong></td>
</tr>
</tbody>
</table>

For question 4, which asked whether readers found the sentences generally too short, too long, an unsatisfactory mix, a satisfactory mix, or whether sentence length was unimportant, the options yielded nominal, not rank data. These are shown in Tables 5.8a and 5.8b, broken down for native-speakerhood and reviewer status, respectively. To facilitate comparison, the data have been converted to percentages. It is clear that per text, half or more of the readers (regardless of native-speakerhood or reviewer status) opted for the answer ‘a satisfactory mix of sentence lengths’. The only indication of a possible effect of a reader attribute (in this case, reviewer status) was for Text R, where the sentence length was deemed satisfactory by almost 90% of reviewers, compared with almost 60% of non-reviewers.

Table 5.8a Question 4 (on sentence length): readers’ responses as NSs (N = 14) and NNSs (N = 31), expressed as percentages

<table>
<thead>
<tr>
<th>Sentence length</th>
<th>Text A</th>
<th>Text K</th>
<th>Text R</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% NS</td>
<td>% NNS</td>
<td>% NS</td>
</tr>
<tr>
<td>Too short</td>
<td>0</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Too long</td>
<td>14</td>
<td>19</td>
<td>7</td>
</tr>
<tr>
<td>Unsatisf. Mix(^1)</td>
<td>21</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Satisf. mix</td>
<td>50</td>
<td>65</td>
<td>71</td>
</tr>
<tr>
<td>Not important</td>
<td>14</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>~100</td>
<td>~100</td>
<td>~100</td>
</tr>
</tbody>
</table>

\(^1\) from the frequencies per country (data not shown here), it was notable that five of the nine readers who found the sentence length in Text K to be ‘an unsatisfactory mix’ were from Spain.
Table 5.8b Question 4 (on sentence length): readers’ responses as reviewers ('rev.', N = 28) and non-reviewers ('n.-rev.' N = 17), as percentages

<table>
<thead>
<tr>
<th>Sentence length</th>
<th>Text A</th>
<th></th>
<th>Text K</th>
<th></th>
<th>Text R</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% rev.</td>
<td>% n.-rev.</td>
<td></td>
<td>% rev.</td>
<td>% n.-rev.</td>
<td></td>
</tr>
<tr>
<td>Too short</td>
<td>7</td>
<td>6</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>Too long</td>
<td>18</td>
<td>12</td>
<td>4</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Unsatisf. mix</td>
<td>14</td>
<td>6</td>
<td>21</td>
<td>18</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Satisf. mix</td>
<td>57</td>
<td>65</td>
<td>64</td>
<td>71</td>
<td>89</td>
<td>59</td>
</tr>
<tr>
<td>Not important</td>
<td>4</td>
<td>12</td>
<td>7</td>
<td>6</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>~100</td>
<td>100</td>
<td>~100</td>
<td>~100</td>
<td>~100</td>
</tr>
</tbody>
</table>

I used GLM analysis to test whether there was an effect of native-speakerhood or reviewer status, and/or any interaction between texts in the responses to question 4. The fact that most readers opted for the ‘satisfactory mix’ response, provided me with a way of dealing with the nominal data generated by the question. To do so, I converted the raw data on which Table 5.8 is based into ‘presence/absence’ data. Each response that was ‘satisfactory mix’ was assigned a 1, and all other responses to question 4 were assigned a 0. The GLM analysis was performed with fixed factors as described above for questions 1, 2 and 3. No significance emerged, nor any interaction between the fixed factors; what this analysis did show was that the difference of 30% between the proportions of reviewers and non-reviewers who described the sentence mix of Text R as ‘satisfactory’ was not significant in the context of the responses to the other two texts.

Question 5 asked readers to choose one word from each of the following three pairs, to describe the writing style: plain/elaborate, appropriate/inappropriate, and direct/indirect. Two NNS readers (Spanish and Japanese) seem not to have understood the question and did not supply three words (one from each pair). I took account of this when calculating the percentages shown in Tables 5.9a and 5.9b. As the tables show, my expectation that the readers would tend to opt for ‘plain’ and ‘direct’ to describe the writing style was met. Indeed, Text R was unanimously characterised as such by all the NSs.

The largest disparity in the assessments elicited by question 5 was between the appropriateness of the style of Texts A and K; over 90% of all readers thought that the style of Text K was appropriate, compared with about two-thirds of readers in the case of Text A. To investigate this, I followed a similar approach to the one used for investigating the answers in the ‘satisfactory/unsatisfactory’ option of question 4, described above. I converted the raw data collected on the ‘appropriate/inappropriate’ part of question 5
into ‘presence/absence’ data, assigning a 1 to the response ‘appropriate’ and a 0 to the response ‘inappropriate’. A GLM analysis with the fixed factors native-speakerhood, reviewer status and text found no significant differences, however.

Table 5.9a Response to question 5: percentages of NS (N = 14) and NNS (N = 31) readers opting for ‘plain’, ‘appropriate’ and ‘direct’ to describe text’s style

<table>
<thead>
<tr>
<th>Text</th>
<th>Plain</th>
<th>Appropriate</th>
<th>Direct</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% NS</td>
<td>%NNS</td>
<td>% NS</td>
</tr>
<tr>
<td>A</td>
<td>71</td>
<td>73¹</td>
<td>64</td>
</tr>
<tr>
<td>K</td>
<td>79</td>
<td>68</td>
<td>93</td>
</tr>
<tr>
<td>R</td>
<td>100</td>
<td>77</td>
<td>86</td>
</tr>
</tbody>
</table>

¹ percentages with this superscript were calculated using 30 NNSs, because 1 NNS failed to provide an answer to this part of the question

Table 5.9b Response to question 5: percentages of reviewer (‘rev.’, N=28) and non-reviewer (‘n.-rev.’, N = 17) readers opting for ‘plain’, ‘appropriate’ and ‘direct’ to describe text’s style

<table>
<thead>
<tr>
<th>Text</th>
<th>Plain</th>
<th>Appropriate</th>
<th>Direct</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% rev</td>
<td>% n-rev</td>
<td>% rev</td>
</tr>
<tr>
<td>A</td>
<td>79</td>
<td>63¹</td>
<td>64</td>
</tr>
<tr>
<td>K</td>
<td>75</td>
<td>69¹</td>
<td>93</td>
</tr>
<tr>
<td>R</td>
<td>82</td>
<td>88</td>
<td>79</td>
</tr>
</tbody>
</table>

¹ percentages with this superscript were calculated using 16 non-reviewers, because 1 non-reviewer failed to provide an answer to this part of the question
² the percentage with this superscript was calculated using 27 reviewers, because 1 reviewer failed to provide an answer to this part of the question

The options in question 6, the question to ascertain how much needed to be done to the text to make it publishable, were not mutually exclusive. Readers were invited to choose one or more of the options *copy-editing*, *revision by an editor specialising in NNS texts*, *revision by the author*, *drastic editing*. Though this sequence roughly mirrors the increasing intensity of revision interventions shown in Figure 2.3, they are not mutually exclusive. For example, drastic editing (implying attention to content as well as to form) could include all three preceding revision options, or might exclude copy-editing and/or revision by the author. Given the scope for personal interpretation of how drastic each of these options might be (recall the discussion in chapter 2 on the disagreement about editing and revision
terminology) I therefore expected that the readers’ answers would not be straightforward to analyse. This was the case; many readers opted for combinations of options, and these were very varied: it seemed that all possible permutations were represented. In order to analyse how drastic a combination of options would be in terms of editorial intervention, I therefore classified the responses into:

- copy-editing only (the minimum intervention)
- language editing (i.e. option 2) only
- drastic editing (the maximum intervention: this included all combinations that included ‘drastic editing’)
- the remaining strategies that included the response ‘revision by author’ (this category thus expressed readers’ confidence in the author’s ability to solve any textual problems)
- ‘other’ (all other combinations of options)

The results (Table 5.10) suggest that Text K required the least intervention: 38% of all readers, the highest percentage in any class, felt it merely needed to be copy-edited. (Over half of the 14 NSs opted for the copy-editing strategy for Text K). Text K also attracted the lowest response in the ‘drastic editing’ category. It will be recalled that readers rated the writing style of this text as ‘appropriate’ (see discussion of question 5, above). It is surely significant that this was the only one of the three texts that had already been published (as a chapter in a thesis).

Table 5.10 Summary of responses to question 6: popularity of five strategies (see text for explanation) for making the texts publishable, as % of responses per text

<table>
<thead>
<tr>
<th>Text</th>
<th>copy-edit</th>
<th>lang. edit</th>
<th>drastic edit</th>
<th>author revis.</th>
<th>other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>16</td>
<td>22</td>
<td>22</td>
<td>24</td>
<td>16</td>
<td>100</td>
</tr>
<tr>
<td>K</td>
<td>38</td>
<td>9</td>
<td>16</td>
<td>16</td>
<td>21</td>
<td>100</td>
</tr>
<tr>
<td>R</td>
<td>16</td>
<td>16</td>
<td>20</td>
<td>31</td>
<td>17</td>
<td>100</td>
</tr>
<tr>
<td>A+K+R</td>
<td>23</td>
<td>14</td>
<td>19</td>
<td>24</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>
Conclusions from analysing the e-mail questionnaire

The readers found the English of texts K and R to be adequate to good, but that of Text A to be poor to adequate. This difference was statistically significant. They found that all three Discussion sections were presented and developed poorly to adequately. From the responses to questions 3 and 4 it seems that on the whole the readers did not find the style of any of the texts to be predominantly characterised by short sentences and lack of cohesion between the sentences. This suggests that at a global level the scientific English of these texts was not experienced as having the choppy style that is arguably a feature of Dutch writing in English (chapter 3). However, the readers did find the style plain and direct, and also appropriate. Text K’s good scores for appropriateness of style, coupled with its being the text seeming to require the least drastic editorial intervention might be attributable to copy-editing prior to publication in a Dutch thesis.

General issues relating to the annotation part of the reception study

The main issues of this part of the study (Part 2) to be discussed here are the data on the time readers spent annotating the texts and the strategy I chose for analysing the annotations. The most important categories of annotations will be discussed in detail in chapters 6 to 8 of this thesis.

Time spent annotating the texts

This study was not a tightly controlled one, in which the group of subjects was herded into a room at a certain time and spent a known time reading, evaluating and annotating the three texts. Instead, it was conducted at long range, relying on the goodwill of individual scientists. There was thus great scope for individual variation in the time allocated to the task. This is reflected in the huge range in the total reading time (i.e. time taken to read Text A, Text K and Text R): from 25 minutes (Spanish reader E3) to 315 minutes (Japanese reader J5).

Several readers commented on the inordinate time they spent. Three readers in particular (all reviewers) spent very long times: Japanese reader J1 annotated meticulously, spending 115 minutes on Text A, 100 minutes on Text K, and 80 minutes on Text R, the equivalent times for his colleague J5 were 90 minutes, 40 minutes and 180 minutes. Swedish reader S4 spent 110 minutes on Text A, 55 minutes on Text K and 120 minutes on Text R. (J5’s and S4’s time spent reading Text R is the more remarkable as this text was much shorter than A). Some readers reported very short times for reading the texts. An indication of the range of reading times per text appears in Table
5.11. To facilitate comparison between the texts, I have also shown the mean reading time adjusted to take account of the differences in text length. To do so, I made the simplistic assumption that reading time is simply a function of number of words to be read. I used Text K, the shortest text, as the benchmark in terms of numbers of words. Thus, if Text K is taken as 100%, Text A (the longest text) becomes 198% and Text R is 159%. The last column in the table shows the reading times adjusted on this basis. These suggest that, on average, the speed at which the readers read was the same for each text but that the variation between readers was greatest for Text R.

Table 5.11 Actual and adjusted time (minutes) spent annotating the three texts. Actual times rounded to nearest whole number. Adjusted time computed in proportion to text length in words, with Text K as the benchmark (=100%). In parentheses: standard deviations

<table>
<thead>
<tr>
<th>Text</th>
<th>Text length (in words)</th>
<th>Mean reading time</th>
<th>Max. reading time</th>
<th>Min. reading time</th>
<th>Mean adjusted time</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (198%)</td>
<td>1476</td>
<td>39</td>
<td>115</td>
<td>10</td>
<td>19.96 (12.29)</td>
</tr>
<tr>
<td>K (100%)</td>
<td>745</td>
<td>23</td>
<td>100</td>
<td>4</td>
<td>23.24 (16.95)</td>
</tr>
<tr>
<td>R (159%)</td>
<td>1181</td>
<td>34</td>
<td>180</td>
<td>7</td>
<td>21.51 (20.06)</td>
</tr>
</tbody>
</table>

Table 5.12, which shows the actual reading times and their standard deviations, per country group, indicates there was large variation between these groups. On average, Spanish readers tended to have the shortest reading times and Japanese readers the longest. However, the standard deviations indicate the huge variation in the Japanese group: the data were skewed by some very long reading times: reader J1 for all three texts, J5 for Texts A and R, and J2 for Text R. Big differences within the country groups of NNSs could indicate differences in proficiency in English, or in commitment to conscientiously carrying out the assignment – or both. The NS groups tended to have small standard deviations and thus to be the most homogeneous; in these groups, differences would not be attributable to language proficiency, but would be more likely to reflect attitude to the assignment. The German and Spanish groups not only had short average reading times but also had small standard deviations; this suggests that in these groups there was a tendency to skim read.
Table 5.12 Actual mean time in minutes (standard deviation in parentheses) readers from different countries spent annotating the three texts

<table>
<thead>
<tr>
<th>Country</th>
<th>Text A</th>
<th>Text K</th>
<th>Text R</th>
</tr>
</thead>
<tbody>
<tr>
<td>US (N=6)</td>
<td>27.50 (10.37)</td>
<td>19.33 (12.31)</td>
<td>25.00 (11.40)</td>
</tr>
<tr>
<td>UK (N=8)</td>
<td>40.25 (10.10)</td>
<td>18.13 (07.08)</td>
<td>30.00 (14.39)</td>
</tr>
<tr>
<td>Netherlands (N=5)</td>
<td>55.00 (20.92)</td>
<td>23.40 (17.04)</td>
<td>33.00 (15.65)</td>
</tr>
<tr>
<td>Germany (N=5)</td>
<td>26.40 (11.17)</td>
<td>20.00 (10.70)</td>
<td>21.20 (09.07)</td>
</tr>
<tr>
<td>Sweden (N=4)</td>
<td>56.25 (39.45)</td>
<td>30.00 (17.80)</td>
<td>47.50 (48.56)</td>
</tr>
<tr>
<td>France (N=4)</td>
<td>37.50 (25.98)</td>
<td>26.50 (16.90)</td>
<td>27.75 (21.61)</td>
</tr>
<tr>
<td>Spain (N=9)</td>
<td>27.33 (15.62)</td>
<td>18.22 (10.28)</td>
<td>19.33 (07.94)</td>
</tr>
<tr>
<td>Japanese (N=4)</td>
<td>63.45 (46.08)</td>
<td>44.50 (39.38)</td>
<td>99.75 (61.05)</td>
</tr>
</tbody>
</table>

To see whether native-speakerhood or mother tongue or reviewer status had an effect on the reading times, and whether there were interactions between these, I performed univariate GLM analysis. I performed separate runs for each text, using actual reading times. In the first run for each text I used native-speakerhood and reviewer status as the fixed factors. For the second run, I refined the language aspect by using country as a fixed factor. None of the runs showed that there was a significant effect, or a significant interaction, except for the second run for Text R. In that run, I found a significant effect of country group (F (7, 30) = 4.074, p = 0.003), which a post hoc test (Tukey) showed to be attributable to the Japanese group: the long average reading times of this group differed significantly from the reading times of all other groups. There were no interactions between the fixed factors.

It seems likely that the time spent per text will have influenced the number or type of annotations made. This will be addressed shortly, after the following explanation of how the annotations were classified.

Classifying and analysing the annotations

Readers’ annotations varied greatly in appearance, quantity and in the textual features targeted. The medium used was red pen, ballpoint, or pencil. A few readers used proofreading marks to indicate changes; most readers made changes in the text and also wrote comments, varying in tone from polite to exasperated. Some readers made detailed changes, some made occasional changes and relied more on marginal comment. In short, the response was as diverse as one might expect, given that readers were annotating voluntarily at a time of their choosing, and that they differed in their command of English.
The challenge was to classify their quantitatively and qualitatively diverse annotations usefully, for subsequent analysis.

The following considerations were borne in mind when collating the data:

- The features of Dutch scientific English discussed in chapter 3
- The frequency of annotations of a certain type
- Features mentioned by readers who used the ‘Comments’ option on the e-mail questionnaire in Part 1 of the study
- Readers’ strong feelings about certain features (as expressed in comments written on the text)
- Annotations that were drastic interventions in terms of the length of text involved.

The annotations may be broadly classified according to their nature and then by their purport. The classification by ‘nature’ distinguishes between two mutually exclusive categories: commentarial and textual annotations.

**Commentarial annotations** were the comments written in the text’s margins (henceforth referred to as ‘marginal comments’), or at the beginning or end of the text, or, occasionally, above a line in the text. Some explicitly referred to sentence length and text flow, both features of Dutch English discussed in chapter 3. For example, [1] – [4] are examples of such comments made at the beginning or end of a text, summarising the reader’s overall opinion:

[1] Even though there are problems with the English, this discussion is well-organized and flows along.
[American reader A7 on Text A]

[2] This text must be rewritten. Supervised by an editor for foreigners. There is very short sentences and very long, without any coma. Vocabulary: simple and easy to understand. Needs great review.
[Spanish reader E4, commenting on Text A]

[British reader B4, commenting on Text R]

[4] The flow is no fluent. Short sentences. Simple English. I can understand the sense, but I strongly recommend a style review for an editor for foreigners.
[Spanish reader E4, commenting on Text R]

5 These, and all other reader comments, have been reproduced faithfully, with no attempt to correct any errors.
As noted above, I took account of the frequency and tone of these spontaneous comments when I was deciding which text changes to focus on in this thesis.

The second broad type of annotation readers made was textual: changes made to the text. They included deletions (the removal of redundancies) and insertions (addition of new word(s) or punctuation). They also included corrections (for example of spelling, punctuation, typeface) that were substitutions. These textual changes can be counted, but to be able to see whether readers converged on the same ‘hotspots’ I decided to convert the texts into ‘maps’, so that the coordinates of the punctuation mark(s) or word(s) affected could be recorded and, if necessary, depicted on these maps. This entailed converting the latter components of the text into ‘editable units’ (or EUs), which could be referred to by their grid reference. The method I used is described in Appendix 5.4.

Classifying the annotations according to their purport

The purpose of my study was not to conduct a detailed error analysis of the three texts following James (1998: 267-277) and to compare it with the response of the readers. To have done so would not only have been very time-consuming, given the texts’ length, but would have put emphasis on the readers’ performance in recognising errors and on the learner English of the three Dutch authors. I was not primarily interested in recording NNS ‘errors’ per se, or readers’ ability to notice and amend shortcomings, but in seeing whether there were generic characteristics of Dutch scientific English (as argued in chapter 3). With these features of Dutch scientific English in mind, even before I had received any of the annotated texts I had decided to look for annotations relating to sentence length, to the deployment of connectives, to sentence focus, to paragraphing and to hedging. With the exception of the annotations relating to hedging, these annotations were to do with text flow and with the ‘choppiness’ of Dutch discourse discussed in chapter 3, and may therefore be grouped under the general heading of cohesion. It will be recalled that chapter 3 concluded by surmising that if scientists with no knowledge of Dutch are confronted with Dutch-authored research articles containing Dutch interference and cohesion, they will have problems in inferring cohesion.
Below (and in chapter 7) I will show that there were indeed many annotations that referred to or modified text cohesion. Questions 3 and 4 of the e-mail questionnaire in Part 1 of the survey had asked readers about text flow and sentence length, so it is possible that this primed them to look at these features in the printed texts they were sent later, for annotation. Even if this were the case, however, how they responded in their annotations remained up to them, so it remains interesting to see whether there was agreement about where intervention was necessary and about the remedial strategies used. The way I defined sentence lengthening and sentence shortening strategies (e.g. the insertion or deletion of connectives and of phrases of three or more words: for details, see chapter 6) generally enabled me to distinguish between adjustments that could be attributed to improving text flow, and insertions and deletions of single words whose function was to adjust the text’s meaning – e.g. the strength of the author’s claim (but see ‘hedging’, below).

The e-mail questionnaire had not explicitly primed readers to look at the deployment of hedges, except possibly indirectly by asking (in question 5) whether the style of writing in the texts was ‘direct or indirect’. Here, ‘indirect’ could be interpreted as containing many hedges. From the work of Hyland (1994, 1996a, b, 1997, 1998a) I knew that hedges are important in scientific writing; furthermore, the case studies done by Knorr-Cetina (1981) and Gosden (1995) had shown that revisions that affected the assertiveness of the author’s claims were important. And, as demonstrated in chapter 3 there appears to be a difference in the tendency to hedge in Dutch scientific discourse compared with similar British discourse. I therefore decided to investigate the annotations relating to hedging. As will be explained in chapter 7, these annotations could be deletions, insertions, or substitutions. Most hedging adjustments were single words, but in the few cases where they were three or more words inserted or deleted, the hedging adjustment was also counted as an adjustment to sentence length. This is explained further in chapters 7 and 8 and below, after the next paragraph; here, it is important to note that this meant that there was some overlap between hedging annotations and annotations affecting cohesion.

When perusing the annotated texts, I was struck by the numerous verb tense changes the readers had made. Hyland (1998a) has pointed out that the deployment of verb tense is a hedging strategy, because in scientific English the distinction between universally valid statements and statements specific to a particular study or author can be signalled by verb tense. I nevertheless decided to create a separate class for the verb tense annotations, as they were so numerous. There is no overlap between this class and the other classes of textual annotations.
At a micro-level (i.e. within sentences) the annotations that deleted or moved text (three or more words) had implications on sentence length and on sentence focus, and could therefore be classified as modifications to cohesion made to improve coherence, as noted by James (1998: 274: see also Figure 2.2). But when the unit of text deleted or moved was one or more sentences, though the coherence at paragraph level was affected, the motivation for the emendation was often genre fidelity (see James ibid.): this was clear from the accompanying comment in the margin, which showed that the reader was reacting to perceived redundancy, i.e. the chunk of text to be deleted or moved was deemed to be out of place in the Discussion. What prompted me to record deletions and moves of one or more sentences was therefore their frequent occurrence, the fact that they were backed up by marginal comments, and the fact that they sometimes involved appreciable chunks of text (strings of sentences).

Further details on how the annotations relating to cohesion, hedging and verb tense were recorded are given in chapters 6, 7 and 8, which are devoted to these three important aspects of Dutch scientific English. It is important to remember that hedging and verb tense changes were mutually exclusive categories, as were verb tense changes and the various subcategories in the annotations to do with cohesion. However, when a phrase of three or more words was added to a sentence, or deleted (i.e. not paraphrased), the annotation was classified as the lengthening or the shortening of a sentence. Sometimes the deleted or added phrase affected the hedging, so in that case the annotation was also classed as a hedging annotation. Thus, the broad classes of cohesion and hedging annotations did overlap slightly. This did not affect the analysis of the data.

Two other categories of annotation were created specifically in response to the frequency with which they occurred. They relate to the opposite extremes of the revision continuum (Figure 2.3). At the copy-editing level (compare James’s (1998) level of ‘errors of substance’), I identified proofreading annotations triggered by typographical errors. The latter comprised misspellings, wrong punctuation and inconsistencies (e.g. of ‘&’ and ‘and’), some of which had been inadvertently introduced when the hard-copy texts were scanned to produce electronic versions. These authentic and introduced errors were very easy to identify; most were picked up by spell-checking software. Examples include ‘;’ instead of ‘:’, ‘I’ instead of ‘1’, ‘drv’ instead of ‘dry’. Some of the typographical errors are also generic learner errors as discussed by James (1998: chapter 5), which are common in Dutch English. The arguably Dutch learner errors included as proofreading errors are detailed below; each is preceded by its grid reference.
Text A (32 typographical errors in total)
1. grid ref. 7/17: NI, N2 and N3 treatment [transfer of Dutch noun concord: see Arts and Wekker 1993: 332; also note that the NI is a scanning-induced typographical error: should be N1]
2. grid ref. 57/16: on the long term [literal translation of Dutch preposition op]
3. grid ref. 69/11: measure for solidity [literal translation of Dutch preposition voor]

Text K (12 typographical errors in total)
1. grid ref. 23/8-9: an other [literal translation of Dutch een andere]
2. grid ref. 26/8: …of these observations, is [transfer of Dutch punctuation, cf. Hannay and Mackenzie: 206-207]
3. grid ref. 48/6: divided in species [transfer of Dutch preposition]

Text R (24 typographical errors in total)
2. grid ref. 9/6: N/P- and N/K ratios [dangling hyphen, cf. ibid.: 54]
3. grid ref. 16/15: Figure 1 and 2 [cf. Text A point 1]
4. grid ref. 45/2: fig. 1 and 2 [ditto]
5. grid ref. 55/3: more then [misspelling attributable to a mispronunciation error: James 1998: 139; Burrough-Boenisch 1998: 61]
6. grid ref. 74/10-11: can differ considerable of that [a learner error (adjective used instead of adverb) plus a transfer of the Dutch preposition van]

The typographical errors were the only class of data for which I perused each text and drew up lists of their occurrence. (As explained at the start of this section, for all other data classes I started from the annotations made by the readers, not a list of ‘errors’ that I had identified beforehand.) I counted the typographical errors not only because they were easily identifiable, but also because the number of these errors corrected by each reader indicates the attention paid to superficial features of text. It will be recalled that Broekkamp’s research (Broekkamp and van den Bergh, 1996) indicated an inverse relationship between attention to superficial details and attention to more substantive aspects of text revision, so these data were therefore interesting to compare with the other category of annotations that was created in response to frequency of occurrence: the epistemic annotations. The latter can be positioned towards the bottom end of the revision continuum
(Figure 2.3). They were the numerous commentarial and textual annotations that seemed primarily inspired by the readers’ specialist subject knowledge. Being generated by knowledge of science, rather than by linguistic or genre considerations, epistemic annotations are based on the individual reader’s content schema (Carrell, 1988). The criterion used to classify an annotation as epistemic was: a change or comment that could only be made by a reader with specialist subject knowledge. Counting the number of comments or alterations that met this criterion provided a crude indication of the effort readers invested in critically assessing the texts’ scientific calibre. I used my judgment (as a non-biologist) to decide which annotations fitted this category; the resulting data set is therefore open to the criticism of being subjective.

The epistemic annotations were commentarial and textual (Table 5.13). Examples of commentarial epistemic annotations that were written in text margins are:

Text A lines 8–9: ‘How did you know it? Include references.’ (Spanish reader C5)

Text A lines 43–44: ‘That is plasticity and belongs to the next section’ (Dutch reader D2)

Text A lines 78–80: ‘what has this to do with leaf angle’? (Swedish reader S1)

Text A lines 85–89: ‘So something was wrong in the methods?’ (Dutch reader D10)

Text K line 45: ‘it is a different idea. 1. no. of habitats 2. No. of species. Better add another sentence’ (Spanish reader C5)

Text K lines 56–59: ‘This section does not follow on well from previous ones. The ideas contained here are not developed at all. Why does incomparability impede advance of phytosociology? The discussion argued for separate classifications of different sites. Standardisation is rather sprung on the reader.’ (British reader B3)

Text R line 25: ‘give r² value here’ (American reader A9)

---

6 Note the similarity with the revisions that Gosden (1995) classified as ‘addition of technical detail’. It will be recalled that in his study, the critical readers were the Japanese supervisors of the seven Japanese PhD candidates whose draft research papers formed the corpus.
Table 5.13 Epistemic annotations per text, with breakdown into commentarial (C = comments in margin) and textual (T = changes made in text)

<table>
<thead>
<tr>
<th>Country/Reviewer status</th>
<th>Text A</th>
<th>Text K</th>
<th>Text R</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C</td>
<td>T</td>
<td>C</td>
<td>T</td>
</tr>
<tr>
<td>US</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rev (N = 5)</td>
<td>11</td>
<td>1</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>n-rev (N = 1)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>UK</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rev (N = 5)</td>
<td>21</td>
<td>14</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>n-rev (N = 3)</td>
<td>10</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Netherlands</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rev (N = 2)</td>
<td>30</td>
<td>13</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td>n-rev (N = 3)</td>
<td>27</td>
<td>13</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>rev (N = 2)</td>
<td>14</td>
<td>0</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>n-rev (N = 3)</td>
<td>12</td>
<td>0</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rev (N = 4)</td>
<td>47</td>
<td>5</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>n-rev (N = 0)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>France</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rev (N = 3)</td>
<td>18</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>n-rev (N = 1)</td>
<td>18</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>rev (N = 1)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Spain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rev (N = 5)</td>
<td>3</td>
<td>4</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>n-rev (N = 4)</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>rev (N = 2)</td>
<td>5</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>n-rev (N = 2)</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Japan</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rev (N = 28)</td>
<td>149</td>
<td>39</td>
<td>74</td>
<td>9</td>
</tr>
<tr>
<td>n-rev (N = 17)</td>
<td>122</td>
<td>37</td>
<td>59</td>
<td>8</td>
</tr>
<tr>
<td>Total (N = 45)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rev (N = 28)</td>
<td>149</td>
<td>39</td>
<td>74</td>
<td>9</td>
</tr>
<tr>
<td>n-rev (N = 17)</td>
<td>122</td>
<td>37</td>
<td>59</td>
<td>8</td>
</tr>
</tbody>
</table>

1 all by 1 reviewer
2 1 reviewer responsible for almost all (41 in Text A, 19 in Text K)

Text R line 35: ‘Depends more on organic matter quality, rather than on amount’ (British reader B3)

Text R lines 80-81: ‘Needs to be more fully explained’ (British reader B1)
Examples of the textual changes in this category are:

Text K grid ref. 8/15: changing author name ‘Greigh’ to ‘Greig’

Text K grid ref. 51/10: deleting ‘species’

Text R grid ref. 76/10: changing ‘leguminosea’ (a misspelling of *Leguminosae*) into ‘Fabaceae’

Table 5.13 shows that the Swedish readers made the most epistemic changes, but this was largely because of one person.

**The implications of epistemic annotations**

Epistemic annotations reveal what a reader finds unsatisfactory about the science of a text. They are comparable with the revision categories of ‘additions and deletions of technical detail’ that Gosden (1995) found in his study of the revisions made by Japanese supervisors to their PhD students’ draft articles. Annotations of this type go beyond the ‘discourse level’ of error analysis that James proposes (1998; see also Figure 2.2). What James seems to have had in mind, particularly in his ‘genre infidelity’ category are the errors and infelicities that ESP teachers, language correctors or copy-editors who are not scientists would identify, on the basis of a formal schema i.e. the background knowledge of the formal rhetorical organisational structure of the text (Carrell, 1988). The biologist readers in this study were, of course, also subconsciously deploying their formal schemata when they read the texts and emended them to remedy perceived mismatch with genre (e.g. their deletions of text they deemed to be out of place in a Discussion). What is crucial here is the ‘biology mindset’ of the readers in this study. The definition of epistemic annotations may, therefore, be refined to: ‘comments or changes attributable to the reader reading primarily as a biologist’.

It was important to quantify the epistemic changes because they indicate how much attention a reader paid to the content of the text – attention that might otherwise be directed to the errors of substance, text and discourse. In other words, as well as providing information on a text’s scientific soundness, epistemic annotations provided information on the reader and might affect the other annotations made by that reader. For example, an NNS

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7 An example of genre infidelity is an informal style of writing (for example, use of the contracted forms ‘aren’t’ or ‘didn’t’) that would be considered inappropriate in a scientific research article.
reader might make epistemic annotations rather than linguistic/discourse annotations because he or she is not sufficiently competent or confident in English to make the latter changes. But the very act of making such annotations reduces the space on the page for other comments or changes, so a reader who makes many epistemic changes may have no physical space for other changes. However, by focusing on text content the reader also reduces the ‘mental space’ he or she has available for identifying and processing other, more superficial errors, as suggested by Broekkamp and van den Bergh (1996). This contention, which I made in a preliminary report of my findings, e-mailed to all readers in July 2000, triggered the following e-mail response from a Dutch reviewer reader, however:

I do agree that parts of the text which need conceptual revision tend to be less thoroughly edited linguistically, but I doubt whether this has to do with available ‘mental space’ or space on paper – personally, I simply do not want to spend much time thinking about improvement of sentences or paragraphs that have to be rewritten anyway because of problems with the contents. I have noticed that this may be different for reviewers with English as their mother tongue; some of these did annotate minor errors in sentences which they advised to be omitted or completely rewritten. I would probably do the same with Dutch texts.

Be that as it may, to simultaneously process a text’s content and its more superficial (typographical) errors requires a reader to process at different levels simultaneously (see chapter 2 and also Butterfield et al., 1996). One would therefore expect few readers to have high scores both in epistemic annotations and proofreading corrections. Figure 5.1, which takes Text A as an example, suggests that this was indeed the case. The outlier (top right) is a Swedish reviewer who is also a journal editor; he exhibits the behaviour of a good scientific editor (an eye for detail, combined with critical assessment of the science content).

As epistemic annotations result from the reader reading for science content, we might expect that the reader’s native-speakerhood would not affect their incidence, but that a reader’s reviewer status might do so (reviewers might be more critical readers). To test these hypotheses I

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8 The deletions and moves of chunks of text mentioned earlier and attributed as being primarily motivated by genre considerations rather than to perceived lack of cohesion are similar to epistemic changes in that it seems probable that they too will occupy so much of a reader’s processing capacity that less attention will be paid to ‘errors’ that are linguistic.
performed univariate GLM analysis, with total number of epistemic changes (commentarial + textual) as the dependent variable. In the run with text, reviewer status and native-speakerhood as the fixed factors there were no interactions and there was no effect of native-speakerhood. The latter supports the first hypothesis, that NS and NNS are equally likely to make epistemic annotations. There was, however, a significant effect of reviewer status (F(1, 123) = 3.950, \(p = 0.049\)), which, given the data shown in Table 5.13, allows us to say that the reviewers were indeed more active than non-reviewers in making epistemic annotations. Refining the language background of the readers by repeating the run but with country replacing native-speakerhood,

![Scatter diagram of proofreading corrections plotted against epistemic annotations, for reviewers and non-reviewers: Text A.](image)

revealed a very significant effect of reviewer status (F(1, 90) = 7.932, \(p = 0.006\)) and also of country (F(7, 90) = 2.846, \(p = 0.010\)). However, there was a significant interaction between the effects of reviewer status and country (F(6, 90) = 3.116, \(p = 0.008\)). A post hoc (Tukey) test revealed that the numerous epistemic annotations of the Swedish reviewer (the outlier in Figure
Chapter 5

5.1; see also Table 5.13) had influenced the result: there was a significant difference (at the 0.05 level) between the Swedish group (all of whom were reviewers) and the Spanish group (5 reviewers and 4 non-reviewers).

The epistemic and proofreading annotations thus give clues about what attracted readers’ attention while perusing the texts, and indicate to what extent readers were annotating at a superficial or substantive level. I had to introduce the concept of ‘epistemic annotations’ because the paradigm shown in Figure 2.2 is too simplistic: it assumes that correct English that meets the genre conventions is factually sound. Though this is a suitable paradigm for those who are teaching English, it fails to take account of the content of the text, which in our case is based on vegetation science. The frequency and content of epistemic annotations in this study reminds us that in real-life situations, readers from the discourse community look beyond the medium (scientific English) and rely on their shared knowledge of the science to interpret the message. Lacking grounding in the science concerned, ESP teachers and language revisers cannot venture far into this dimension of the text’s purport.

The reception study data discussed in subsequent chapters

Above, I showed that the readers in this study could not resist looking at the texts’ science content, even though they were aware that the study’s aim was to assess the scientific English. Further evidence of their understandable interest in the texts’ science can be seen from many of the comments in Appendix 5.5. In the remainder of this thesis, however, I will leave aside the epistemic and proofreading annotations and will focus on annotations that were triggered by linguistic features of the texts: the errors of text and of discourse (Figure 2.2). As noted earlier in this chapter, in this study the text- and discourse-level annotations could be broadly described as cohesion-related and hedging-related, with the verb tense changes meriting consideration as a separate category because of their volume. Each of the next three chapters is devoted to one of these broad classes. In each chapter, when presenting and analysing the data concerned, the possible effects of native-speakerhood and reviewer status will be borne in mind and, where the data are sufficiently numerous, the reader groups will also be examined per country (to see, among other things, whether the Dutch readers behaved differently from readers from the other countries). And having already shown in this chapter that the readers did not rate the three texts as being of a similar standard of English, I will examine whether readers’ responses continued to vary between the texts and, if so, why.
Chapter 6

Coherence and the annotations relating to cohesion

The annotations discussed in this chapter, which all relate to text cohesion, reveal the readers’ strategies to improve text flow. As noted in chapter 5, many of the readers were concerned about the poor text flow: this can also be seen from the comments in Appendix 5.5. How well a text flows does not depend on the grammaticality of the individual sentences but on the way the information is presented in a sentence and how consecutive sentences link up – ultimately into the larger unit of the paragraph and thence into a larger text unit: a section or chapter, for example. Together, these elements of the discourse are what engender the coherence of the text. The coherence is a property that a reader will discern in the text; it allows the reader to make sense of the text (Carrell, 1982: 482; Hannay and Mackenzie, 1996: 178). Many of the annotations in the reception study are therefore likely to be changes readers made to accentuate or impose their interpretation of the coherence. The annotations of a reviewer or editor reading as a representative of other scientists or other target readers can therefore be seen as attempts to adjust the text to make it easier for these later readers to infer the same coherence.

The following classes of annotations will be dealt with here: refocusing sentences, adjusting sentence length, inserting and removing connectives and other cohesive devices, adjusting paragraphing, deleting text (three or more consecutive words or one or more consecutive sentences) or suggesting text be moved elsewhere. Figure 6.1 shows how they can be grouped as representing reader reactions to the three types of coherence distinguished by James (1998: 162-163)\textsuperscript{1}. The figure shows how coherence is built up, from the cohesion within sentences, to the cohesion between sentences, to the cohesion between paragraphs. In discussing the annotations I shall follow the same progression from micro to macro level. The annotations at the micro scale of coherence relate to sequential coherence. As will be elaborated below, this is the coherence resulting when consecutive propositions are arranged effectively within a sentence; in English sentences, this entails putting the ‘new’ (i.e. high impact) information at the end of the sentence. At the meso and macro scales, between sentences and between

\textsuperscript{1} Both Knorr-Cetina (1981) and Gosden (1995) also reported the deletion of text in their case studies of revision. However, they ignored the impact of the deletions on text cohesion, and instead explained the deletions in terms of modifying the strength of the author’s argument or of removing unnecessary technical detail.
paragraphs, comes the **relational coherence**. This is the cohesion achieved grammatically, lexically, or by reference. The third type of coherence, **topical coherence**, operates at all scales. As James (ibid.) explains, it is achieved when the discourse components are relevant. In the context of this study, therefore, annotations that deleted or moved text can be grouped under this heading, because it can be assumed that the readers deemed the text concerned to be irrelevant. Topical coherence operates at various text levels: within sentences (when phrases are deleted) and, when chunks of text (>1 sentence) are deleted or moved, within paragraphs.

<table>
<thead>
<tr>
<th>Level of text</th>
<th>Type of coherence</th>
</tr>
</thead>
<tbody>
<tr>
<td>paragraph to paragraph</td>
<td>RELATIONAL</td>
</tr>
<tr>
<td>sentence to sentence</td>
<td>deletions of chunks</td>
</tr>
<tr>
<td><em>remove</em>/<em>insert</em> full stop</td>
<td><strong>TOPICAL</strong></td>
</tr>
<tr>
<td><em>add</em>/<em>remove</em> cohesive device</td>
<td>deletions of 3+ words</td>
</tr>
<tr>
<td>within sentence</td>
<td></td>
</tr>
<tr>
<td>sentence refocusing</td>
<td></td>
</tr>
</tbody>
</table>

*Figure 6.1 Types of cohesion within and between units of text, the types of coherence they result in and (in italics) the related classes of annotation*

One further type of coherence not mentioned by James will be referred to incidentally in this chapter: the inferred coherence called **interactional coherence**, referred to briefly in chapter 4, in relation to the Coasts text. Common in science texts (Enkvist, 1990; see also Halliday and Hasan, 1976: 301), it comes about because the reader’s specialist knowledge picks up covert cohesion in the text. It must be borne in mind in this study because the readers and authors were all biologists (whereas many readers of this thesis have little knowledge of biology).

The order in which I have presented James’s three types of coherence is the order in which I will deal with them in this chapter. The first class of annotations I deal with are those that refocus sentences. Focusing a sentence in order to maximise its impact is one of the techniques the author of an
English argumentative text (a research article, for example) can use to advance the argument flowingly. The ideal pattern to achieve sequential coherence is to present the reader with known information at the start of the sentence, leaving the new information until the end. This is described by linguists of the Prague school as 'theme versus rheme', but is also referred to, more transparently, as 'given versus new' (Gosden, 1996; Grabe and Kaplan, 1996: 55) and as ‘topic versus comment’ or ‘background versus focus’ (Bardovi-Harlig, 1990). However, though in English (and in Czech: see Young, 1996: 141), the pattern is to put new information at the end of the sentence, in other languages this is not necessarily so. Authors who transfer un-English sentence focusing from their mother tongue will therefore produce sentences in which the propositions are arranged in a sequence that is not effective. The result is the inappropriate sequential coherence I referred to in chapter 3 in relation to Dutch English as ‘frontal overload’ (Hannay and Keizer, 1993; Hannay and Mackenzie, 1996: 141), which contributes to a text’s jerkiness or choppiness. Frontal overload has also been observed in academic/scientific English written by Finns (Ventola, 1992 (she refers to it as ‘heavy themes’); Mauranen, 1996; Norris, 1998) and Germans (Ventola, 1994). Readers’ changes to sentence focusing in this study should therefore give insight into which sentences hampered the thematic progression (the unpacking of the argument via a sequence of propositions) and hence reduced the texts’ coherence.

Recall that a feature of Dutch English is short, ‘choppy’ sentences (Hannay, 1997; see also chapter 3). The adjective ‘choppy’ already implies that there is a problem with the cohesion of this English. Above, I noted that infelicitous positioning of clauses within a sentence can contribute to this. Also important are the sentence length and the more overt signals of relationships between consecutive sentences. Under the heading ‘ Adjusting sentence length and cohesive devices’ I will therefore discuss the readers’ textual adjustments that primarily affect inter-sentence relationships and can be characterised as influencing the text’s relational coherence. Note that by ‘cohesive devices’ I mean reference (anaphora, generic reference), lexical choice (using words that are associated with a notion or phenomenon, or are synonyms) and connectives (words that typically occur sentence-initially and that link a sentences to its preceding sentence). Here I follow Hannay and Mackenzie (1996: 178). I will not consider their fourth cohesive device, consistency of tense, however.

Moving to a deeper level of text organisation, in this chapter I consider another manifestation of the texts’ relational coherence: the readers’ response to paragraphing. In these Dutch-authored texts, however, not only the appropriateness of grouping sentences into paragraphs but also the occurrence of Dutch alinea’s and their influence on paragraphing inferences
must be considered. Connectives (and their absence) also play a role because when present they help provide the internal cohesion that holds a paragraph together, and they can smooth transitions between consecutive paragraphs and/or alinea’s. Of relevance here is the finding from the rerun of the Mauranen test reported in chapter 4, that in a text with few fronted connectors, readers asked to insert paragraph breaks agree only reasonably well on where to make the breaks. In that chapter I speculated that the availability of an orthographic convention – the alinea – to signal the coherence of smaller units of text within a conceptual paragraph\(^2\) allows or even encourages Dutch authors to dispense with explicit textual signalling of coherence. Indeed, in a conversation about the differences between Dutch and English paragraph orthography, Author R suggested that this was the advantage of the Dutch convention over the English convention.

As noted earlier, the readers’ deletions or moves of text chunks (>1 sentence) can be seen as a response to the texts’ topical coherence. These are the final group of annotations considered in this chapter. Removing extraneous or out-of-place text will enhance the relevance of the remaining information and also improve the coherence (James, 1996:162). It is a drastic modification to the text, requiring a degree of confidence that could rest on subject knowledge (‘this information is trivial science, so can be omitted’) or genre knowledge (‘this information is out of place in the Discussion section of a research article, so must be moved’), or both. Neither of these types of knowledge (which are respectively the content and formal schemata – see Carrell, 1988) are the exclusive domain of NSs, so this is a type of text annotation in which NNS readers will not be disadvantaged.

Probable reader strategies and the constraints to evaluating them

Given the conclusions reached about Dutch scientific English in chapter 3, it can be expected that the predominant reader strategy – certainly among NSs – will be to lengthen sentences and insert cohesive devices in order to adjust the style towards the paradigm of scientific English. Readers from writing cultures in which the sentences in academic writing tend to be long and complex might also be expected to lengthen short ‘Dutch’ sentences. Based on reports by other researchers, in my study these could be expected to be the Germans (Ventola, 1994: 286), French (Riley, 1996), Spanish (Connor, 1990: 52) and Japanese (ibid.: 44). They might be constrained in their application of this strategy, however, by their learner English. Or, indeed, when reading in a foreign language they might find shorter sentences easier to understand. To be

\(^{2}\) As explained in chapter 3, the conceptual paragraph is the unit of thought; in English, it should ideally coincide with the orthographic paragraph.
able to draw meaningful conclusions in terms both of the country groups (which represent reader’s writing culture) and of readers’ competence in English, the reader response would have to be large (in terms of numbers of readers and frequencies of annotations).

Similarly, ample data are necessary to be able to thoroughly evaluate reader attitude to infelicitously focused sentences and to the Dutch convention of the *alinea*. However, as will become apparent, there were not many annotations in these categories. My analysis will therefore be descriptive and qualitative. Though their low numbers suggest that these text features are of low priority to most of the readers in this study, they give insight into factors contributing to readers’ impression of the texts’ coherence.

The ‘out-of-place and redundant text’ category of annotation was created after examining the annotated texts and finding many such annotations. They were difficult to quantify, because they varied greatly in size: one reader may have deleted a single sentence, whereas others deleted that sentence and some contiguous text. Because of this variation in size, I did not statistically analyse these annotations. Instead, I have mapped them (as explained in Appendix 5.4), thus revealing problem areas of text.

Bearing in mind the constraining factors described above, we may now consider the data collected. These will be presented starting with the micro-level (within-sentence) annotations and proceeding to the meso and macro levels of text organisation.

**The data collected**

**Sentence refocusing**

In chapter 3 I reported that when writing in English, Dutch authors tend to put the rhetorical weight of the sentence at the beginning, rather than at the end (Hannay and Mackenzie, 1990, Hannay and Keizer, 1993). Hannay and Mackenzie (1996) point out that a common feature in Dutch-authored sentences is that the arrangement of the clauses does not achieve rhetorical impact. As noted above and depicted in Figure 6.1, the effect is to hamper the sequential coherence. The data I collected on reader responses to this lack of coherence comprises instances when readers rearranged clauses in a sentence. For convenience, I shall refer to this rearranging of clauses as sentence refocusing, as it shifts the rhetorical impact of the sentence. In the event, not many clauses were relocated by readers: 14 in Text A, 11 in Text K and 12 in Text R. Bearing in mind the difference in text lengths, this suggests that the greatest problem with infelicitous sentence focus was in Text K. Text A (nearly twice as long) had almost the same number of clauses shifted.
The reader response per text was low: 29% of readers relocated a clause in Text A, compared with 33% in Text K and 20% in Text R. The breakdown by native-speakerhood and reviewer status is given in Table 6.1. It can be seen that NSs were always more active than NNSs, reviewers were more active than non-reviewers, and Text K attracted the most attention.

Table 6.1 Percentages of NSs, NNSs, reviewers and non-reviewers who relocated clauses within sentences, per text

<table>
<thead>
<tr>
<th>Reader category</th>
<th>Text A</th>
<th>Text K</th>
<th>Text R</th>
</tr>
</thead>
<tbody>
<tr>
<td>%NSs (N = 14)</td>
<td>35</td>
<td>64</td>
<td>35</td>
</tr>
<tr>
<td>%NNSs (N = 31)</td>
<td>29</td>
<td>23</td>
<td>13</td>
</tr>
<tr>
<td>% reviewers (N = 28)</td>
<td>39</td>
<td>43</td>
<td>21</td>
</tr>
<tr>
<td>% non-reviewers (N = 17)</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
</tbody>
</table>

Table 6.2, which indicates readers’ agreement about which clauses should be relocated, shows that most instances of sentence refocusing were one-off (12 in Text A, 9 in Text K and 7 in Text R). The paucity of the response and the low frequencies made a detailed statistical analysis inappropriate. The hotspots in Texts A and R on which three or four readers converged will be presented and discussed below. (Data on number of sentences and mean sentence length appear later, in Table 6.3.)

Table 6.2 Readers’ convergence when relocating clauses within sentences, per text

<table>
<thead>
<tr>
<th>Clause removed by</th>
<th>Text A</th>
<th>Text K</th>
<th>Text R</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 reader</td>
<td>12</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>2 readers</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3 readers</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>4 readers</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

The hotspot in Text A was the first sentence of the fifth paragraph (lines 40-44). The original version is shown in [1], followed in [2] – [5] by the refocused versions.

[1] Compared to Tilmans theory our results fit better in the notions of Grime (1979) who stated that species adapted to nutrient rich environment (Ruderals/Competitors) are better in capturing all resources.

(Text A, lines 40-43)
The results of our experiment fit more closely the predictions of Grime (1979) rather than Tilman. Grime stated that species adapted to nutrient rich environments (Ruderals/Competitors) are better at capturing all resources.

(reader B1)

Our results fit better to the theory of Grime (1979), rather than that of Tilman. Grime states that species adapted to nutrient rich environment (Ruderals/Competitors) are better in capturing all resources.

(reader B3)

Our results are more consistent with the theory of Grime ( ) than of Tilman ( ). According to Grime, species adapted to nutrient rich environment (Ruderals/Competitors) are better in capturing all resources.

(reader F4)

The hypothesis of Grime (1979) explained better the results than Tilman’s one that species adapted to nutrient rich environment (Ruderals/Competitors) are better in capturing all resources.

(reader J1)

The hotspot in Text R was the sentence on lines 60-61. It is shown below in [6], followed by the versions created by the four readers.

[6] In this data set a phytometer appears a good tool to measure the nutrient availability for vegetation in the soil.

(reader A8)

[7] In this data set a phytometer appears a good tool to measure the nutrient availability in the soil for vegetation.

(reader B5)

[9] A phytometer appears to be a good tool to measure the nutrient availability for vegetation.

(reader D10)
Chapter 6

[10] A phytometer appeared a good measure of the nutrient availability in the soil for vegetation. (reader J1)

The hotspot that attracted the attention of three readers in Text R was the first sentence. It is shown in [11], followed by the readers’ versions.


[12] To a large extent, variation in soil substrate determines vegetation composition in our study area. (reader A7)

[13] Variation in soil substrate largely determines vegetation composition in this study. (reader B8)

[14] In our study area, variation in soil substrate to a large extent determines vegetation composition. (reader B9)

The clause-shifting shown in [2] – [5], [7] – [10] and [12] – [14] achieved different results. In [2], [3] and [4] the readers who rearranged the first part of the sentence and upgraded it to a full sentence, ended up with a short sentence in which the rhetorical impact (at the end) was ‘Grime rather than Tilman’. This is more rhetorically effective than starting the sentence with ‘Compared to Tilmans theory’. In all three cases the next (new) sentence then started with a clear anaphoric reference to Grime. J1’s solution, shown in [5] did not split the original sentence, but moved Grime’s hypothesis to the front of the sentence. Unfortunately, the result was a drastic change in meaning: Tilman’s theory was attributed to Grime! In [7] – [10], all four readers gave end prominence to ‘vegetation’, but the two NNSs additionally deleted the cohesive phrase ‘In this data set’. In [10], by changing the verb tense to past tense, the Japanese reader inserted a subtle signal that the statement referred to the present study (see chapter 8 for an elaboration on the signals transmitted by past tense). The Dutch reader’s solution [9], however, had no anaphora and though grammatically sound, its lack of anaphora makes it rhetorically weak – especially given that it is the final sentence of a paragraph.

The three NS solutions for the opening sentence of Text R (see [11] – [14]) all seem to have been triggered by a wish to remedy the weak ending
Coherence and cohesion

(to a large extent). In [13] and [14] this adjunct was moved in front of the verb; in [12] it was moved to the start of the sentence. In all cases the sentence’s emphasis became ‘vegetation composition’ (in the study or study area).

Adjusting sentence length and cohesive devices

Moving to the meso level of text, to consider inter-sentence cohesion (which impacts on relational coherence), brings us to annotations that involved adjusting sentence length and inserting (or removing) cohesive devices. It seems that most of these were motivated by readers’ response to relational coherence. Exceptions are the deletions of phrases within sentences: these are the manifestation of readers’ response to topical coherence.

I will first consider sentence lengthening and shortening strategies. An overview of these, as applied to the three texts, is shown in Table 6.3. To assist the discussion of the annotations on sentence lengthening and shortening, the table also shows the number of sentences and the mean sentence length per text. Also included is the number of places per text where three or more words were deleted. The latter deletions suggest there was redundancy within sentences that could be removed to improve text effectiveness and sentence flow. They contrast with the deletions of entire sentences, which will be dealt with later in this chapter.

Table 6.3 Number and mean length of sentences in the three texts, and distribution of points at which sentence lengthening or shortening strategies were applied

<table>
<thead>
<tr>
<th>Text</th>
<th>N sentences</th>
<th>Mean sentence length</th>
<th>Sentence lengthening</th>
<th>Sentence shortening</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>N points in text where full stop removed</td>
<td>N points in text where cohesive device added</td>
</tr>
<tr>
<td>A</td>
<td>60</td>
<td>23.3</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>K</td>
<td>38</td>
<td>18.0</td>
<td>14</td>
<td>16</td>
</tr>
<tr>
<td>R</td>
<td>58</td>
<td>19.7</td>
<td>19</td>
<td>31</td>
</tr>
</tbody>
</table>

1 calculated excluding literature references that appeared in parentheses
2 includes one marginal comment that a particular sentence should be split in two

In all three texts there were points at which readers applied the strategy of deleting a full stop and merging two sentences. It will be recalled that in terms of word counts, Text A and Text R are respectively 198% and 159% longer than Text K; with this in mind it can be concluded from Table
6.3 that the text with proportionally most points where sentence-lengthening annotations could be applied was Text K. The table also shows that Text A, the text with the longest mean sentence length, attracted the most interventions to shorten sentences. The data on Text R indicate that in this text the strategy of inserting cohesive devices was more important than in the other two texts.

The scope for annotations that improved text flow by adjusting sentence length and cohesive devices, and by removing redundant phrases, belies the actual response. Though 67% of all readers made at least one such annotation, per text the reader response was well under 50%. The numbers of readers removing full stops were: Text A, 15 readers (33%); Text K, 13 readers (29%) and Text R, 17 readers (38%). The breakdown by native-speakerhood and reviewer category is in Table 6.4. Once again, NSs and reviewers were more active than NNSs and non-reviewers (especially in Text R: 71% of NSs versus only 23% NNS, for example).

Table 6.4 Percentages of NSs, NNSs, reviewers and non-reviewers who removed full stops, per text

<table>
<thead>
<tr>
<th>Reader category</th>
<th>Text A</th>
<th>Text K</th>
<th>Text R</th>
</tr>
</thead>
<tbody>
<tr>
<td>% NSs (N = 14)</td>
<td>57</td>
<td>36</td>
<td>71</td>
</tr>
<tr>
<td>% NNSs (N = 31)</td>
<td>23</td>
<td>26</td>
<td>23</td>
</tr>
<tr>
<td>% reviewers (N = 28)</td>
<td>39</td>
<td>32</td>
<td>43</td>
</tr>
<tr>
<td>% non-reviewers (N = 17)</td>
<td>24</td>
<td>24</td>
<td>29</td>
</tr>
</tbody>
</table>

Table 6.5 shows the extent of reader convergence on full stops. In Text A, by far the most (70%) of the instances of full stop removals were by only one or two readers. The comparable figures for the other texts were 36% (Text K) and 35% (Text R), which indicates that some of the full stops in these texts were hotspots, i.e. removed by more than two readers. Because of the low frequencies I deemed it unwise to subject these data to detailed statistical analysis, so I will present and discuss them qualitatively.

The full stops that were the foci of reader attention are shown and discussed, per text, below. The grey bars highlight the full-stop hotspots (defined as full stops removed by at least three readers). In all cases, the consecutive sentence is also given, to provide context. The three hotspots for Text A are shown in [15] – [17]. If the references in parentheses are ignored, the total number of words in each of these two-sentence text extracts is 28 or 25 – a word count that would not be unusually long for an English sentence in an academic or scientific text (see chapter 3).
Table 6.5. Readers’ removal of full stops, per text

<table>
<thead>
<tr>
<th>Full stop removed by</th>
<th>Text A</th>
<th>Text K</th>
<th>Text R</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 reader</td>
<td>6</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>2 readers</td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>3 readers</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4 readers</td>
<td>1</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>5 readers</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>6 readers</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

[15] With respect to the shoot architecture results generally confirm this expectations. Specific shoot height and specific leaf area were higher in species from a fertile environment. (Text A, lines 36-38. Full stop removed by 3 readers.)

[16] Their higher values for the SLA result in high values for the RGR (Grime and Hunt 1975, Poorter and Reemkes 1990). This causes a higher biomass also in nutrient poor conditions as shown by our results. (Text A, lines 47-49. Full stop removed by 4 readers.)

[17] Especially the plasticity of the shoot-to-root allocation was responsible for the change in dry matter partitioning at different nutrient levels. This effect was already noticed by Brouwer (1962). (Text A, lines 78-80. Full stop removed by 3 readers.)

In Text K, reader activity in lengthening sentences focused on a sequence of short sentences in lines 20-24 (of respectively 8, 7, 15 and 26 words) shown in [18].

[18] Most precise is to classify these areas separately. Hogeweg and Beeftink (1976) obtained similar results. They separately clustered the vegetation of three mud flats that came up from the sea. A conclusion was that the application of the classification obtained on one of the islands to an other island does not always optimally reflect the local classification. (Text K, lines 20-24. Three readers removed the first full stop, five removed the third. No readers removed both.)

The first three of these sentences also attracted the attention of two Spanish readers (C1 and E5), who wrote marginal comments (e.g. ‘too short
sentences!’) but did not otherwise intervene in the text here. In all, three of the nine Spanish readers drew vertical lines in the margin and added comments to indicate parts of Text K where they felt sentences were too short. The text chunks alluded to in these marginal comments have been mapped in Figure 6.2, together with the full stop hotspots.

Figure 6.2 Short sentences in Text K. Grey shading indicates text that attracted marginal comments about short sentences from three Spanish readers. Within these areas, the stops that other readers removed when merging sentences are shown; the two cells shaded black mark full stops that three or more readers converged on when merging sentences.

Text R attracted the most consensus on full stops that needed to be removed to adjust sentence length. In [19] – [23], the lack of cohesion between consecutive sentences is striking. Except for [23], none of the sentences that follow the hotspot full stop contain any anaphoric reference. The anaphora in [23] line 63 is achieved by the phrase ‘All these species’,
which refers to the ‘six species’ that were the subject of the preceding sentence. In [19] – [22] the weak cohesion between successive sentences is provided by repetition: of ‘soils’ in [19], ‘ratios’ in [20]. In [21], implicit anaphoric reference is achieved by the ‘soil acidity’, which, as scientists would know, is what ‘pH’ – mentioned in the preceding sentence – indicates. (This is therefore an instance of interactional coherence). In [22], the reference is the repetition of ‘ratio/ratios’; in the second sentence, the ‘potassium’ is a repetition of the ‘K’ (the chemical symbol for potassium) in the ‘N/K ratio’. In these extracts, as in those in [15] – [18], the word count of the ‘full-stop hotspot’ sentence plus the consecutive sentence is generally under 30. (The only exception being the final two sentences in [18]).

[19] The loam percentage is practically zero in the sandy soils where species-poor heath is the dominant vegetation. Grassland communities prevail on soils with a higher loam content.

[20] Also the nutrient supply ratios are correlated to loam percentage. N/P- and N/K ratios are high on the sandy soils and much lower on the silt and clay soils.

[21] The amount of phosphorus and potassium available to plants is related to soil acidity in podzol soils. For plants the availability of soluble phosphates in the soil decreases below pH 6.

[22] Also the variation in N/K ratio in the data set is high. Potassium seems to be a limiting nutrient for vegetation growth in at least part of the plots. The aboveground biomass of the vegetation on these nutrient poor soils is at its maximum at intermediate nutrient ratios, indicating that not one single nutrient is strongly limiting (Fig. 3). Balanced nutrient supply ratios favour plant growth.

[23] Six species in this data set are on the red list or are protected in the Netherlands. All these species strongly declined since 1950.
The cohesion problems in [19] – [23] are a feature of inexpert Dutch English described by Hannay and Mackenzie (1996: 179-185), who note that using full repetition to provide anaphoric reference to link consecutive sentences is often clumsy and ‘should be used sparingly’ (ibid. 185).

Readers’ strategies for dealing with the short sentences in [15] – [17] and [18] and with the combination of short sentences and poor anaphoric reference (i.e. clumsy full repetition) in [19] – [22] may be illustrated by showing the emended versions of Text R lines 3-4 [19]. The latter was the greatest full-stop hotspot in the entire study: five readers converged on it. In [24] – [28] below, I have underlined the words and punctuation the reader in question added or substituted.

[24] The loam percentage is practically zero in the sandy soils where species-poor heath is the dominant vegetation and grassland communities prevail on soils with a higher loam content. (reader A5)

[25] In the sandy soils where species-poor heath is the dominant vegetation, the loam percentage is practically zero, grassland communities prevail on soils with a higher loam content. (reader B4)

[26] Loam percentage is practically zero in the sandy soils where species-poor heath was the dominant vegetation whereas grassland communities prevailed on soils with a higher loam content. (reader B8)

[27] The loam percentage is practically zero in the sandy soils where species-poor heath is the dominant vegetation, whereas grassland communities prevail on soils with a higher loam content. (reader G3)

[28] Sandy soil sustains species-poor heath while loamy soil supports grassland communities. (reader J2)

Summarising, the readers’ strategies shown above are:
- replacing the full stop by the connective ‘and’ [24]
- refocusing the original sentence and inserting a comma splice [25]
- replacing the full stop by a comma and the connective ‘whereas’ in [26] and [27]. (In [26] the reader also inserted a comma after ‘soils’,
thereby making the second clause parenthetical, and changed the present tense to past: see chapter 8.)

- rewriting to form a more compact sentence, in which the full stop has been replaced by the connective ‘while’ (this connective being used as a synonym for the ‘whereas’ solution adopted in [26] and [27]).

Similar cohesion-improving strategies were deployed elsewhere where sentences were short and clumsy repetition provided cohesion. The connectives the readers used in [24] – [28] to achieve cohesion were a simple conjunction or the adverbs ‘whereas’ and ‘while’, but, as Hannay and Mackenzie (1996: 192-197) have demonstrated, prepositional phrases, adjectives and punctuation are also effective connectives. When writing persuasive text in which an idea is elaborated on in subsequent sentences, authors tend to place the connectives sentence-initially, as in [16] and [17]; the connectives there were ‘This’ and ‘This effect’. The author of Text A relied heavily on ‘this’ as an anaphoric cohesive device, especially in lines 71-92, causing reader E5 to ring in ink four instances of a sentence-initial ‘This’ and two readers to make the following marginal comments:

[29] Too many ‘This effect’ at the beginning of the sentences.
    (reader A8, commenting on lines 71-92)

[30] Unclear use of this
    (reader B6)

The strategies the readers used to improve the cohesion in lines 47-49 (see [16]), where two short sentences were anaphorically linked by the overused connective ‘This’ are shown below. (Once again, the readers’ paraphrases or inserted words and punctuation have been underlined.)

[31] Their higher values for the SLA result in higher values for the RGR (Grime and Hunt 1975, Poorter and Reemkes 1990), which also resulted in a higher biomass in nutrient-poor conditions in our experiment.
    (reader B3)

---

3 Reader E5 also ringed two close-together earlier instances of sentence-initial ‘This’ in Text A, plus two close-together instances of sentence-initial ‘However’.
Their higher values for the SLA result in high values for the RGR (Grime and Hunt 1975, Poorter and Reemkes 1990) and also causes a higher biomass in nutrient-poor conditions, as shown by our results.

(reader B5)

Their higher values for SLA result in high values for the RGR (Grime and Hunt 1975, Poorter and Reemkes 1990) and can produce a higher biomass in nutrient-poor conditions, as shown by our results.

(reader B6)

Their higher values for SLA result in high values for RGR (Grime and Hunt 1975, Poorter and Reemkes 1990) leading to a higher biomass also in nutrient poor conditions, as shown by our results.

(reader S4)

From [31] to [34] it can be seen that when dealing with short sentences that had clumsy anaphoric reference, the readers' strategy was similar to that applied to remedy short sentences plus clumsy repetition: remove the full stop and insert a better connective (twice this was the conjunction 'and', once a relative clause construction and once a gerund). The readers who did this were responding not only to the author's predilection for short sentences, but also to his lack of skill in deploying varied and appropriate connectives.

As well as focusing on infelicitous sentence breaks (full stops), readers improved cohesion by inserting cohesive devices at other points in the text. This effectively lengthened the sentence (unless the cohesive device replaced equally long deleted text). Reader response was 19% for Text A, 38% for Text K and 47% for Text R. The breakdown by native-speakerhood and reviewer category is in Table 6.6. Yet again, NSs and reviewers were more active than NNSs and non-reviewers (86% of NSs and 57% of reviewers intervened in Text R).

Table 6.6 Percentages of NSs, NNSs, reviewers and non-reviewers who inserted cohesive devices, per text

<table>
<thead>
<tr>
<th>Reader category</th>
<th>Text A</th>
<th>Text K</th>
<th>Text R</th>
</tr>
</thead>
<tbody>
<tr>
<td>%NSs (N = 14)</td>
<td>43</td>
<td>50</td>
<td>86</td>
</tr>
<tr>
<td>%NNSs (N = 31)</td>
<td>13</td>
<td>19</td>
<td>32</td>
</tr>
<tr>
<td>% reviewers (N = 28)</td>
<td>29</td>
<td>32</td>
<td>57</td>
</tr>
<tr>
<td>% non-reviewers (N = 17)</td>
<td>7</td>
<td>24</td>
<td>35</td>
</tr>
</tbody>
</table>
The data on Text R shown in Tables 6.1, 6.4, 6.6 suggest that this text required the most intervention to improve cohesion. Five NNSs wrote marginal comments on Text R’s poor coherence:
- lines 2-22: ‘needs “connectors” between sentences’ (reader C7)
- grid ref. 27/3: ‘needs link’ (reader D2)
- grid ref. 30/1: ‘needs linking sentence’ (reader D2)
- grid ref. 53/15: ‘needs link’ (reader D2)
- lines 30-43: ‘no clear coherence’ (reader D1)
- lines 67-72: ‘no clear coherence’ (reader D11)
- lines 23-29: ‘logical connection of sentences not clear’ (reader J1)
- line 17: ‘abrupt’ (reader J5)

Table 6.7 shows, per text, the frequencies of changes that inserted cohesive devices. Yet again, the preponderance of one-off interventions is striking. Also important is the hotspot in Text K at grid ref. 22/7-8. In [35] this hotspot (a lack of cohesion between consecutive sentences) is given in its original form.

Table 6.7 Readers’ additions of cohesive devices, per text

<table>
<thead>
<tr>
<th>Point where cohesive device was added by</th>
<th>Text A</th>
<th>Text K</th>
<th>Text R</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 reader</td>
<td>15</td>
<td>13</td>
<td>22</td>
</tr>
<tr>
<td>2 readers</td>
<td>1</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>3 readers</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4 readers</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>11 readers</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

[35] They separately clustered the vegetation of three mud flats that came up from the sea. A conclusion was that the application of the classification obtained on one of the islands to an other island does not always optimally reflect the local classification.

The commonest strategy to improve the cohesion (and thus the coherence) was to remove the full stop and insert the connective ‘and’ (one reader preceded the ‘and’ by a comma). See [36]:

[36] They separately clustered the vegetation of three mud flats that came up from the sea and concluded that … (readers A5, A6, B1, B2, F1)
Example [37] shows a strategy adopted by two readers. It retained the position of the full stop but smoothed the transition to the second sentence by creating an explicit anaphoric reference (a pronominal connective):

[37] They separately clustered the vegetation of three mud flats that came up from the sea. They concluded that…
(readers A 4, C3)

The remaining four readers also retained the full stop but added anaphora to the word ‘conclusion’, making it explicit sentence-initially that the conclusion was one reached by the authors cited in the text, Hogeweg and Beeftink:

[38] They separately clustered the vegetation of three mud flats that came up from the sea. One conclusion from their work was…
(reader B3)

[39] They separately clustered the vegetation of three mud flats that came up from the sea. Their conclusion was …
(reader B4)

[40] Hogeweg and Beeftink (1976) separately clustered the vegetation of three mud flats that came up from the sea. The conclusion was…
(reader C6)

[41] They separately clustered the vegetation of three mud flats that emerged from the sea. One of their conclusions was…
(reader D1)

Seven readers (three Americans and four NNSs) converged on another point in Text K that had problematic cohesion, but instead of annotating in the text, they all commented in the margin about the abrupt change of subject or lack of transition. In this case, the lack of cohesion between consecutive sentences occurred between the last sentence of one paragraph and the first sentence of the next paragraph. So here the problem was at macro scale: it was the abrupt change of topic between consecutive paragraphs. It was at grid ref. 31/2 and is shown in [42].

[42] A practical consequence of these observations is, that in mapping the vegetation of an area in the usual way (Braun-Blanquet 1951; Zonneveld 1988), it would be better to start mapping parts with a weak vegetation pattern than to start with strongly patterned parts,
Coherence and cohesion

provided that the relative strength of a classification may be inferred from the distinctness of boundaries between vegetation patches.

Only recently, the taxonomy of *Rubus* subgenus *Rubus* in northwestern Europe became clear (Weber 1985, 1995). Still, many national floras are not fully covering the subgenus (Van der Meijden 1996; Stace 1997).

(Text K, lines 26-33)

As noted earlier, Text R attracted the most insertions of cohesive devices, but the vast majority of these were by no more than one or two readers (Tables 6.3, 6.6). In the chunk of text from lines 50 to 67, there were 13 points at which readers inserted cohesive devices; three of these points were converged on by two readers and a further three were converged on by three readers. The hotspot for insertion of cohesive devices in Text R (grid ref. 4/4) was in [19]. It was discussed above, in the context of the strategies readers used when lengthening the sentences in lines 2-3.

*Shortening sentences*

The sentence-lengthening annotations are only part of the strategy of improving text flow in these three texts. As Table 6.3 showed, readers also shortened sentences by deleting (i.e. not paraphrasing) phrases and by inserting full stops. Earlier I noted that by far the most changes of this type were made to Text A – the text with the longest mean sentence length. Figure 6.3 shows where the deletions were made, and indicates reader convergence. Twenty readers (44% of the total) deleted phrases in this text. More NSs did so than NNSs (57% versus 39%). The two hotspots of redundant phrasing, which each attracted seven readers, are underlined in [43] and [44].

[43] At harvest 4 within the species *Holcus and Rumex* (from a nutrient rich perennial stage) were found to have the highest root fraction…

(Text A, lines 20-21)
Figure 6.3 The deletions of phrases (3 or more words) in Text A, showing the number of readers who performed the deletions. Pale grey = 1–2 readers, dark grey = 3–5 readers, black = 7 readers
If we consider both architecture and allocation, allocation was found to be more sensitive for the nutrient level than architecture (Text A, lines 72-73)

Fourteen readers (31% of all readers) inserted full stops in Text A. They represented 57% of the NSs and 39% of the reviewers. Of the 19 points at which full stops were inserted, nine were one-offs and a further seven were converged on by only two readers. The four hotspots of full stop insertion are highlighted in grey in [45], [46] and [47].

At harvest 4 within the species Holcus and Rumex (from a nutrient rich perennial stage) were found to have the highest root fraction and within the grasses Holcus have the highest specific root length. However, Elberse and Berendse (1993) found indeed higher SRL values in grasses from a nutrient poor environment which contradict our results and confirm the expectations. Our experiment would have give the same results if a growing period of 4 weeks was considered (Fig. 3). (Text A, lines 20-26)

Compared to Tilmans theory our results fit better in the notions of Grime (1979) who stated that species adapted to nutrient rich environment (Ruderals/Competitors) are better in capturing all resources. (Text A, lines 40-43)

Within the grasses, no evidence was found for any plasticity with respect to architecture but especially in Plantago and Rumex major changes in the specific shoot height occurred due to the nutrient level. (Text A, lines 73-75)

The two hotspots in [45] (grid refs. 21/14 and 24/5) attracted respectively four and three readers. All the readers (A4, A7, B6, S4) who converged on 21/14 removed the ‘and’ and inserted a full stop. Instead of retaining the ‘within’ as the start of the newly created sentence, reader A7 replaced it with ‘of’ (‘Of the grasses, Holcus...’). The Swedish reader S4 also removed the ‘within’, but he rewrote, to ‘The grass Holcus was also found to have the highest specific root length.’

The two (Dutch and Spanish) readers who converged on 24/5 adopted the same strategy: deleting the full stop, replacing ‘which’ by ‘This’ and correcting the verb agreement. American reader A6, however, rewrote and amplified:
Their findings support Tilman’s (1985, 1988) expectations and also contrast with our results.

The hotspot in [46] (grid ref. 40/18) was converged on by three readers (B1, B3, F4). They all rearranged the first two clauses in the sentence (see [2], [3] and [4]) and then began the second sentence: ‘Grime stated (or states)…). The solutions of the five readers (all NSs) who converged on the ‘but’ in [47] are shown in [49] – [52].

But, especially in Plantago and Rumex, major changes in specific shoot height occurred due to the nutrient level.
(reader A4)

In the herbs Plantago and Rumex, major changes in specific shoot height occurred due to the nutrient level.
(reader A6)

However, in the forbs Plantago and Rumex, major changes in specific shoot height occurred due to the nutrient level.
(reader A9)

However in Plantago and Rumex major changes in specific shoot height occurred due to nutrient level.
(readers B1 and B6)

It can be seen that four of the readers opted to retain or reinforce the sentence-initial connective. Reader B1 also merged the sentence with the next one, by substituting a comma for the full stop after ‘level’ and deleting the next three words. This was the only instance recorded of adjusting sentence flow by combining full stop removal and full stop insertion to consecutive sentences. Elsewhere in Text A the chunks of text containing focal points for adding full stops did not contain focal points for full stop deletion.

Though characterised by its short sentences, Text K did contain one long sentence, which two Spanish readers commented on and one American reader split. The sentence is given in [53], the amended version in [54].

A practical consequence of these observations is, that in mapping the vegetation of an area in the usual way (Braun-Blanquet 1951; Zonneveld 1988), it would be better to start mapping parts with a weak vegetation pattern than to start with strongly patterned parts,
provided that the relative strength of a classification may be inferred from the distinctness of boundaries between vegetation patches.
(Text K, lines 26-30)

[54] A practical consequence of these observations is, that in mapping the vegetation of an area in the usual way (Braun-Blanquet 1951; Zonneveld 1988), it would be better to start mapping parts with a weak vegetation pattern than to start with strongly patterned parts. This being the case if the relative strength of a classification may be inferred from the distinctness of boundaries between vegetation patches.
(reader A7)

Reader A7 was also one of the three readers to make annotations in Text R that involved removing full stops. He advised splitting the 45-word sentence in lines 14-20. Later in that text, at lines 46 to 48, two consecutive sentences of respectively 31 and 32 words were shortened by adding a full stop. Two readers (a Spaniard and a Japanese) converged on the first of these sentences, converting a relative clause into a fully-fledged sentence. These were the only three instances of full stop additions in Text R.


text_rMK21_1592_1595

Removing cohesive devices

Cohesive devices were removed less often than they were added. They were removed at 13 points in Text A, three points in Text K and nine points in Text R. (For comparison, see Table 6.7). There were three points of convergence in Text A that each attracted four readers. One point in Text R was converged on by eight readers. Two of the Text A hotspots (grid ref. 21/14 and 23/2) appeared in [45]. The first, the highlighted ‘and’ was deleted when readers added a full stop. The second was the sentence-initial ‘However’ shown in [45]. The third hotspot, also a deletion of a sentence-initial ‘However’, occurred in the sentence that followed on from the last sentence shown in [45]. A German (G6) and a Spaniard (C6) removed both ‘howevers’; it seems probable that the other readers (A6, B3, B6, S4), who removed one or other of these were responding to the inelegance of beginning consecutive sentences with the same connective. Additionally, those who removed the ‘however’ at grid ref. 23/2 may have been responding to the paragraph-initial position of this connective.

The connective in Text R that attracted the attention of eight readers is shown next, in [55].
Only the common heathland species *C. vulgaris* and *E. tetralix* and *S. cespitosus* are growing in soils with low pH. The reason for its removal is its redundancy; in all cases it was replaced by a comma.

**The paragraphing and the readers’ responses to it**

As noted in the introduction (see Figure 6.1), relational coherence also operates at the level of the paragraph. At this level, it is inferred not only from the content of the text, but also from the paragraph orthography (i.e. the visual signals of paragraph breaks). From the description given in chapter 3 of the Dutch practice of using two types of *alinea* whereas English has only one type of paragraph, it is clear that if Dutch authors do transfer the Dutch paragraphing conventions to English, non-Dutch readers could be nonplussed. American and British readers in particular will not recognise the cohesion signals transmitted by ‘subparagraphs’ beginning flush left on a new line (see e.g. Ulijn and Campbell, 1997), and in manuscripts they are likely to interpret this as careless typing.

The three texts display differences in their paragraph orthography. Text A contains 10 paragraphs; except for the first and last, they were all indented. There is no ‘subparagraphing’. The first eight paragraphs are short (no longer than 11 lines). The two remaining paragraphs are of 23 and 15 lines (the latter is the final paragraph). The paragraphing is reinforced by four subheadings: Method and annual performance; Architecture, allocation and turnover; Plasticity; and Conclusions.

The paragraphing provoked a very small reader response. Three readers (all NNSs: C6, D10, J1) made a paragraph break at grid ref. 49/5 and ran on the paragraph at 51/16. In [56] the break they inserted is shown by ¶ and the run-on is indicated by ~.

[56] …This causes a higher biomass also in nutrient poor conditions as shown by our results. ¶ On the other hand Grime (1979) related low RGR with the toleration of nutritive stress. The mechanism why these slow growing plants perform better at low nutrient levels can, in our view, be found in their lower biomass turnover. ~

Results show that the dead leaf fraction in grasses adapted to nutrient poor environments were lower than in the grasses adapted to nutrient rich environment.

(Text A, lines 48-53)
Presumably to smooth the transition, Reader C6 inserted ‘Our’ in front of ‘results’. Reader D10 made no textual changes in relation to the reparagraphing, but J1 rewrote extensively, to create:

[57] …A higher biomass in nutrient poor conditions was also shown in the results. Low RGR was related with the toleration of nutritive stress (Grime (1979). The mechanism why these slow growing plants would perform better at low nutrient levels because of their lower biomass turnover. The dead leaf fraction in grasses adapted to nutrient poor environments were lower than in grasses adapted to nutrient rich environments.

It is clear that J1’s reparagraphing was part of a strategy to improve the presentation of the information. By comparison, the reparagraphing of the other two readers, and of reader D10 who created a larger paragraph by running on at line 39, achieved only an orthographic reorganisation.

In contrast to Text A, Text K contains an *alinea*. With the exception of the first paragraph, which begins flush left, the seven paragraphs in the text are indented. Line 17 is the first line of the *alinea’s*. It is difficult to see, because the only visual signal is that it begins on a new line. Tschichold (1988: 55) has pointed out that this practice makes it difficult for readers to identify the start of a new paragraph.

Nine readers (20% of all readers) responded to the *alinea* at line 17, by marking that it should be indented or commenting that it should be the start of a new paragraph. Five of these readers were NSs (three Americans, two British). The others were Spanish, Japanese (two) and Swedish. An American reader who initially thought that line 16 should be the start of a new paragraph changed his mind and repositioned that new paragraph at line 17.

All nine readers who responded to the *alinea* at line 17 did so by making it an unambiguous paragraph break. They were preserving the Dutch author’s paragraph structure but giving it an accepted anglophone marking.

Text R has the longest paragraphs of all three texts. There are six. They begin flush left and are marked off from each other by a double blank line. There are two *alinea’s*. One, which begins on line 12, is again difficult to see in the manuscript, as the author has used the conventional Dutch orthographic signal – a new line, starting flush left, but the preceding line extends almost to the right margin. This clearly breaks the (anglophone) compositor’s maxim, as given by Stiff (1996: 145):
The reader should be able to see, at a glance and without a second look, that this thing is a paragraph, and that this is a paragraph, and so on.

The second alinea, which begins on line 62, is more visible because the preceding line ends some distance from the right margin.

As in Text K, some readers reacted to the alinea’s in Text R by clarifying their status as paragraphs in conformity with the anglophone convention. Six readers (five British, one Swede) reacted in this way to the alinea at line 12, but eight reacted to the easier-to-spot alinea at line 62. These eight comprised four NSs and two Dutch and two Japanese.

The long paragraphs in Text R triggered the largest reader response to paragraphing: 13 readers (29% of the total). Apart from the two alinea’s discussed above, there were three other points in the text where readers inserted a paragraph break. Only one of these was converged on by more than one reader. It was at grid reference 20/7 (indicated by ¶ in [58] below) and it was converged on by readers B3, A6, G6, and J1.

[58] We conclude that increased acidity of the soil can be the principal cause for the declining species richness in nutrient poor grassland and heathland communities, which is in agreement with the results of other studies (Grime, 1979; Houdijk et al., 1993; Roelofs et al., 1996). However we found that nutrient supply ratios also influence the species composition. The effects of the nutrient supply ratio in the vegetation biomass are rather independent of the pH effect (Fig. 4).

In summary, 16 readers (36% of total) made paragraphing annotations. Only the Japanese reader J1 did so in all three texts, but five readers (three were NSs) responded to Texts K and R.

Out-of-place and redundant text

It will be remembered that this category of text annotations was created to record two types of emendations:
- number and location of chunks of text (minimum, one sentence) that readers wanted to move to elsewhere in the Discussion or in the article
- number and location of chunks of text (minimum, one sentence) deleted.
These represent reader responses to the texts’ topical coherence.

Nineteen readers (42% of all readers) identified one or more sentences as being out of place or redundant. Here, however, the NNSs were more active than the NSs: 48% of the NNSs, versus 28% of the NSs. The
Coherence and cohesion

corresponding figures for reviewers and non-reviewers were 50% and 29%. Only two readers (both Dutch) deleted or moved text in all three texts.

In all, there were 67 annotations in this category. Only seven of these related to Text A – the longest text. Text K, the shortest text, had relatively the most deletions and text moves: 27. Table 6.8 lists, for all three texts, the text moves and deletions that were accompanied by marginal comments that indicate where the sentences involved should have been.

Table 6.8 The lines unequivocally deemed to be out of place, their recommended destination as revealed by marginal comments, and the readers (* = reviewer) making the recommendation

<table>
<thead>
<tr>
<th>Text</th>
<th>Lines to be moved</th>
<th>Destination</th>
<th>Reader(s) making suggestion</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3-6</td>
<td>Methods</td>
<td>A7*</td>
</tr>
<tr>
<td>A</td>
<td>6-9</td>
<td>Results</td>
<td>A7*, G6</td>
</tr>
<tr>
<td>A</td>
<td>7</td>
<td>Results</td>
<td>C6</td>
</tr>
<tr>
<td>A</td>
<td>7-9</td>
<td>Results</td>
<td>D2*</td>
</tr>
<tr>
<td>K</td>
<td>2-5</td>
<td>Methods</td>
<td>F1*</td>
</tr>
<tr>
<td>K</td>
<td>6-16</td>
<td>Introduction</td>
<td>F1*</td>
</tr>
<tr>
<td>K</td>
<td>2-16</td>
<td>Introduction</td>
<td>D11*</td>
</tr>
<tr>
<td>K</td>
<td>14-15</td>
<td>Earlier in Discussion</td>
<td>C7*</td>
</tr>
<tr>
<td>K</td>
<td>49-52</td>
<td>Results</td>
<td>A6*</td>
</tr>
<tr>
<td>K</td>
<td>52</td>
<td>Earlier in Discussion</td>
<td>C7*</td>
</tr>
<tr>
<td>R</td>
<td>2-17</td>
<td>Results/Methods</td>
<td>D2*</td>
</tr>
<tr>
<td>R</td>
<td>7-13</td>
<td>Results</td>
<td>F4*</td>
</tr>
<tr>
<td>R</td>
<td>9-17</td>
<td>Results</td>
<td>A6*</td>
</tr>
<tr>
<td>R</td>
<td>22-25</td>
<td>Results</td>
<td>A6*</td>
</tr>
<tr>
<td>R</td>
<td>22-27</td>
<td>Earlier in Discussion</td>
<td>D1*</td>
</tr>
<tr>
<td>R</td>
<td>24-29</td>
<td>Earlier in Discussion</td>
<td>S2*</td>
</tr>
<tr>
<td>R</td>
<td>30-41</td>
<td>Introduction</td>
<td>J1*</td>
</tr>
<tr>
<td>R</td>
<td>41-43</td>
<td>Elsewhere</td>
<td>C7*</td>
</tr>
<tr>
<td>R</td>
<td>53-54</td>
<td>Earlier in Discussion</td>
<td>C7*</td>
</tr>
<tr>
<td>R</td>
<td>53-57</td>
<td>Later in Discussion</td>
<td>J2*</td>
</tr>
<tr>
<td>R</td>
<td>58-61</td>
<td>Elsewhere</td>
<td>A4*</td>
</tr>
<tr>
<td>R</td>
<td>62-65</td>
<td>Introduction</td>
<td>J1*</td>
</tr>
<tr>
<td>R</td>
<td>62-72</td>
<td>Earlier /Later in Discussion</td>
<td>D1*, S2*</td>
</tr>
<tr>
<td>R</td>
<td>70-73</td>
<td>Earlier in Discussion</td>
<td>F4*</td>
</tr>
<tr>
<td>R</td>
<td>73-81</td>
<td>Earlier in Discussion</td>
<td>A4*, G3*</td>
</tr>
<tr>
<td>R</td>
<td>74-76</td>
<td>Elsewhere</td>
<td>C7*</td>
</tr>
</tbody>
</table>

* Because large chunks of text were sometimes moved, the actual sentences have not been cited in the table.
The 29 deletions and text moves listed in Table 6.8 can be checked against the 'moved and deleted' text chunks shown in the maps in Figure 6.4. The 38 text chunks not shown in Table 6.8 have also been incorporated into Figure 6.4: they had been crossed out, but only in a few cases had readers noted the reason for the deletion (usually a one-word marginal comment of ‘redundant’, or ‘repetition’). It is possible that some of these deletions without marginal comments were also of chunks of text that readers felt were out of place in the Discussion but could have been fitted in elsewhere in the paper. Or, they might have been sentences that readers could not understand.
The shading in Figure 6.4 shows the readers’ overlap on redundant or out-of-place text. It is clear that all three texts had one or more sentences near the beginning that were deemed to be dispensable. In Text A, the sentence that four readers converged on (see (59) below) repeated a result (see also Table 6.8).

[59] Productivity levels at the end of these 16 weeks were 330, 825 and 1650 g/m² for the NI, N2, N3 treatment respectively (including dead leaves) which is a realistic productivity range for poor, medium rich and rich grasslands.

(Text A, lines 7-9)
In Text K, the reader convergence on the first 16 lines was apparently provoked by the generality of the text. Table 6.8 suggests the motivation: readers felt that these two scene-setting paragraphs are more appropriate to an Introduction than to the final part of a paper.

Figure 6.4b and Table 6.8 suggest that Text K also ends weakly. Two chunks of text toward the end of the text were hotspots: five readers converged on [60] and six on [61]. The latter is the penultimate paragraph of the Discussion, yet it appears to consist of bald propositional statements that the author has not linked to the research that has been the subject of the paper. This makes it difficult to interpret them as the research conclusions he intends them to be.

[60] Most species of the subgenus *Rubus* prefer loamy sand or loam, both rich in humus and nutrients (Weber 1995).

(Text K, lines 46-47)

[61] General-purpose vegetation classification (flora-based), and thus vegetation mapping, involves many decisions to be taken before field work starts. These decisions, all to different extents, may distinctly affect the resulting classification.

(Text K, lines 53-55)

The most confused picture is presented by Text R (map on page 170). A clue to the readers’ response is the summarising comment of Spanish reader C7: ‘Looks more of a “messy results” section than a Discussion section’. Table 6.8 provides evidence that the convergence on lines 10-14 (see [62]) was in response to sentences that seemed to be merely reiterating Results.

[62] Species richness varies but is relatively high in grassland and low in heath. In this data set, the parent material is the determinant of several measured parameters including management type. Therefore we first analysed the data set as a whole but subsequently analysed the two major vegetation types separately.

(Text R, lines 11-14)

The five readers who converged on the last sentence in [62] presumably felt that it was incongruous to wait until the Discussion to report a research method.

In common with Text K, Text R also had a weak ending. Once again, the textual shortcoming underlying reader dissatisfaction seems to be the lack of metadiscourse. The sentence to which seven readers took objection [63] is not clearly related to a research finding, and appears to be conjecture that
invites research, rather than a conclusion based on the presented research. In chapter 8 I will show that what contributes to the impression of generality is the deployment of the present tense.

[63] Competition for nutrients may affect the uptake ratio and some species certainly are better competitors for one or more nutrients (Braakhekke, 1980).

(Text R, lines 74-75)

Synthesising discussion of the results

Differences between texts

From Table 6.3 it can be concluded that readers seem to have experienced problems with text flow in all three texts. The problems in Texts K and R were apparently associated more with short sentences that required lengthening, with Text R requiring more cohesive devices. Though Text A also required sentence lengthening and the insertion of cohesive devices, the more important remedial strategy in this text was to remove redundant phrasing and to shorten sentences.

Readers’ adjustments to sentence length should be put in the context of the sentence length of the texts. The longest of these mean sentence lengths (Text A: 23.3 words) is almost exactly the same as the mean sentence length Bazerman (1988) reported for articles in the American journal Physical Review. Compare this with the mean sentence lengths I found when analysing English-language and Dutch-language text extracts from biology journals (chapter 3), of respectively 27.8 and 20 words. The mean sentence lengths of Texts A, K and R were all below the mean for the published English language texts – and Texts K and R also had shorter mean sentence lengths than the mean Dutch sentence length I reported in chapter 3.

In Texts K and R, the cohesion problem seems to stem from a lack of metadiscourse, i.e. of a lack of features that make the organisation of the text explicit, provide information about writer’s attitude towards the text content and engage the reader in the interaction (Intaraprawat and Steffenssen, 1995). In these texts, the authors do not argue or persuade so much as present a series of bald statements that appear to be propositions (see [60] – [63]). As citation [63] shows, author R makes statements that are difficult to identify as her findings or conclusions.

The differences in text cohesion problems between the three texts provoked differing strategies from the readers. Summarising, these were that Text A (mean sentence length 23.3 words) attracted the most sentence-shortening strategies, in the form of insertions of full stops and deletion of
redundant phrases. Many of its cohesion problems arose not from a lack of anaphora but from its clumsy deployment, particularly the overuse of the sentence-initial ‘this’. Relative to its length it attracted the least number of sentence-refocusing changes. Text K was notable for its short sentences. In this text, readers generally opted to remove full stops to improve cohesion. Incoherence was also apparent at meta scale: at one point, several readers commented on a poor transition between consecutive paragraphs. Text K attracted relatively the most sentence-refocusing changes.

Text R appeared to require the most intervention to improve its cohesion and coherence, largely because the author relied on repetition, rather than anaphora, and she underused cohesive devices. One way of remedying this was to suggest paragraph breaks (including making the paragraphing more explicit, by upgrading alinea’s to English paragraphs). Another remedy to improve the cohesion was to add cohesive devices (Table 6.7). More sentence refocusing was done than in Text A.

**Sentence refocusing**

The low response of these peer readers (27%) to sentence focus problems was similar to the reluctance Ventola (1992: 202) reported for NS revisers (these were language specialists, not subject specialists) to refocus sentences in Finnish-authored academic texts (see also Ventola and Mauranen, 1991). It is interesting to see that NSs who refocused sentences did not come up with the same solutions: see [2] and [3], [7] and [8] and – in particular – [12], [13], [14]. This suggests that the supposedly optimal rhetorical strategy of putting ‘old’ or ‘given’ information first and ‘new’ information last in a sentence is not necessarily self-evident to NSs. This agrees with Ventola and Mauranen’s (1991) finding that the NS language revisers they studied (I hesitate to call them ‘language professionals’, as they appear to have been postgraduate NS students rather than trained editors) sometimes made infelicitous thematic changes. For the readers in my study or the language revisers in Helsinki to systematically examine and adjust the sentence focusing of a NNS text would have required much time and effort; they would be more likely to opt for a satisficing approach in which the bare minimum is done, to rectify particularly poorly focused sentences.

Another conclusion that could be drawn from the low incidence of sentence refocusing in my study is that poorly focused sentences are not a text feature that NS readers easily and readily correct while first reading a text. (I assume that these readers did read the texts once only: the test instructions implied that the reading should be thorough, but once-only; furthermore, these busy scientists are unlikely to have reread several times, as language revisers and copy-editors must do.) I would also argue that ‘cumbersome thematic
progression’ (Ventola, 1992: 203) might be a low priority when dealing with NNS texts that have other shortcomings; it is a feature of poor writing but not of ‘wrong’ writing. A reader’s priority when correcting the English would be to correct obvious errors and to rectify mismatch with genre. The latter not only involves dealing with redundancy and out-of-place text, but also checking the hedging and tense use (see chapters 7 and 8). Furthermore, as shown in chapter 5, these subject-expert readers also found plenty of content shortcomings to comment on and rectify.

**Adjustment of cohesive devices**

The paucity and lack of variety in use of cohesive devices in all three texts, especially in Texts A and R, echoes the findings of Finnish researchers (Ventola and Mauranen, 1990, 1991; Ventola, 1992) relating to the use of connectives in English-language academic texts written by Finns. Ventola’s observation on the Finnish authors’ use of connectives and the resulting impact on the reader applies to these Dutch texts too:

> In short, the use of connectors by Finnish writers seems to be infrequent, fairly locally motivated, and somewhat haphazard and monotonous. Consequently, an English reader has to work somewhat harder than usual to understand the global organisation of parts of the text in Finnish writers’ texts and to unravel the intended logical meanings between propositions.
> (Ventola, 1992: 201)

The density of the places in Text R where cohesive devices were inserted (particularly in lines 50-67) is evidence of a poorly cohesive text. The readers seem not to have tackled the problem systematically, however, as can be seen by the low numbers converging on these points. This echoes the findings reported by Ventola (ibid.: 204) that

> revisers’ connector changes appear to be motivated locally without consideration of how the argumentation of the text proceeds

That more readers did not react to the shortcomings in cohesion might be attributable to various factors. One of these could be that short sentences, though possibly irritating (and thus eliciting adverse comments about the texts being ‘jerky’ or ‘sentences being ‘too short’; see Appendix 5.5) are easier to comprehend than long and complex sentences. Another factor must be the way the readers read the text: did they read through once, and was their reading skim reading? If so, they could not have tackled the cohesion
shortcomings systematically and consistently. The evidence for a more thorough, systematic approach (possibly involving several readings of the texts) is the number of annotations and the time spent reading/annotating. As mentioned in chapter 5, the readers who spent the most time on the texts were NNSs. Two of these, J1 and S4, made the most improvements to cohesion: see Figure 6.5, which indicates reader activity in removing full stops. (The Japanese reader’s exceptional activity will also be referred to in the context of tense changes: see chapter 8.)

Figure 6.5 Lengthening sentences by removing full stops. Pooled data for the three texts. Black bars = reviewers, grey bars = non-reviewers
Figure 6.6 Sentence shortening: deletions of three or more words. Pooled data for the three texts. Black bars = reviewers, grey bars = non-reviewers.

Figure 6.7 Sentence refocusing. Pooled data for the three texts. Black bars = reviewers, grey bars = non-reviewers.
Yet another factor influencing reader activity in improving cohesion must be competence in English. Though the NSs were generally more active than the NNSs, there was again evidence of great variation in individual behaviour, with some NNSs behaving like NSs. Figure 6.5 not only indicates the sentence-lengthening activity of the Japanese and Swedish readers (J1 and S4) referred to above, but also that two NSs removed no full stops. Figure 6.6, which shows the deletions of phrases deemed redundant confirms that reader J1 was very active in editing the text, but shows that reader S4 made few such changes. And Figure 6.7, which shows the frequency at which readers made sentence-refocusing changes, confirms J1’s activity in annotating the texts and shows that reader B1, who was also prominent in the removal of full stops, performed the most clause relocations. It is interesting to see how long these active readers spent annotating the texts. The longest time, 295 minutes, was spent by reader J1. The Swede S4 spent 285 minutes. By contrast, reader B1 spent only 91 minutes, and the American A6, who deleted the most phrases, must have had an eye for spotting redundancy: he spent only 61 minutes on the texts. However, it is quicker to spot redundancy and delete the redundant words than to spot infelicitous English, reformulate the offending piece of text and write it in.

It is not clear why most of the points in the text where cohesion adjustments were made were focused on by only one or two readers. As noted above, readers’ idiosyncrasy or inconsistency, and their attitude and attention (close versus skim reading) presumably play a role. It is worth noting that Ventola (1992) has reported that even professional language revisers fail to be consistent in amending shortcomings in cohesion and coherence. She does not offer an explanation for this, merely suggesting that the mental processes of revision are responsible for these, arguably human, errors.

Failure to remedy failings in the texts might also be a manifestation of another factor that could have accounted for the lack of response to coherence problems in my reception study: interactional coherence, i.e. the biologist readers’ ability to infer coherence by virtue of being on the same wavelength as the biologist authors. Text extract [21] was an example of this type of inferred coherence: readers who knew that acidity is expressed as pH would be able to make the intended link between the two consecutive sentences. Inferred coherence was also important in the test I described in chapter 4, in which readers were asked to sequence scrambled sentences of three Dutch English texts.

That the peer readers in this reception study may have been more daring in their text changes than language revisers who operate primarily from their expertise in the English language and (hopefully) of knowledge of the research article genre can be seen from the response to one of the cohesion bottlenecks: the clumsy sentence in lines 40 to 43 in Text A, shown in [1].
have shown that the three reader strategies for improving this, the opening sentence of the text’s fifth paragraph, were to refocus it ([2] – [5]) and to shorten it (four readers added a full stop, six readers deleted a redundant phrase). In all cases, the phrase deemed redundant was the opening phrase, in which the author alluded to Tilman’s theory. It seems unlikely that a language professional would have taken the drastic action of removing this allusion.

**Paragraphing**

The response of the readers in the present study to the Dutch *alinea’s* can be seen as confirming the Bond and Hayes (1984) model for paragraphing decisions, described in chapter 4, in which the cue to start a new paragraph is the length of the current paragraph, combined with a topic shift. In this case, the paragraph cue was an almost invisible orthographic one, as well as a topic shift. The greater reader activity in Text R could also be a response to the long paragraphs (the second of the assumptions in the Bond and Hayes model). That only 14 of the 45 readers (31%) responded to the *alinea’s* in Texts K and R, could be interpreted either as suggesting that most readers did not notice the *alinea* break, or that they recognised and agreed with it. Whatever the reason, adjusting the paragraphing was clearly not a priority. It is noteworthy that the starting points of *alinea’s* were hotspots for readers’ marking of paragraph breaks. It would be worth doing more research to clarify the impact of *alinea’s* on non-Dutch readers’ perception of text coherence.

**Out-of-place and redundant text**

The dominance of NNSs making these annotations (Table 6.8: 3 NSs versus 13 NNSs, respectively 14% and 42% of all readers) is interesting. Could it be that the NSs are underrepresented because they found enough to amend at the substance and text levels of error correction and in adjusting the hedging and tense use (see chapters 7 and 8)? The dominance of NNSs could then be attributed to a lack of proficiency in English, which caused them to concentrate more on content and on whether the text was appropriate for a Discussion section. The latter are both aspects of the texts’ suitability that they as professional scientists can be expected to feel more confident about.

Those readers who wanted certain sentences from the Discussion texts to be repositioned in other paper sections seem to have been striving for prototypical article sections with minimal overlap with other sections of the paper. Table 6.8 shows that all but two of these were reviewers. Their ideal was, presumably, a Discussion of the type specified by *Cancer Research*, a journal Dubois (1996: 8) singled out for explicitly formulating its requirements for Discussion sections:
In this section, the data should be interpreted concisely without repeating material already presented in the Results section. Speculation is permissible, but it must be well founded. (http://www.aacr.org/2000/2100/2110/2110.html)

Analyses of published research articles, however, have revealed that there is overlap between the content of sections of a research paper. When they examined 120 articles in hard sciences and biology, for example, Berkenkotter and Huckin (1994) found that in 75% of them, some of the paper’s findings were reported in the Introduction. Overlap may, indeed, be desirable, given the evidence that readers rarely read IMRD (Introduction, Methods, Results and Discussion) sections in that order, but instead follow a strategy that involves reading the most rewarding (news-rich) sections first (Burrough-Boenisch, 1999a). For readers who read a Discussion section first (or out of context, as in this reception study), repetition of results or of background information could be helpful. This could be why over half the readers did not suggest text deletions or text moves. That the background information presented at the start of Text K was sometimes experienced as helpful is apparent from the marginal comment of reader G6: ‘Good introduction’.

**Metadiscourse**

When discussing the readers’ response to [60] – [62] I speculated that lack of metadiscourse may have contributed to readers interpreting sentences as propositions unrelated to the research findings. At this point I would like to elaborate on the implications of underuse of metadiscourse on coherence in the context of Dutch writing style.

From their evaluation of 47 NNS essays, Intraprawat and Steffenssen (1995) concluded that skilled writers are aware of their readers’ needs and are able to control the strategies for making their texts more considerate and accessible to readers, but poor writers are unable to generate ‘considerate texts’. This being so, the authors of Texts A, K and R could be characterised as being poor writers. Because they were writing English as NNSs, they are likely to have produced less cohesion in their texts than an NS would have done (Parsons, 1991). If they write equally ‘inconsiderately’ (in the sense of not using metadiscourse) in Dutch, however, does this confirm that they are poor writers in their mother tongue too, or could it be that Dutch academic writing, like its German counterpart (Duszak, 1997; Kreuz and Harres, 1997) is less reader-oriented than English academic writing? In other words, do Dutch authors expect their readers to read ‘between the lines’? After all, Carrell (1987) has noted that skilled readers are able to infer cohesion even in
the absence of ‘signalling words’. It certainly seems likely that a reliance on implicit cohesion, such as achieved by the two types of *alinea* would make Dutch discourse more writer-oriented than reader-oriented (see Hinds, 1987). This would be an interesting avenue for future research. The shortcomings of learner English (including the lack of variety in deployment of connectives, lack of skill in focusing sentences) would certainly enhance any reader-unfriendliness of the text arising from a transfer of the Dutch discourse features relating to implicit cohesion I mentioned above.

**Conclusions**

The data presented in this chapter support my contention that readers confronted with the ‘choppy’ style of Dutch scientific English will react by lengthening sentences and inserting cohesive devices. The low reader response (27% to sentence refocusing, 42% to redundant and out-of-place text, 33% to removing full stops) plus the low frequency of the annotations in these categories makes it difficult to draw conclusions about the response in terms of the country classes (i.e. of language/writing culture). Thus the conjectures I presented at the start of this chapter, about how readers from cultures that favour long, complex sentences might react to the short choppy style of Dutch English, remain open. Instead, this data set gives more insight into the ways individual readers behave and the combinations of strategies they use when imposing their notions of coherence onto the texts.

Possible reasons for the low reader response and low frequencies of annotations discussed in this chapter are that the readers overcame or ignored some or all of the reader-unfriendliness of the texts arising from Dutch-style inter-sentence and inter-paragraph cohesion. Furthermore, learner ineptitude may have prevented the NNSs from making changes. However, the participation of proportionally more NNSs than NSs in moving and deleting text demonstrates that text content and context were important to these readers. That 74% of the readers who suggested text moves and deletions were reviewers is further evidence that genre fidelity (cf. James, 1998) is important to these gatekeepers to publication. When designating redundant and out-of-place text they were operating at the deeper discourse level of error analysis (Figure 2.2), rather than at the more superficial levels of substance (spelling, punctuation) and text (grammar and lexis). They suggested moving text out of the Discussion to another section of the paper on the basis of their formal schema, i.e. their background knowledge of the formal rhetorical organisational structure of the text (Carrell, 1988).

As explained in chapter 2, when revising a text a reader operates at various levels of error analysis and at any given moment tends to give priority to one level only. For readers who read a text once, the priorities may
fluctuate from sentence to sentence, depending on which errors and infelicities the reader notices at a particular instant of reading. The next two chapters deal with two categories of annotation that attracted far more reader response than the annotations discussed in this chapter. These text features are hedging and tense changes, and both may be characterised as being associated more with genre appropriateness than with the discourse appropriateness. It seems possible that readers gave priority to these two text features and to the epistemic annotations of the texts, at the expense of the changes to cohesion discussed in this chapter. This could be because they were more interested in the genre appropriateness and scientific integrity of the texts than in the flow of the English, or because they were less willing and able to annotate to improve cohesion.
Chapter 7

The annotations affecting hedging

Hedging, a rhetorical technique common in persuasive writing, is important in scientific discourse. The connotation of ‘hedging’ will become clear from the discussion of the development of theory on hedging that follows. Here, suffice it to say that hedging enables a scientist-author to signal commitment to a claim; for example, to signal certainty about a research result. Used less in science textbooks, because the latter present established facts rather than report on new empirical evidence for drawing conclusions about hypotheses (Myers, 1992), it is a distinguishing feature of research articles:

…hedges are among the main pragmatic features which shape the research article as the principal vehicle for new knowledge and which distinguish it from other forms of academic discourse.

(Hyland, 1998: 245)

Hyland (1994, 1996a, b, 1997, 1998a) notes that hedges represented about one word in every 50 in the corpus of 75 000 words (26 cell and molecular biology articles published between 1988 and 1993) he examined. In the Discussion sections he analysed, however, instances of hedging rose to one in every 36 words. This reinforces Myers’s (1989) contention that most hedging occurs in Discussion sections of research articles because it is here that an author needs to show commitment while leaving open the possibility of being mistaken. In similar vein Salager-Meyer (1994) summed up the distribution of ‘vague expressions and other hedging strategies’ in medical research papers as being clustered in the Introduction and Discussion, whose language she characterised as being ‘general and vague’ (in contrast to the ‘particular and precise’ language of the body of the paper). A high incidence of hedges in the Discussion section of a research paper is to be expected, because it is in this section that authors evaluate their results, seeking to demonstrate their relevance to the body of scientific knowledge. As the three texts in my reception study were Discussion sections, it was no surprise to

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1 Hyland is coy about the units he used when quantifying hedging. His examples suggest that, where necessary, he took whole phrases to be units. Thus, he cites ‘it seems that’ as a hedge (Hyland, 1998a: 3), but also ‘It might be speculated that’ (ibid.). The latter includes two hedges, however: the modal verb ‘might’ and the lexical verb ‘speculate’. I will return to this ambiguity later in this chapter, when presenting the results of my analysis.
find that many of the alterations made by the readers could be classified as hedging-related. This chapter does not consider annotations to verb tenses: as explained in chapter 5, the latter will be discussed in the next chapter.

Before presenting and discussing the data I collected on hedging-related annotations, I will briefly outline the theory behind hedging developed by applied linguists, and will discuss scientists’ attitude towards hedging as manifested in stylebooks and writing manuals written for the scientific community. I will also suggest how cultural background and competence in English (NS versus NNS) might affect the deployment of hedging and the reaction to it.

Hedging, politeness and face-saving

Hedges are the lexical signals indicating caution or uncertainty. The term ‘hedge’ was introduced by Lakoff (1972), who defined hedging as ‘words whose job it is to make things more or less fuzzy’. It was Myers (1989), however, who first discussed the significance of hedging in scientific writing. He elaborated the theory on the pragmatics of politeness that had been proposed in sociolinguistics to explain certain communication strategies and the impact of utterances on listeners. Myers took this theory, which Brown and Levinson published in 1978\(^2\) (Brown and Levinson, 1987) in the context of spoken communication, and demonstrated that it was applicable to academic writing in general, and to scientific writing in particular. He argued that the hedging in scientific writing is the response to the actual and expected interaction between the author and the assumed readers. The scientist-author, who writes as a particular individual but also as a researcher, addresses two audiences. One is the wide audience that comprises the scientific community; Myers calls this audience the *exoteric audience*. This audience ‘listens in’ to what one of its members has to say. The other, smaller, audience is comprised of individual researchers – particularly those working in the author’s field. This is the *esoteric audience*. According to Myers, the author deals with these different audiences by reacting to the difference in power relationships. The power difference between a scientist-author and the esoteric audience is great, so it behoves the author to show appropriate respect. Myers contends that when addressing an individual (a member of the esoteric audience), however, the author can assume that the power difference is small – even if the social difference (in terms of rank and prestige) might be great.

In effect, Myers’s argument is that an author addresses these audiences by making claims that are tempered in anticipation of the impact

\(^2\) It originally appeared in a compilation edited by Goody, but since 1987 has been available as a separate publication.
that they could have on the audiences’ ‘face’ (in the sense of ‘reputation’ or ‘good name’; see Thomas, 1995: 168). One of the ways he illustrates this is by examining the opening of the classic article by James Watson and Francis Crick, in which they announce the structure of DNA. The article was published in *Nature* in 1953. Myers argues that when, in the fifth sentence, Watson and Crick announce that the structure of DNA proposed by Pauling and Correy is unsatisfactory, they are perpetrating a face-threatening act (FTA). The phrase they use is uncompromising: ‘this structure is unsatisfactory…’. To mitigate this bold assertion (i.e. to save the ‘face’ of Pauling and Correy - who, as they noted, were kind enough to allow them to read the manuscript version of the article in which they presented their structure for DNA), Watson and Crick preceded the assertion with a hedge: ‘In our opinion’. Though Myers does not specifically say so, that hedge was therefore primarily intended to mollify the esoteric audience (colleagues, specifically Pauling and Correy). At the same time, it sent signals to the wider scientific community that Watson and Crick were being appropriately deferential about their revolutionary claim. (Myers notes that in real life, Watson and Crick were far from modest about their discovery.)

Myers examined about 60 research articles on molecular biology, looking for similar instances of author deference to the intended audience. He concluded that the authors’ perception of their exoteric and esoteric audiences did indeed influence their lexical choice; when announcing their findings and situating them within existing knowledge, the scientist-authors hedged to mitigate FTAs. The hedges were intended to save the collective ‘face’ of the readers (whether the exoteric or esoteric audiences), as in the Watson and Crick example given above. They were also to save the author’s ‘face’ vis-à-vis the readers. Examples of the latter included phrases demonstrating the author’s commitment to a claim, while leaving open the possibility that this might subsequently be refuted (e.g. ‘Thus, *it seems highly likely that*’ and ‘*I would like to argue that*’).

Conceptually, the distinction between esoteric and exoteric audiences is useful. In practice, however, even if a hedge is targeted at only one of these audiences, it will always impact on both. This is clear from the examples quoted from Myers (1989) above. The esoteric audience is, after all, a subset of the exoteric audience. Perhaps for this reason, more recent studies of hedging have moved away from the esoteric versus exoteric distinction.

As noted above, Hyland examined hedging in scientific discourse, largely on the basis of 26 cell and molecular biology articles published between 1988 and 1993 (Hyland, 1994, 1996a, b, 1997, 1998a). He notes (Hyland, 1998a) that some explanations of the motivation behind hedging in academic and scientific writing have emphasised the importance of modality. In this case, the hedging is seen as primarily reflecting the writer’s opinion
and attitude. Audience must affect these, but is not paramount. Hedging has also been attributed a function in metadiscourse, that is in telling readers about the structure and purpose of the text they are reading. Hyland (1998b) has reported that the writers of the seven biology research articles he analysed for metadiscourse features made notable use of hedges to support their position.

What seems to be driving a scientist’s deployment of hedging can therefore be said to be a combination of adherence to the conventions of addressing the readers of an article, and a personal feeling about how much qualification of a claim is necessary, given the research being reported.

Scientists’ attitudes to hedging

A scientist-author’s standpoint should rest on the reliability of the evidence he or she is presenting. Important factors influencing reliability include the research method, statistical significance and the extent to which the findings confirm previous (published) research. There is evidence, however, that many established scientists and journal editors view hedging negatively – presumably because too much hedging projects an impression of uncertainty and of evasion. For example, Dudley-Evans (1991) notes that the British supervisor of a biology PhD student tended to strengthen the claims being made by the student in the thesis, because he knew that the external examiner disliked hedging. Furthermore, instead of advocating hedging, manuals on scientific writing written by science professionals and editors warn against hedging unnecessarily (see Hyland, 1998a: 221-222). Thus, in his chapter on redundancies, Day (1995: 98) states that ‘Any conclusion containing the verb “may be” is not much of a conclusion’, Lindsay (1995) says authors should merely give facts and allow the reader to draw conclusions about the conclusiveness of the data, the CBE Style Manual (1994: 43) warns authors ‘do not overdo the hedge’ 3, O’Connor (1991:109) advocates removing ‘vague qualifiers’ such as ‘very, quite, rather, fairly, relatively, comparatively, several, much’ and Matthews et al. (1996: 129-130) include a section on ‘Unnecessary hedging and redundant modifiers’.

Hedging is unnecessary not only when more assertive senior scientists believe it is unwarranted, but also if it is believed that the target readers

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3 The more recent (1994) sixth edition of the Manual does not mention hedging. However, according to the editor, E.J. Huth (personal communication via e-mail, 25 October 2000), this was because of a deliberate decision to ‘omit content about “how to write papers”’, because of the constraints of space. Huth noted that ‘So omitting comment on matters like hedging should not be taken as lack of concern with imprecise statement [my italics] and other aspects of prose style.’
require an unambiguous message. I have already noted that this is why science textbooks contain little hedging. The study by Fahnestock (1986) illustrates how, in the process of being transformed from an article in Science to a popular journal, a text was stripped of its hedges.

Given the hard line style manuals on scientific writing take about hedging, it is clear that at the manuscript stage of a research article, hedges will be prime candidates for alteration. How much of the author’s opinion and attitude survive after colleagues, journal reviewers, editors, copy-editors and possibly language correctors have been at work? These readers of manuscripts submitted for publication undoubtedly influence the persuasive rhetoric of the final published article. In her case study of the revisions made to a biochemistry paper, Knorr-Cetina (1981) found that the senior author was instrumental in introducing hedges. In his analysis of supervisors’ revisions to seven Japanese-authored draft papers, Gosden (1995) found that 22% of the revisions affected the author’s claims. Myers (1989) has noted that in academic writing the decisions about redress or avoidance of FTAs are not solely the author’s, and that editors and reviewers have some influence, but he did not go into detail.

From the foregoing preamble it is clear that various factors could influence hedging-related interactions between the texts and the readers in the reception study. An important factor is whether a reader considers a particular hedge to be appropriate and/or the text as a whole to be over-hedged or under-hedged. The style guides’ and manuals’ emphasis on avoiding unnecessary hedging implies that scientists (at least, those who are NSs) tend to over-hedge. There also seems to be a belief among scientists that the rhetoric of a research article (and thus the hedging) has no influence on how a reader evaluates the information in that article.

When I read a scientific paper, either for its own sake or when wearing an editorial hat, I usually drink in the introduction (to whet my appetite for the subject matter), skim the methods, eyeball the figures and tables, and then read every word of the discussion. Then I go back to the methods and results sections and weigh the rhetoric of the authors’ conclusions against my own assessment of the objectivity and general value of their work.

(Greenhalgh, 1995: 987)

The citation above, from a biomedical scientist and editor, appeared in reaction to the Editor of the influential British medical journal The Lancet (Horton, 1995), who had warned about persuasive rhetoric influencing readers. From the full text of her reply it is clear that Greenhalgh believes that aided by the facts in a paper’s figures and tables, scientists are sufficiently
objective to be able to assess the implications of research findings, regardless of the rhetoric (compare Lindsay’s (1995) views of hedging, noted above). From this I conclude that she would infer the appropriate hedging post hoc (i.e. after reading the (published) article). This view implies that the author’s hedging does not need to be tampered with: scientists are capable of ignoring it, if necessary. In contrast, Horton’s view is that scientist-readers should not be put in this position. Instead, the pre-publication readers of a manuscript should screen the rhetoric and adjust it as required. Arguing that medical researchers should understand the implications of persuasive rhetoric in research articles, he therefore advocated using linguistic analysis as a complementary part of the peer review process, to reveal ‘the reasoning that underpins an author’s point of view’. This would enable journal reviewers and editors

...to prise the text of an article away from the author. The need for this shift of ownership is that effective peer review is ‘owned’ by the wider research community, through moderation of the ‘spin’ that authors place on their own work. (Horton, 1995: 986)

By using the word ‘spin’, Horton implies that the persuasive rhetoric puts research findings in a favourable light. Thus, if reviewers and editors (representatives of the exoteric audience) were to moderate that spin, they would probably do so by inserting hedges. Their aim would be to qualify the author’s claims, in the light of their interpretation of the data presented in the tables and figures, to make them more fitting if necessary. This view that the journal editor should assess the merits of an author’s claims is endorsed by Page et al. (1997: 47): this manual on journal editing recommends that editors ask ‘are the [author’s] conclusions fair ones to draw from the evidence given?’.

I have drawn on the exchange between Greenhalgh and Horton in the British Medical Journal to show that a reader’s response to the hedging in a manuscript research article might reflect whether that reader’s attitude is laisseez-faire (Greenhalgh) or interventionist (Horton). However, in my reception study there are two additional complicating factors that must be borne in mind when considering the hedging-related reader responses: culture/linguistic considerations and the writers’ and readers’ proficiency in English.
Culture/linguistic influences on hedging, and NNS proficiency

An important factor affecting the incidence of hedging is the cultural perception of the appropriateness and desirability of hedging. Bloor and Bloor (1991: 7) expressed this as: ‘there are clearly identifiable differences in the degrees of directness and concession permitted (or encouraged) in academic writing in different languages’. Here too, the notion of politeness and face (Brown and Levinson, 1978) has been invoked, to account for the norms of politeness and face that prevail in a given culture and are reflected in the discourse of that culture. For example, Geluyken’s (1996) study (mentioned in chapter 3) drew on the theory of FTAs. It showed that in Dutch-language business correspondence there was less use of politeness forms – particularly of modals – than in NS English business correspondence, with the interlanguage business correspondence (written in English by Dutch NSs) being in between.

Hedging and politeness are not synonymous, however. As Myers points out (1989: 12):

Hedging is a politeness strategy when it marks a claim, or any other statement, as being provisional, pending acceptance in the literature, acceptance by the community – in other words, acceptance by the readers.

An example of a hedge being used for reasons other than politeness would be

[1] In Dutch heathlands soil pH nowadays is usually below 5
   (Text R, line 66, my italics)

where the hedge qualifies the claim, by indicating that there could be exceptions. The Dutch versus English difference in the frequency and strength of modal use affects the directness of the writing, including in the ‘announcements’ made in the business correspondence Geluyckens and his colleagues (Braecke et al., 1997) studied. As research articles also contain ‘announcements’ (for example, statements of results), we can expect that these too will (or should) contain modals. Therefore the Dutch versus English cultural difference in modal use needs to be borne in mind in the present study. There have been no published studies of hedging in Dutch scientific discourse, but it will be recalled that my comparative study of extracts of Dutch and English scientific writing, reported in chapter 3, suggested that there was less hedging in Dutch science writing.

Confusingly, there appears to be some disagreement about cultural differences in propensity to hedge: Germans and Czechs are said both to avoid
hedging (Adams et al., 1991) and, together with Poles and Finns, to favour hedging (Clyne, 1991; Čmejrková and Daneš, 1997; Markkanen and Schröder, 1989). The contention that Germans and Czechs avoid hedging (Adams et al., 1991) was based on studies of the English academic writing of students of these nationalities, whereas the contention that Germans and Finns favour hedging was based on comparing English academic discourse with comparable discourse in German and Finnish (Čmejrková and Daneš, 1997; Markkanen and Schröder, 1989). From his textlinguistic analysis of academic writing in German and in English, Clyne (1991) also concluded that the convention in German was to hedge more than is the case in comparable English discourse. The implication is that whatever the conventions on hedging in their mother-tongue writing culture may be, when authors write in a foreign language they may be neither sufficiently skilled in that language, nor sufficiently attuned to the hedging conventions in that language to be able to hedge effectively. These were the reasons proposed by Flowerdew (1999), to explain the features – including hedges – of the written English of Hong Kong academics. Thus, when Hinkel (1997a) reports that the Asian NNSs whose discourse she analysed contained more ‘vague words’ than the discourse of NSs, it is not clear whether this was primarily the result of lack of proficiency in English or of a cultural difference in assertiveness when writing. A disparity between ability to hedge in the mother tongue and a foreign language probably accounts for the conflicting opinions on German and Czech propensity to hedge, mentioned above.

Being an NNS does not necessarily mean that you will be unable to hedge effectively in a foreign language, however. Skilled speakers of several languages, such as the bilingual and trilingual academics whom Markanen and Schröder (1989) studied and the Dutch executives in Shell whose English e-mails Nickerson (2000) analysed appeared to be able to adjust their writing to the hedging and politeness conventions of another language. Unfortunately, Markkanen and Schröder do not go into detail about how bilingual or trilingual their subjects actually were (i.e. were they raised bilingually or trilingually, or did they acquire near-native competence in their second or third language later in life). They did demonstrate, however, that when these very competent academics translated their own work into their second or third language, they did so elegantly, adopting the hedging conventions of that language. By contrast, Nickerson makes no claims that the Dutch managers whose e-mails she studied had near-NS competence. From the examples she gives, it is clear that their writing is not error-free. She nevertheless concluded

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*Markanen and Schröder misleadingly imply that their article considers hedging in ‘scientific texts’; in fact, they examine texts in philosophy/linguistics; the former is not a science in the English sense. See also footnote 1 in chapter 1.*
that lack of proficiency in English did not constrain these authors from using hedges effectively as an interpersonal strategy. She surmised that they had been influenced by exposure to hedged e-mails and other correspondence from their NS (British) counterparts.

**Hypotheses on hedging**

Above, I have argued that what influences hedging and readers’ reaction to it in the present study is primarily the interplay between the hedging conventions in the genre and the standpoint and attitude of the scientist (whether writer or reader). In turn, these are influenced by the mother-tongue writing culture and by proficiency in English. More specifically, the influences can be said to be:

**Influences on the author**

- the soundness of the author’s research method and results
- the author’s assertiveness (including attitude towards the scientific community)
- the expected audience
- the author’s skill in writing English
- the Dutch ethos on hedging

**Influences on the reader**

- the reader’s status within the scientific community (including his or her knowledge of the subject matter)
- whether the reader is reading as an individual, or as a representative of the discourse community (i.e. as a reviewer)
- the reader’s views on the desirability of using qualifying words and expressions in scientific English (a seasoned reviewer might have pronounced views on hedging – see also the preceding point)
- the reader’s competence in English (ability to suggest a more apposite word or phrase)
- the ethos on hedging in the reader’s mother tongue

The extent to which these factors play a role in the data interpretation will be discussed towards the end of this chapter, in the context of three testable hypotheses that can be derived from this preamble:

1. Assuming that Dutch authors tend to hedge less than NS English authors (see chapter 4), the non-Dutch readers in this study would be more likely to insert hedges than to remove them.
2. The reviewers (established scientists, more likely to be following style manual advice) will remove hedges rather than insert them.
3. The NS readers (American and British) will make more adjustments to the hedging of the three Dutch-authored texts than NNS readers.

Two final aspects need to be elucidated before I present and discuss the data: what constituted a hedge in this study, and the way I collected the data.

What constituted a hedge in this study

When deciding whether an annotation could be classified under ‘hedging’ I found Crompton’s (1997) test of a hedge to be useful. This involves asking whether a proposition can be restated in such a way that the author’s commitment to it is greater than at present. Clear instances of hedges were therefore modal verb forms (may, might, can, would, should, must). The importance of these parts of speech as hedges has been reported by others: Hyland (1998a) reported that the modals ‘would’, ‘could’ and ‘may’ accounted for 75% of the hedges in his corpus of 26 biology articles, while Salager-Meyer (1992) found that modal verbs accounted for 38% of the verbs in the 84 medical abstracts she analysed. Also important are the modal adverbs (such as ‘possibly’, ‘probably’, ‘certainly’, ‘perhaps’) and modal adjectives (such as ‘possible’, ‘probable’), so I also included these.

The broad definition of hedging used in this study included not only the modal forms mentioned above, but also other lexical and discourse features that imparted uncertainty and vagueness to the text. Thus, verbs such as ‘seem’, ‘appear’, ‘suggest’ were counted as hedges, as were phrases such as ‘in general’. So, a hedge may be one word, or several. This catholic approach to what constitutes a hedge is largely that adopted by Mauranen (1997) in her investigation of the hedging and modality changes made by three native English language revisers to academic texts written in English by Finns. It has been argued (Hyland, 1998a) that verb tense is also one of the means by which an author can hedge. This is because of the convention in scientific English to use the present tense to report universal truths and not to use that tense to report one’s own findings. Instead, the past tense is used to report one’s own results: this signals that at the time of writing the results are still research-specific: they have not yet been accepted by the discourse community and thus become part of shared scientific knowledge. As explained in chapter 5, however, the readers’ tense emendations were so numerous that I chose not to classify them as hedging data, but to deal with them separately. They will therefore be discussed in detail in chapter 8.
How the data were collected

As noted in chapter 5, readers’ annotations included deletions, changes and insertions. I looked to see whether these alterations had implications for hedging. I distinguished between hedges that readers had added and those that they had removed. (Bear in mind that ‘a hedge’ might be a word or a phrase.) The most straightforward case of an added hedge is an instance in which a hedge was inserted. But an added hedge also occurred when a word or phrase had been deleted and a less forceful word or phrase had been substituted. An example is shown in [2], where the underlined phrase ‘results in’ has been substituted for ‘causes’

[2] This makes these species more efficient growers in increasing biomass and as competitors because the higher specific leaf area causes results in a higher RGR…

(Reader B3’s annotations to Text A, lines 101-2: underlined words are those the reader inserted)

Adding a hedge has the effect of weakening the claim made by the author, so may also be referred to as ‘claim weakened’. The most straightforward case of a removed hedge was when a hedge had simply been deleted. But this category also included instances where to replace the deletion a more forceful word or phrase had been substituted (for example, ‘will permit’ was replaced by ‘will cause’). Thus, removing a hedge has the effect of strengthening the author’s claim, so may also be referred to as ‘claim strengthened’.

When a word or phrase was simply deleted, I recorded the grid reference(s), i.e. editable unit(s) (EUs: see Appendix 5.4) involved (i.e. deleted). These alterations were easy to classify as removed hedges. When a word or phrase was deleted but replaced by text, I again recorded the EUs that had been deleted, but now I had to decide whether the substitution strengthened the claim or weakened it. If the claim was strengthened, the hedge was weakened and thus the alteration could be classified as a removed hedge. If the claim was weakened, the hedge was strengthened or intensified, so was effectively an added hedge. Where the hedging annotation was the insertion of a new word or words, I recorded the grid reference of the (first) word that the insertion modified. Thus, in Text K, reader F4 inserted the phrase ‘Our results indicate that’ at the start of line 17, so I recorded the EU affected by the annotation as 17/1.

The data I collected this way are in Appendix 7.1, under the heading ‘Hedging annotations per text and the readers who made them’. They are presented in the form of tables showing the ‘hedging hotspots’ (points in the text where at least two readers converged to adjust the hedging/claim) and
lists of the hedging adjustments that were one-off (i.e. made by only one reader).

Note that by dividing the text into EUs, I was able not only to record each change as a grid reference, but also to pinpoint changes within a phrase. For example, consider the following:

[3] Yet, it is to be expected that vegetation classifications with the *Rubus* species lumped distinctly differ from those with the *Rubus* species kept separate.

(Text K, lines 34-35)

Underlined in [3] are the five EUs affected by hedging annotations. In common with what Hyland appears to have done (1998: 3) I treated instances like this as a single, albeit compound, author’s claim. Thus, in the detailed data on hedging annotations in Appendix 7.1, the entire hedge or claim is shown, and its EUs (e.g. 34/13-17). In that appendix and in the tables presented in this chapter, it is this block of one or more EUs that is counted as one ‘point’ in the text that attracted hedging annotations. In the results section below (see citations [13 a-f] I will discuss the readers’ alterations of [3] in more detail, and will show that these affected different combinations of the five EUs. This indicates the potential for adjusting a ‘compound hedge’ or claim.

**Qualitative assessment of the data collected on hedging**

Before considering the data quantitatively, I propose to discuss the raw data appended to this chapter. They not only reveal the strategies used by the readers to adjust the hedging or the claims made in the text, but also show the different solutions chosen within the strategy and sometimes reveal that some points in the texts evoked contradictory responses from readers.

The most clear-cut strategy was to remove a hedge by deleting it. For example, deleting ‘in general’ from ‘This means in general that species are more efficient’ (Text A grid. ref. 44/7-8) makes the author’s claim more assertive. Inserting a hedge is also a clear-cut strategy. One point in Text R that attracted such a change was the verb ‘favour’ (grid ref. 53/11) in the sentence ‘Balanced nutrient supply ratios favour plant growth’. Of the three readers who hedged this verb, two (see [4] and [5] below) inserted a verb that qualified the verb ‘to favour’ (i.e. introduced uncertainty). The past tense of the inserted verb in [5] is an additional hedge (restricting the claim to the author). The third reader (see [6]) inserted a modal verb and an adverb:

Balanced nutrient supply ratios appeared to favour plant growth.

Balanced nutrient supply ratios would therefore favour plant growth.

The hedging strategy of replacing a word or phrase was sometimes equivocal. Thus, whereas replacing ‘distinctly differ’ with ‘differ slightly’ (Text K, grid. ref. 35/6) is unequivocally an added hedge, the change achieved by, for example, replacing ‘may’ by ‘might’ is more subtle. In the two examples shown as [7] and [8], the ‘may’ was replaced by ‘might’ – in both instances by NNSs (Japanese and Spanish):

This fast development of the annual plants may [might] be caused by the short day length at the start of the experiment [Text A, grid ref. 12/7]

This may [might] have a significant effect on the biomass and nutrient loss in the long run [Text A, grid ref. 107/5]

Following Salager-Meyer (1992: 93) I attributed a higher degree of certainty to ‘may’ than to ‘might’. Hedging adjustments like this, that entailed substituting one modal for another, therefore had to be classified as ‘added hedge’ or ‘removed hedge’ on the basis of a scale of uncertainty, going from certainty (i.e. assertiveness) to uncertainty (i.e. caution) as follows (see Salager-Meyer, 1992):

must → should → would → can → may → might

Whether NNSs are fully aware of the subtle differences between these modals is a moot point.

There were other cases of substitution that did not involve modals, where I had to use my NS judgment when classifying hedging adjustments. One example is changing ‘is usual’ to ‘is common’ (Text R, grid ref. 46/13-14). According to The New Oxford Dictionary of English (1998 edition), ‘usual’ means ‘habitually or typically occurring’, whereas ‘common’ means ‘occurring, found, or done often’. As the alteration therefore subtly diminished the certainty, I classified it as an added hedge. However, in some instances (see the three examples from Text R in [9], [10] and [11] below) I was unable to discern a shift in meaning after a hedge had been replaced by another.

…increasing acidification can be seen as most important…

[grid ref. 82/10-11]
was altered by a Dutch reader to:

[9b] …increasing acidification seems to be the most important…

and

[10a] …a phytometer appears to be a good tool

[grid ref. 61/1]

was altered by a Spanish reader to:

[10b] …a phytometer seems to be a good tool

whereas

[11a] These species seem to be…

[grid ref. 79/14]

was altered by a British reader to:

[11b] These species appear to be…

Arguably, [9b] was a response to clumsy lexis, but [10b] and [11b] seem to be instances of change for the sake of change. As such, they might be manifestations of ‘the ritual of altering’ against which the historian Jacques Barzun rails in his essay on the phenomenon of over-zealous intervention in a text on the part of a ‘corrector’ or copy-editor (Barzun, 1986). I did not record these substitutions of synonyms as adjustments to hedging.

Note that [10a] is the only time the verb ‘appears’ was used in the three test texts. This verb implies that there is uncertainty about the contention being made, which is why in dictionaries of English it is presented as a synonym for ‘seem’ (for example, see the definition for ‘appear’ given by The New Oxford Dictionary of English, 1998). The Dutch verb blijken, however, which has ‘appear’ as its primary English connotation (Van Dale Groot Woordenboek Nederlands-Engels, 1991) also has very specific connotations that have a much greater message of certainty than the English verb ‘appears’. (See also footnote 8 in chapter 3.) That dictionary notes that other possible translations of blijken are ‘prove, turn out, emerge, be shown/proved/found’. Donaldson (1990: 15) has also warned about blijken having very specific connotations that are best translated as ‘it is obvious/evident that’. It is therefore possible that the author of Text R did what Dutch authors often do
when they write in English: use ‘appear’ as a mistranslation of ‘blijkt’. If that
is so, the resulting hedge in English was unintentional, and what the author
intended to say was: ‘...it is evident that a phytometer is [or was5] a good
tool’. That none of the readers queried the author’s ‘appears’ illustrates the
difference between the level of text interpretation applied by readers reading
NNS English at face value and that applied by readers who read with
specialist knowledge of the potential for linguistic transfer from the mother
tongue. The example of the different connotations of blijken is particularly
interesting because which English equivalent is chosen (‘appears’ or ‘proves’)
affects the strength of the claim made in the text. As in the case shown in
[10a], then, the result can be a false (i.e. not intended by the author) hedge.
Further investigation of this phenomenon would be worthwhile, but was
unfortunately beyond the scope of this research.

The data on hedging hotspots given in Appendix 7.1 also show that in
each text there were instances in which readers disagreed on the nature of the
hedging adjustment required: add hedge/weaken claim or remove
hedge/strengthen claim. These included the point in Text A that attracted the
most (9) hedging annotations in the study:

[12] The fact that they grow faster caused an increased need…
[grid ref. 86/3]

Seven readers made adjustments that added a hedge (may have caused/could
lead to/may lead to/resulted in/may have exhausted/may have caused). Reader
B6, however, substituted an arguably weaker ‘produced’ for ‘caused’, and
reader J1 rewrote [12] to the more forceful ‘The faster growth increased
necessity...’. The three other points in Text A that attracted contradictory
hedging annotations (see Appendix 7.1) were:

- the ‘will be’ in ‘which will be superior competitors’ (grid ref. 63/9) was
  hedged to ‘would be’ and should be’, but also changed to the more
  universal ‘are’
- the ‘results’ in ‘which results in a functional response’ (grid ref. 87/4) was
  changed to the hedged ‘could result’, but also to the more forceful
  ‘producing’
- the ‘causes’ in ‘higher specific leaf area causes a higher RGR’ (grid ref.
  102/2) was changed to the less forceful ‘leads to’, ‘results in’ and
  ‘produces’, but reader B8, who changed it to ‘produced’ achieved a
  change in status of the claim being made (from universal to specific to the

5 The inappropriate use of present tense by Dutch authors to discuss their own
findings/results is discussed in detail in chapter 8.
research described – see the discussion of the connotation of verb tense, in chapter 8), so his annotation was counted as a removal of a hedge.

In Text K there were three similar instances of contradictory hedging annotations. One of these (grid ref. 34/14-17) attracted equal numbers (three) of added and removed hedges. The sentence in question contained the compound hedge that I discussed above. It appeared as example [3]. Below, however, are the six versions [13a] – [13f] produced by readers.

[13a] Yet, it may be expected that vegetation classifications that lump the *Rubus* species differ distinctly from those with *Rubus* species kept separate. [hedge added by B6: it was a substitution for EUs 2 and 3]

[13b] Yet, it is likely that vegetation classifications that combine all subspecies of *Rubus* differ from those that separate [sic] *Rubus*. [hedge intensified (i.e. added) by B8: it was a substitution for EUs 3 and 4]

[13c] Yet it can be expected that vegetation classifications with the *Rubus* species lumped distinctly differ from those in which the species are kept separate. [hedge added by B8: it was a substitution for EUs 2 and 3]

[13d] Vegetation classifications with the *Rubus* species lumped differ distinctly from those with *Rubus* species enumerated.[hedge deleted by A6: all 5 EUs were deleted]

[13e] For mapping purposes, we found that vegetation classifications based on the cluster of *Rubus* species differ slightly from those with the *Rubus* species kept separate. [hedge removed by F2: all 5 EUs were deleted. Note weakening of claim achieved later in the sentence, by replacing ‘distinctly with ‘slightly’]

[13f] Many vegetation classifications with the *Rubus* as subgenus distinctly differ from those with the *Rubus* at each species. [hedge deleted by J1: all 5 EUs were deleted]

As can be seen from the raw data presented in Appendix 7.1, in Text R there were four instances of contradictory hedging annotations. The one attracting the most (7) readers was a modal ‘can explain’, which in six instances was changed to a weaker form (‘may explain’ or ‘could explain’) and in one case was deleted, leaving ‘explains’.
Quantitative assessment of the data collected on hedging

Having discussed the challenges of identifying the annotations that adjusted the hedging in the text, and also noted that readers’ responses were sometimes contradictory, I now propose to consider the resulting data quantitatively.

Table 7.1 is based on the details on hedging annotations appended to this chapter. It shows that in terms of the number of points per text where hedging annotations were made, Texts A and R were similar. Given that Text A was 39% longer than Text R (Table 5.1), this implies that proportionally more hedging adjustments were made to Text R. It can be seen that for each text, there were more points at which hedges were added than at which hedges were removed. This has relevance for Hypothesis 1 (that readers will tend to insert hedges rather than remove them).

Table 7.1 Distribution of hedging annotations in the three texts

<table>
<thead>
<tr>
<th>Text</th>
<th>N points in text where hedge(s) added</th>
<th>N points in text where hedge(s) removed</th>
<th>N points in text where hedges were both added AND removed</th>
<th>Total points at which hedging alterations were made</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>18</td>
<td>15</td>
<td>4</td>
<td>37</td>
</tr>
<tr>
<td>K</td>
<td>8</td>
<td>9</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>R</td>
<td>22</td>
<td>9</td>
<td>4</td>
<td>35</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>33</td>
<td>11</td>
<td>92</td>
</tr>
</tbody>
</table>

Just under half (47%) of all readers made one or more alterations that adjusted hedging. Table 7.2 summarises the detailed data on the frequency of hedging annotations (hedging hotspots, on which readers converged) that appear in Appendix 7.1. For this table I used four frequency classes for the numbers of readers (left-hand column). Table 7.2a shows the actual numbers and Table 7.2b shows these expressed as percentages of the total hedging emendations in the text. Table 7.2b shows that for each text, 50% or more of the points at which hedging adjustments were made were converged on by only one or two readers. (In Text K, for example, 34% of the hedging annotations were one-off changes.) It was unusual for more than six readers to converge on one point: this happened only once in Texts K and R, but three times in Text A. (The hedging hotspots in Text A will be discussed below, when considering the texts individually.) Figure 7.1 shows the difference in the response of individual readers, for the three texts combined (i.e. it shows the total number of hedging adjustments per reader).
Table 7.2a Reader convergence to make hedging annotations, per text, in four frequency classes, shown as number of points in the text that were in the given frequency class

<table>
<thead>
<tr>
<th>N readers focusing on a point in the text to make a hedging annotation</th>
<th>Text A</th>
<th>Text K</th>
<th>Text R</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>3-5</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>6-9</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total hedging annotations per text</td>
<td>77</td>
<td>35</td>
<td>65</td>
</tr>
</tbody>
</table>

Table 7.2b Reader convergence to make hedging annotations, per text, in four frequency classes, shown as a percentage of total hedging annotations to the text in question

<table>
<thead>
<tr>
<th>N readers focusing on a point in the text to make a hedging annotation</th>
<th>Points in text attracting hedging annotations from the given frequency class, as % of total hedging alterations to the text</th>
</tr>
</thead>
<tbody>
<tr>
<td>N points in text attracting hedging annotations from the given frequency class</td>
<td>Text A</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>3-5</td>
<td>22</td>
</tr>
<tr>
<td>6-9</td>
<td>28</td>
</tr>
<tr>
<td>Total hedging annotations per text</td>
<td>100</td>
</tr>
</tbody>
</table>

Given texts of different lengths, by different authors, who may differ in their assertiveness and proficiency in English and are discussing different research findings that differ in their certainty, it is clearly not sensible to dwell on the differences between the texts in frequency of hedging-related alterations. The broad comparison, based on percentages, shown in Table 7.3 suffices to show the distribution of the hedging adjustments per text, in terms of whether the readers added or removed hedges. It can be seen that in all three texts, over half of the hedging annotations resulted in more hedging (either by adding hedging or by intensifying existing hedging – i.e. making the author’s claim more tentative). This again seems to support Hypothesis 1, that there will be a tendency for hedges to be added to Dutch scientific English, rather than removed.
Figure 7.1 Hedging adjustments per reader. Pooled data for the three texts. Black bars = hedges added, grey bars = hedges removed

Table 7.3. Nature of the hedging annotations to the three texts; data per text expressed as percentages of total hedging adjustments per text

<table>
<thead>
<tr>
<th>Text</th>
<th>Adjustments that added/intensified hedging</th>
<th>Adjustments that removed/reduced hedging</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>64</td>
<td>36</td>
<td>100</td>
</tr>
<tr>
<td>K</td>
<td>51</td>
<td>49</td>
<td>100</td>
</tr>
<tr>
<td>R</td>
<td>65</td>
<td>35</td>
<td>100</td>
</tr>
</tbody>
</table>
Testing the hypotheses that reviewer status and native-speakerhood influenced hedging annotations

Table 7.4 shows descriptive statistics for added (Table 7.4a) and removed (Table 7.4b) hedges.

**Table 7.4a Descriptive statistics for added hedges, by native-speaker and reviewer categories**

<table>
<thead>
<tr>
<th>Native-speakerhood</th>
<th>Reviewer status</th>
<th>Text</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS</td>
<td>Reviewers</td>
<td>A</td>
<td>1.80</td>
<td>2.20</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>K</td>
<td>0.50</td>
<td>0.53</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R</td>
<td>1.60</td>
<td>2.12</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>1.30</td>
<td>1.82</td>
<td>30</td>
</tr>
<tr>
<td>NS</td>
<td>Non-reviewers</td>
<td>A</td>
<td>0.75</td>
<td>0.96</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>K</td>
<td>0.50</td>
<td>1.00</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R</td>
<td>1.25</td>
<td>1.89</td>
<td>4</td>
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<tr>
<td></td>
<td>Total</td>
<td></td>
<td>0.83</td>
<td>1.27</td>
<td>12</td>
</tr>
<tr>
<td>NS</td>
<td>Total</td>
<td>A</td>
<td>1.50</td>
<td>1.95</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>K</td>
<td>0.50</td>
<td>0.65</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R</td>
<td>1.50</td>
<td>1.99</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>1.67</td>
<td>1.68</td>
<td>42</td>
</tr>
<tr>
<td>NNS</td>
<td>Reviewers</td>
<td>A</td>
<td>1.33</td>
<td>2.17</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>K</td>
<td>0.33</td>
<td>0.69</td>
<td>18</td>
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<tr>
<td></td>
<td></td>
<td>R</td>
<td>1.00</td>
<td>1.94</td>
<td>18</td>
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<tr>
<td></td>
<td>Total</td>
<td></td>
<td>0.89</td>
<td>1.74</td>
<td>54</td>
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<tr>
<td>NNS</td>
<td>Non-reviewers</td>
<td>A</td>
<td>0.31</td>
<td>0.63</td>
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<td>K</td>
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<td>R</td>
<td>0.15</td>
<td>0.38</td>
<td>13</td>
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<tr>
<td></td>
<td>Total</td>
<td></td>
<td>0.26</td>
<td>0.50</td>
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<tr>
<td>NNS</td>
<td>Total</td>
<td>A</td>
<td>0.90</td>
<td>1.76</td>
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<td>0.60</td>
<td>31</td>
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<tr>
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<td></td>
<td>R</td>
<td>0.65</td>
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</tr>
<tr>
<td></td>
<td>Total</td>
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<tr>
<td>Total</td>
<td>Reviewers</td>
<td>A</td>
<td>1.50</td>
<td>2.15</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>K</td>
<td>0.39</td>
<td>0.63</td>
<td>28</td>
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<tr>
<td></td>
<td></td>
<td>R</td>
<td>1.21</td>
<td>1.99</td>
<td>28</td>
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<tr>
<td></td>
<td>Total</td>
<td></td>
<td>1.04</td>
<td>1.77</td>
<td>84</td>
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<tr>
<td>Total</td>
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<tr>
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<td>K</td>
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<td>0.61</td>
<td>17</td>
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<td>R</td>
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<td>R</td>
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<td>0.79</td>
<td>1.51</td>
<td>135</td>
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</tbody>
</table>
### Table 7.4b Descriptive statistics for removed hedges, by native-speaker and reviewer categories

<table>
<thead>
<tr>
<th>Native-speakerhood</th>
<th>Reviewer status</th>
<th>Text</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS</td>
<td>Reviewers</td>
<td>A</td>
<td>0.70</td>
<td>1.06</td>
<td>10</td>
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<tr>
<td></td>
<td></td>
<td>K</td>
<td>1.10</td>
<td>1.52</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R</td>
<td>0.90</td>
<td>1.29</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>0.90</td>
<td>1.27</td>
<td>30</td>
</tr>
<tr>
<td>NS</td>
<td>Non-reviewers</td>
<td>A</td>
<td>2.25</td>
<td>3.30</td>
<td>4</td>
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<td>K</td>
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<td>R</td>
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<td>0.58</td>
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<td>0.79</td>
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<td>Total</td>
<td>0.95</td>
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<td></td>
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<td>54</td>
</tr>
<tr>
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<td>Non-reviewers</td>
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<td>0.38</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>0.28</td>
<td>13</td>
</tr>
<tr>
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<td></td>
<td>R</td>
<td>7.692E-02</td>
<td>0.28</td>
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<td></td>
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<td>Total</td>
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<td>0.31</td>
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<td>Total</td>
<td>A</td>
<td>0.39</td>
<td>1.31</td>
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<td></td>
<td>K</td>
<td>0.16</td>
<td>0.45</td>
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<td>R</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>0.30</td>
<td>0.93</td>
<td>93</td>
</tr>
<tr>
<td>Total</td>
<td>Reviewers</td>
<td>A</td>
<td>0.61</td>
<td>1.47</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>K</td>
<td>0.54</td>
<td>1.07</td>
<td>28</td>
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<td></td>
<td></td>
<td>R</td>
<td>0.68</td>
<td>1.12</td>
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<td>84</td>
</tr>
<tr>
<td>Total</td>
<td>Non-reviewers</td>
<td>A</td>
<td>0.65</td>
<td>1.73</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>K</td>
<td>0.18</td>
<td>0.39</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R</td>
<td>0.18</td>
<td>0.39</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>0.33</td>
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<td>45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>K</td>
<td>0.40</td>
<td>0.89</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R</td>
<td>0.49</td>
<td>0.94</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>0.50</td>
<td>1.16</td>
<td>135</td>
</tr>
</tbody>
</table>

To test the validity of the hypotheses that postulated effects of reviewer status and native-speakerhood on hedging annotations, I used univariate General Linear Model analysis. I performed this analysis for the number of hedges added and then for the number of hedges removed. (Note that although in all my analyses I tested for significant interaction effects, I found none; this information is neither presented in the tables in this chapter nor discussed.
further.) With the fixed factors native-speakerhood (NS or NNS), reviewer status (reviewer or non-reviewer) and text (A, K or R), the only statistically significant effect was that of native-speakerhood on the removal of hedges ($F(1, 123) = 2.83$, $p = .002$): regardless of their reviewer status, the NS readers removed significantly more hedges than the NNS readers (see Table 7.4b). The effect of reviewer status in adding hedging was not significant ($F(1, 123) = 3.50$, $p = .064$).

To elucidate the effect of native-speakerhood, I repeated the analysis, but this time substituted country for native-speakerhood. This time, therefore, I was testing for two groups of NSs (US and UK) and five groups of NNSs (Dutch, German, Swedish, French, Spanish and Japanese). This analysis produced significant differences in both the added and the removed hedges. The effect of reviewer status in adding hedging, became significant ($F(1, 90) = 4.20$, $p = .043$). Country was very significant in the removal of hedges ($F(7, 90) = 3.13$, $p = .005$). A post hoc (Tukey) test showed that the latter result could largely be attributed to the performance of the British readers, who removed significantly more hedges than the German and Spanish readers.

To validate Hypothesis 3, that NSs would be more likely than NNSs to adjust the hedging, I did another GLM analysis, but this time used the total hedging adjustments (added plus removed hedges) per reader. Once again, the fixed factors were native-speakerhood, reviewer status and text. The only significant effect was indeed for native-speakerhood ($F(1, 123) = 8.36$, $p = .005$). So, given the descriptive statistics shown in Table 7.4, the hypothesis was confirmed.

**Discussion**

*The validity of the three hypotheses*

Though Tables 7.1 and 7.3 contain evidence to support Hypothesis 1 – that in this study hedges would tend to be added to the Dutch-authored texts, rather than removed – the statistical analyses only confirmed this for readers who were reviewers, and only when country, not native-speakerhood, was a fixed factor. Given that the only statistical evidence of reviewer status influencing the adjustment of hedging is a tendency to add hedges, Hypothesis 2 (that reviewers will tend to remove hedges) must be rejected. From this, I infer that in this study, the dominant motivation for the reviewer-readers’ response was a lack of hedging in the texts. The reviewers’ response could thus be seen as a reaction to the phenomenon described by Myers (1998: 3): ‘a sentence that looks like a claim but has no hedging is probably not a statement of new knowledge.’ They inserted the hedges to prevent readers assuming that the authors were making (or reasserting) claims of universality. This response
appears to confirm the expectation (arising from the textual analysis presented in chapter 3) that Dutch scientific English displays less hedging than NS scientific English. But in this case, given the results of the post hoc analysis, the contrast can be argued to be between Dutch scientific English and British scientific English. The possibility that lack of hedging was actually a product of the authors’ lack of proficiency and that it was this that primarily motivated the British reviewer-readers to add hedges or intensify the existing hedging cannot be excluded. I will return to this aspect below.

Looking at the bar graphs shown in Figure 7.1 it is clear that almost all individual NS readers (i.e. the readers with codes A and B) made hedging annotations, whereas in the other country groups the pattern was more variable, with many readers making no such changes. As shown above, this visual evidence supporting Hypothesis 3, that NSs would make more hedging adjustments than NNSs, was confirmed by the statistical analysis. Confirmation of Hypothesis 3 is hardly unexpected, but what is interesting is that the native-speakerhood effect was very significant for the removed hedges (Table 7.4), but was not significant for the added hedges. How can this be reconciled with the finding that reviewers tended to add hedges (though this was only statistically significant when the eight countries were considered, not at the NS versus NNS level)? The most likely answer is that the readers were primarily motivated not by a simple shortage (or superfluity) of hedging in the texts, but by local shortcomings in the English of the texts; this can be seen from the changes they made that were not simple deletions or insertions of hedges. These adjustments of inappropriate lexis are discussed below.

**Inappropriate lexis (NNS English) as a motive for the hedging annotations**

With the exception of the few ‘change for change’s sake’ adjustments discussed early in the chapter (see [9], [10] and [11]) many of the readers’ adjustments were presumably intended to make the author’s meaning more precise. Crucial to this was the reader’s interpretation of what the author intended to say (compare Markkanen and Schröder, 1989; 172: ‘…the linguistic devices used for hedging get their meaning only through the response they produce in the readers’). Earlier (see [12] and [13]) I noted that readers’ adjustments to lexis sometimes produced diametrically opposite results on the author’s claims. The specified hedging annotations in Appendix 7.1 provide further evidence of the variation in readers’ interpretation of author’s intentions and of the variation in the solutions they offered to what they perceived as inappropriate assertiveness, inappropriate hedging or inappropriate lexis.
Examination of the actual hedging changes reinforces the suggestion made above and at the start of this chapter that shortcomings in the authors’ English skills are important in accounting for the readers’ responses. Recall that Table 7.2 showed that the highest frequencies of annotations occurred in Text A (48% of the hedging annotations in this text were made by three or more readers, compared with 38% in Text K and 31% in Text R). The hedging data given in Appendix 7.1, notably the ‘specification of changes’ for the hedging hotspots in Text A, suggest that many of the hedging annotations in Text A were responses to the author’s inappropriate lexis. For example, five instances of forms of the verb ‘to cause’ accounted for 27 (= 35%) of all the hedging annotations in that text. Most (20) of these annotations intensified the hedge, by replacing ‘cause(s)(d)’ by a less forceful verb, such as ‘allow’, ‘enables’ ‘leads to’. It has already been noted that the ‘caused’ in ‘The fact that they grow faster caused an increased need…’ attracted the most (9) hedging annotations of the study.

Lexical shortcomings attributable to lack of skill in English seemed to be less of a problem in the other two texts. In Text K there was arguably one instance in which poor lexis was the underlying cause of the annotation that resulted in a hedging change. It occurred at grid ref. 14/3-4 (…most decisions remain to be made). Two of the alterations strengthened the claim (‘have to be made’ and ‘must be made’) and one inserted a modal and thus a hedge: ‘It should be decided’.

**Differences among readers in the frequency of hedging annotations**

That there were big differences in readers’ propensity to make hedging changes can be seen from Figure 7.1. Fourteen readers made no hedging adjustments in any of the texts. They included only one NS (A6). The others were four Germans, four Spanish two Japanese, and one each of Dutch, Swedish and French. One reader stood out for adding hedges: French reader F4. In Text A she was the only reader to add hedges to the author’s conclusions. (Note that the statistical analyses revealed that reader’s sex had no significant effect on this or any other of the data collected in this study; there were only 10 female readers.) British readers B3 and B1 also appeared to favour adding hedging rather than removing it. Though the Swede S4 is one of the three NNSs to stand out in this figure for adding hedging, note that three of the ten hedging adjustments he made were to remove the adjective ‘strongly’ in Text R. He was the only reader to do this; in each instance his deletion (a ‘bee in the bonnet’ response?) weakened the author’s claim. The figure shows that with one exception, NSs either added more hedges than they removed, or added as many hedges as they removed. The exception was British reader B9 who, like Japanese reader J1, removed more hedges than he
This British reader must have contributed greatly to the statistically significant performance of the British readers compared with the Germans and Spanish in removing hedges, as reported above when discussing the results of the univariate GLM analyses.

As in the case of the annotations involving cohesion, I can only speculate on why less than half the readers made alterations that had impact on the hedging and on why there was not more agreement (in terms of reader convergence) about which points in the text should be changed. As pointed out in chapter 6, differences in the time the readers spent reading and annotating the text were probably important, coupled with their proficiency in English (NS or NNS), their tolerance of suboptimal rhetoric and lexis, and their attitude to the task they had volunteered to do.

The findings in relation to previous research

It is interesting to compare the findings of this study with the results and conclusions of the studies of text revision reported by Mauranen (1997) and Ventola (1997). Ventola used an engineering text written by an English NS, from which the modals had been removed, to test whether English native-speakerhood or expert subject knowledge would be more important in ability to reinstate modals correctly. She found that English native speakers performed best, followed by Finnish-native-speaking experts in engineering, with Finnish native speakers with a good knowledge of English coming in last. When Mauranen (1997) studied the revisions made by language revisers working at Helsinki University, who were NS graduate students with no specialist knowledge of the scientific and economic papers they were correcting, she found that the revisers were reluctant to tamper with the authors’ hedging. In the light of the results I have presented, in which it is clear that NS and NNS subject experts were willing and able to add or remove hedging, it seems that Mauranen’s revisers were exhibiting a caution born of unfamiliarity with the subject matter, or of deference to senior members of the scientific discourse community – or both.

The implications of this study for theory and future research on hedging

It will be clear that in my discussion of the hedging annotations and on the authors’ use of hedges my explanations have drawn on Myers's interpretation of notions from politeness theory and from theory on modality. Thus, I have alluded to power distance (the author’s status vis-à-vis the exoteric audience and the readers’ role as representatives of that audience, for example) but I have also argued that as scientists, the authors’ claim-making was primarily controlled by the soundness they attributed to their research findings. It seems
Chapter 7

This study, in which native-speakerhood and readers’ and authors’ ‘culture of writing’ presumably influence the hedging annotations, shows that other factors should be incorporated into theory on hedging. Thus, given the pattern shown in Figure 7.1 and the details of hedging adjustments shown in Appendix 7.1, I would argue that theory on hedging should take more account of the possible linguistic insecurity of NNS authors and of the influence reviewers and journal editors can have on the hedging in published articles. The differences in response elicited by some points in the test texts show that critical readers disagree about what is considered ‘appropriate’ hedging in a given context. Because of the way I recorded the hedging annotations (by scrutinising each alteration to see whether it strengthened or weakened the author’s claim) I have been able to show that changes to hedging are often subtle. They may even have been an unintentional by-product of an intervention to remedy some other textual shortcoming (for example, inappropriate lexis, as in the case of the overuse of ‘cause(s)(d)’ in Text A). That they may be arbitrary was suggested by the examples of rewordings that did not change the intensity or meaning of the hedge ([9], [10] and [11]), but merely appeared to have changed the text to suit the particular reader’s stylistic preference. This being so, when an NNS author receives a manuscript that has been annotated by a reviewer, how is he or she to know whether any hedging changes are idiosyncratic or essential? If the author adopts these changes, then the published version of the text will reflect deference to the reviewer (even though, paradoxically, the process is called peer review). The author’s deference may be attributable to respect for the reviewer’s native-speakerhood, or for the reviewer’s senior status in the scientific community – or both – or to abeyance to the reviewer’s superior subject knowledge. If the journal’s editorial policy is to practise intrusive editing, including changing the hedging, as Horton (1995) seems to advocate, then interpretations of how assertive the author should be in making claims will be transferred to the published version of the text. Applied linguistics studies of hedging strategies in published papers should therefore always ascertain whether the strategies revealed in the text are true reflections of the author’s stance, or are modifications originating from other interventions along the revision continuum (Figure 2.3).

Though I conjectured that the ethos on hedging in the reader’s mother tongue influences the propensity to adjust hedging, I could not reach any conclusions on this: I was thwarted by the small size of the country groups. To disentangle such cultural effects from the effects of proficiency in English would require a more structured study, with larger groups of readers, screened for competence in English. What this study has revealed about hedging is that
when asked to annotate a text to improve its English, its effectiveness and its appropriateness, many readers (in this case, nearly half) spontaneously adjust the strength of the author’s claims. The variation in which lexical items are deemed to need adjustment, and in the adjustments made (strengthening versus weakening the claim; the intensity of the strengthening or weakening) are tantalising evidence of readers’ personal preferences that other researchers might wish to investigate.

In this chapter I have examined some of the rhetorical devices and strategies a scientist has at his disposal to argue a case and to make claims in a research article. I focused on explicit signals of uncertainty and assertiveness and argued that the key to the readers’ responses to these was probably, as in the case of changes to cohesion, the clumsiness of the English. A more implicit signal of commitment to a claim is contained in the verb tense a scientist uses. This is the subject of the next chapter.
Of all the responses elicited from the readers in this reception study, the response to the verb tenses used in the three test Discussion texts was the most striking, in terms of the content and quantity of comments and alterations and their distribution among the reader categories. As early as Part 1, the global assessment of each text via e-mail, the tense use in the test texts elicited spontaneous comments from eight of the readers (three Americans, four British, one Dutch). Seven of these comments related to Text A, and two of these went so far as to say – in almost identical wording – that the tense agreement was ‘the biggest problem in this text’.

Verb tense also stimulated commentarial annotations in Part 2 of the study. One British reader who had commented about inappropriate tense use in Text R in Part 1 of the study, wrote comments about tense use on each of the three manuscripts in Part 2 of the study. The other commentarial annotations on tense collected in Part 2 of the study were made by eight readers. Three (one American, one British, one German) wrote tense-related comments on Text A, one (Spanish) did so on Text K and four (one American, two British, one French) did so on Text R.

The readers’ response to verb tense was almost invariably triggered by the present tense. Table 8.1 shows that this was the dominant tense in all three test texts. The simple present dominated, with only a few present progressives. Also rare was the present perfect, the tense used in academic writing to signal that previous research being referred to is relevant to the present study, and to imply the author disagrees with previous findings (Salager-Meyer, 1992). There were three occurrences, in Texts A and R.

The few past tense verbs in the texts were predominantly preterite. There were three instances of the imperfect tense, in Texts A and R. The
future tense was used three times in Text A (grid refs. 57/10, 58/16 and 63/9), not at all in Text K and twice (55/13, 84/12) in Text R.

Table 8.1 Tense use in the three test texts

<table>
<thead>
<tr>
<th>Text code</th>
<th>Present tense verbs</th>
<th>Past tense verbs</th>
<th>Future tense verbs¹</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>A</td>
<td>69</td>
<td>64</td>
<td>36</td>
</tr>
<tr>
<td>K</td>
<td>41</td>
<td>95</td>
<td>2</td>
</tr>
<tr>
<td>R</td>
<td>80</td>
<td>90</td>
<td>7</td>
</tr>
</tbody>
</table>

¹ all these were modal *will* with future time reference

Three questions arise from the foregoing:
1. Why did the readers respond to the tense use?
2. How did they respond to the tense use in the texts, and why?
3. Why did the Dutch authors prefer the present tense?

To answer these questions I propose to discuss three aspects. One is cultural and has to do with the verb conventions when reporting science in English and in other languages. A second, related, aspect is linguistic transfer: it includes the influence of mother tongue and of tense meanings in the mother tongue. The third aspect is competence in English (mother tongue or foreign language).

Crucial to answering all three questions posed above is an understanding of the conventions of reporting science. In Part 1 of this chapter I therefore outline the role of verb tenses in English scientific discourse: the theory behind the conventions of tense use. This discussion will touch on adherence to these conventions and will highlight some relevant differences between anglophone and non-anglophone conventions of tense use in various written genres. It will suggest answers to questions 1 and 2. Having established the tense options available to scientists when writing science, in Part 2 of this chapter I will consider the specific case of Dutch scientists writing in English, with the aim of answering question 3. To do so I will focus more on linguistic transfer from Dutch and on competence in English, though not ignoring the role of the Dutch culture of academic and scientific discourse. In the third part of the chapter I will present the data collected on tense changes and analyse and interpret them using the insights obtained in

but the latter should have been preterite. In Text R: ‘All declining species were *were growing*’ (line 65)
Parts 1 and 2. The discussion puts the findings in a broader context. It leads to conclusions and to recommendations for authors, editors and EAP teachers.

**Part 1: Conventions of tense use in scientific discourse**

*English scientific discourse*

One way of ascertaining the conventions of scientific English is to look at writing manuals for scientists. Those written by scientists or editors, primarily for their NS colleagues, tend to be prescriptive in their advice on tense usage in scientific discourse. For example, the most popular book on scientific English listed by Amazon.com in May 2000 gives the following four ‘rules’ on tense use:

1. Established knowledge (previous results) should be given in the present tense.
2. Description of methods and results in the current paper should be in the past tense.
3. Presentation (Table 1 shows that…) is given in the present tense.
4. Attribution (Jones reported that…) is given in the past tense.

(Day, 1995: 72)

Day stresses that these ‘rules’ must be followed carefully, because otherwise readers will have difficulty in distinguishing between the author’s own findings and what is accepted scientific knowledge or universal truth. Rules 1 and 2 encapsulate a paradigm of science writing in English, that past tense signals the specific (for a given experiment or research project, the method used and the results obtained) whereas present tense signals the universal (that a method is standard, that a statement is irrefutable).

It has been said that in English science writing ‘proper use of tense derives from scientific ethics’ (Matthews *et al.*, 1996: 104). Put simply, the change of status a piece of information undergoes, from being a finding in a particular experiment to a being a tenet of science, is accompanied by a change in tense. The information starts by being reported in the past tense in a research article. But once published in a reputable journal (after passing the scrutiny of the journal’s reviewers and editor, who are gatekeepers to the dissemination of scientific knowledge to the global community), the information becomes part of the established body of scientific knowledge. Henceforth, other scientists may acknowledge this by referring to that information in the present tense.
Chapter 8

The technique of deploying present and past tense to signal the status of scientific information is described in detail in Matthews et al. (1996: 104-106), whose intended readers are ‘authors intending to publish research papers in journals’ (ibid.: xii). That English NSs have to have the tense conventions of scientific English inculcated by such textbooks and by writing courses indicates that these conventions are a cultural construct that aspiring members of the discourse community need to master. As Taylor (1989: 150) notes ‘...there are certain conventions about the use of tenses – especially past and present – in academic writing which are not intuitively obvious’.

NNSs who aspire to be members of the international academic discourse community also need to know these conventions, which is why the writing manuals for such readers take pains to explain the role verb tenses play in academic (scientific) writing. For example:

The verb tenses used in the discussion section depend on the type of information you want to present. Remember that the first information elements of the discussion refer specifically to the study and its findings. The verb tense most commonly used in referring to the purpose, the hypothesis, and the findings is the **simple past**. …As you move from the specific considerations of your study to a broader, more general statement about the importance of the study as a whole, use **simple present tense**… (Weissberg and Buker, 1990: 170-171).

Whereas the ‘science writing practitioners’, who include Booth (1984), Day (1992), Huth (1990), Lindsay (1995), Matthews et al. (1996) and O’Connor (1991), discuss tense usage as though it were inviolable (a set of rules), applied linguists take pains to note that in real life, tense usage in science writing varies; hence the qualification ‘most commonly used’ in the Weissberg and Buker citation above. The recommendations in Weissberg and Buker (1990) and Swales and Feak (1994) are based on observations of tense use in practice. These analyses (their own and done by other applied linguists) of papers published in a range of scientific disciplines show that in real life, authors and journals do not adhere rigidly to the conventions.4

4 Note that the conclusions drawn from such research may say more about journal policy on verb tense than about authors’ preferences. (If an author ignores the journal’s ‘guidelines to contributors’, a copy-editor will emend in accordance with house style). For example, McCarthy and Carter (1994) found that all the verbs in the Abstracts of the British Medical Journal were in the past tense, except for the final sentence, which projects forward to ‘future research’. They note (page 102) that ‘The shifts in grammatical choice are a fundamental feature of the genre, adhered to by all contributors’ [my italics; the role of the BMJ’s copy-editors seems to have been
The advice on tense use Swales and Feak (1994) give their NNS readers reflects Swales’s earlier deliberations (1990: 151-153) on the significance of tense use in research articles. At that time he reviewed the literature on tense usage in academic writing, (Swales, 1990) and identified three approaches. As these start from the most simplistic paradigm of tense use in scientific English (the one the practitioners espouse in their prescriptive textbooks), but successively elaborate that paradigm, I will now discuss them.

The first approach Swales identified was that the general rules on past and present tense usage are adequate; in other words, there is no need to challenge the paradigm of tense conventions in scientific English presented in prescriptive textbooks. One of the papers exemplifying this attitude was by Malcolm (1987), who looked at the broader rhetorical patterns in a scientific research paper, using a sample of papers from the *Journal of Pediatrics*. She made a distinction between the timelessness implied by the present tense and the timeboundedness implied by the past tense. She also argued that an important function of the past tense is to be referential, to focus specifically and explicitly on the field of the experiment in question, and to distinguish experience (the author’s or other researchers’) from ideas. The second approach that Swales identified went beyond timeboundedness and entered the domain of rhetorical persuasion: using tense to reinforce the scientific claims being made. This approach is exemplified by Oster’s (1981) study. According to Selinker and Trimble (who edited the book in which Oster’s chapter appeared) Oster was the first to study the rhetorical function of tense usage in reporting past research. Moving from the simplistic division that present tense signals generality whereas past tense signals non-generality, she postulated more complex functions for these two tenses. These were that present tense is used to refer to ‘supportive or nonrelevant (sic) previous research’, and also merely to refer to, rather than to discuss, past literature. Past tense (preterite) implies nongenerality of the past literature, and is used to refer to past research that does not support the research described in the current article. Her examination of tense use in two electrical engineering papers seemed to bear out these hypotheses, though she was careful to note that her sample was very restricted and that looking at more papers might have revealed more variation between authors.


overlooked!]. The BMJ has professed an interest in standardising the way information is presented in its articles (Doherty and Smith, 1999). Current BMJ house style stipulates structured (and therefore standardised and formulaic) Abstracts.
Swales argues that the past/present contrast allows an author to express proximity to the cited work – in terms of the temporal frame (when the work was done), or of its perceived relevance: past tense would then signal less relevance to the present situation. Hence Swales’s contention that tense use signals an author’s stance towards the cited work. He develops this further in his discussion of the Create A Research Space (CARS) strategy used in (and serving as a model for) research article Introductions (1990: 137-166), discussed in chapter 2 in relation to genre theory – specifically, the research article genre.

Because it incorporates the rhetorical as well as the ethical dimensions of tense use, Swales’s paradigm of tense use in scientific English better fits the somewhat anarchistic tense use found in published papers (Swales, 1990: 153). Using this paradigm, Swales and Feak explain the rhetorical signalling function of tenses in scientific English. For example:

The differences among … tenses are subtle. In general, a move from past to present perfect and then to present indicates that the research reported is increasingly close to the writer in some way: close to the writer’s own opinion, close to the writer's own research, or close to the current state of knowledge.
(Swales and Feak, 1994: 184)

And when discussing tense use in the individual parts of the research paper, they are careful to stress that their guidelines are ‘only general’, and to point out that there are variations across disciplines (‘Studies have shown that at least two-thirds of all citing statements fall into one of these three major patterns’ 1994: 182).

Conclusions on English tense use in science writing, and the implications for the reception study

From the above we may conclude, firstly, that past and present tenses of verbs can be used in English scientific writing to signal both the status of information and the author’s stance towards an item of information. This is thus the English paradigm of tense use in scientific writing: it is part of the culture of science in anglophone countries, so is taught via textbooks on writing and by senior members of the scientific community ‘correcting’ juniors (for example, Dudley-Evans (1991) reports a supervisor changing the tense in drafts of a biology PhD thesis). The second conclusion is that although textbooks explain and advocate using tense as a tool in scientific rhetoric, particularly to distinguish between findings that are research-specific and information that is widely applicable in practice, these conventions are
not followed slavishly. So, referring back to the three questions posed at the start of this chapter, the possible answers to questions 1 and 2 (why and how the readers reacted to tense use) would depend on whether the readers were sticklers for tense convention, or more easy-going. (This assumes they were aware of the tense conventions in English science reporting.) One answer to why the three Dutch authors used so many present tenses (question 3) could be that, like many English NSs, they do not rigidly adhere to tense conventions in scientific English.

The answers to the questions should also take account of the fact that in this study the authors and most readers were NNSs. Clearly, linguistic transfer and competence in English must therefore be considered when attempting to explain the authors’ tense use and the readers’ reactions. I will deal with these aspects in Parts 2 and 3 of this chapter. First, however, I wish to complete the discussion of institutionalised tense use in scientific writing by looking at tense use conventions in the discourses of certain other languages and to discuss the scope for transferring these between writing cultures and between written genres.

**Tense conventions in non-English scientific and other discourse**

A good illustration that different cultures have different paradigms of tense use in scientific (and academic) writing is provided by Hinkel’s (1997b) study of the tense use of speakers of American English, Chinese, Korean, Japanese and Indonesian in English-language student essays and Cloze tests. She found differences between the NSs and the speakers of Asian languages. The latter tended to use past tense in their introductions, to establish the time frame, but then to use present tense to signal current relevance. Hinkel suggests that this is because speakers of Asian languages have a different perspective on the sense of ‘timelessness’ conveyed by the present tense. She links her findings to the tense conventions in discourse, referring to the ‘conventionalization of tense use in discourse’ (1997: 309). She notes that in English, but not in Chinese, Japanese, Indonesian and Korean, the convention is ‘to frame present-time events in the past tense, even if the action or event is currently relevant and not completed in the objective time’ (ibid.). Using the sentences ‘Last year Mary met John. John works at the university.’ she argues that in the paradigm of English written academic discourse, the present tense in the second sentence is inappropriate, even though John might still be working at the university. For her Asian authors, the present tense in the second sentence is appropriate, however.

Cultural differences in the conventions on tense use in written genres (whether attributable to differences in tense systems, or to differences in perceptions of tense meaning – or both) often become visible – marked –
when translations preserve the original tense. A striking illustration of this, albeit not in the genre of academic or scientific writing, is provided by Hatim and Mason (1997: 123). They show how the Arabic rhetorical tradition is to switch to the past tense to emphasise the magnitude of the event referred to and to underline that an event will actually happen. Using the Bible as an example, they show how translations into English, German, French and Spanish that keep the past tense, which has no such rhetorical function in these languages, may bemuse their readers, because Jonah appears to pray in the past tense:

[1] Then Jonah prayed unto the lord his God out of the fish’s belly, and said
   I cried by reason of mine affliction unto the Lord
   And He heard me;
   Out of the belly of hell cried I and thou heardst my voice.
   (Jonah 2:1-2, Authorised King James Version of the Bible (1611))

Most NS readers, however, would assume from [1] that Jonah was referring to previous events, not to a current action. They would be more likely to be fazed by translations into English that preserve a convention of using present tense to describe a past event. This is because using the present tense to describe the past (i.e. the historic present tense) ‘is perhaps rather less common in English than in other European languages’ (Comrie, 1976: 73). Earlier, I explained the role of the present tense in the paradigm of scientific English. In English-language narratives its function as a historic present tense is to convey immediacy: the past is described ‘as if it were happening now’ (Declerck, 1991: 72). The English historic present can thus be encountered in journalese (in headlines and photo captions in newspapers), in the résumés of the plots of plays, operas and films, and sometimes in novels – particularly in American detective novels set in the gangster era. It may occasionally be encountered in accounts of events in history, and in epic poetry.

One genre in which English would not use the historic present, but in which other European languages do so, is the minutes of meetings. In English, these must be reported in the past tense5. In Dutch and French6, it is the

6 To compensate for the shortage of literature on tense conventions in the reporting of science in languages other than English, I sought information from various experts: Professor Ulrich Ammon, Duisburg University (German); Professor Staffan Hellberg, Stockholm University (Swedish); Professor Frances Lutikhuizen, Barcelona University, Mary-Ellen Kerans, EAP teacher in Barcelona and Karen Shashok, science translator and authors’ editor, Granada, (Catalan/Spanish), Dr Pierre Chirac,
convention to report meeting minutes in the present tense. This is also a possible option in German and Swedish (for a more detailed discussion, with examples, of this and other tense conventions, see Burrough-Boenisch, 2000a). The general heading to the minutes of a meeting typically gives the date on which the meeting took place, thereby providing a time frame for the events reported. This time frame is often made more precise in the body of the minutes, by reporting the clock times at which the meeting was opened and closed. Given this information, even a monolingual English reader unfamiliar with the convention of reporting minutes in the present tense should be able to assign the connotation of ‘completed events’ to present tense verbs in meeting minutes written in English by an NNS who has unwittingly transferred the convention.

In French, using the present tense to report past events is also common in genres other than meeting minutes. Monville-Burton and Waugh (1991) give examples of the historic present being used in news reporting. In [2] below, the reader obtains sufficient temporal context from explicit references to times or dates:


French history books, too, are written in the historic present. According to my informants, historic present also appears in Swedish, Spanish and German history books, where it is used in conjunction with the past tense – perhaps for the rhetorical impact achieved by marking the information in this way. This use of the historic present within past tense narratives to mark information is also known in Dutch. The following extract is from a university textbook on Dutch law (I have indicated past tense in bold, and historic present by underlining):

---

Editor of Revue Prescrire (French). I asked them three questions: Are the Minutes of meetings ever reported in the present tense? Are history textbooks ever written in the present tense? Do scientists report their findings in the present tense?

1 Last Monday, at Cantin, in the North [… ] at about 20.15 h, a car takes a bend wrongly and smashes into a telephone box. In the car [there are] two young men and a young woman. They are returning from an engagement dinner.
Het tweede belangrijke incident was de Luxemburg-kwestie in 1868. Als gevolg van het Weens Congres in 1815 bestond er een personele unie met Luxemburg; de Koning der Nederlanden was tevens Groot-Hertog van Luxemburg. Na 1866 ontstond er een reeks van conflicten waarbij Pruisen, Oostenrijk, de Duitse Bond en Frankrijk betrokken zijn. Willem III die aanvankelijk bereid was Luxemburg aan Frankrijk te verkopen, zag daar onder druk van Bismarck van af. Uiteindelijk komt er een verdrag tot stand waarbij Nederland de neutraliteit van Luxemburg garandeert. …

(Burkens et al., 1997: 218)

The bilingual (English/Dutch) university student who gave me the above example reported that she found the tense switching very distracting. An English-language university textbook would be most unlikely to exhibit tense switching like this in historical narrative (recall that in English the historic present is infrequent and thus results in strong marking).

From the foregoing it is clear that in the European languages represented in my reception study, the historic present has much wider currency in discourse than in English. But what of the specific case of scientific discourse? Benes (1991) reports that in German scientific writing, the simple present is used to state general truths, whereas the past is restricted to narrative. However, Andersson (1990), reporting on the function of German tenses in a classic botany textbook, expands on this. After noting that in German, as in English, the present tense is used to present scientific universals, he shows how the past tense (he calls it ‘the distance form’) signals ‘views no longer valid’ (compare Swales’s explanation, discussed above, of how tenses signal author’s stance in relation to the information presented).

In French scientific discourse the present tense as a narrative tense is institutionalised; it is part of the culture of French science (see Salager-Meyer, 1992: 102). Consider the following, written by a French scientist in her mother tongue in reaction to the editor of Annales de Dermatologie et Vénéréologie, who had decided to break with French tradition and convention and had issued instructions to authors that materials, methods and

\[\text{8 The second important incident was the Luxembourg question in 1868. As a result of the Vienna Congress in 1815 a personal union with Luxemburg existed: the King of the Netherlands was also the Grand Duke of Luxemburg. After 1866 a series of conflicts arises in which Prussia, Austria, the German Confederation and France are involved. William II, who was initially prepared to sell Luxemburg to France, cried off, under pressure from Bismarck. Finally, a treaty comes about, in which the Netherlands guarantees the neutrality of Luxemburg…}\]
observations should be reported in the past tense (‘Matériel et méthodes – ou observation – à rediger au passé’).

[4] Alors, pourquoi le passé quand notre souci dans la rédaction médicale est d’être précis et clair, compris de tous et aisément traduit?...Constantment, le présent est plus simple, plus bref ... et surtout, il est plus juste.10
(Delauney, 1998: 568, my emphasis)

The issue of Annales de Dermatologie et Vénéréalogie containing Delauney’s defence of the French tradition of reporting in the present tense contains an equally impassioned contribution from the editor, arguing that contributors to that journal should follow the tense signalling common in anglophone science writing, because the information they are reporting must be unambiguous to readers who are not French NSs:

[5] Ces informations doivent pouvoir être comprises par tous, y compris de nos collègues étrangers qui n’ont pas une pratique quotidienne de la langue française.11
(Lorette, 1998: 571, my emphasis.)

That the French convention of reporting science is transferred to English and may slip through into published English-language journals in spite of a language corrector (acknowledged by the authors) is shown in [6]. I have underlined the present tenses. The text extract appeared under the heading ‘Mapping the rainfall distribution’, but it is not a general description of a standard procedure: it describes the procedures the authors followed in their study.

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9 Compare the notes for contributors to Journal des Malades Vasculaires: ‘Style: Il est expressément demandé de mettre les faits du passé au passé et donc de ne pas utiliser le présent de narration.’
[Style: It is expressly required to report past facts in the past tense and thus not to use the historic present.]

10 So why use the past tense, given our concern in medical editing to be precise and clear, understood by all and easily translated?...The present tense is constantly simpler, more direct, more concise ...and, above all, is more accurate.

11 This information must be comprehensible to everyone, including to our foreign colleagues who do not use French daily.
[6] The regression models are applied to the 300 reference points that provide for each of these points a couple of values, Gd(60) and Pd(60). The variograms of the first four PCs show a minimal range of 6 km, so a sampling every 2 km should be sufficient for describing the spatial variability of the relief (in its general trend). Spline interpolation (Smith and Wessel, 1990) of the 300 CP-derived estimates is then carried out to produce the map of the Gumbel parameters...

(Wotling et al., 2000: 96)

The fact that I felt it necessary to clarify the purpose of text extract [6] underscores the point made in [5] about the risk of French tense conventions in science confusing readers from other cultures.

Informal e-mail correspondence exchanged with my informants in Spain, Germany, and Sweden and with a Japanese teacher of Japanese in the Netherlands and an English EAP teacher in Japan\textsuperscript{12} suggest that the French convention of using the present tense to report one’s own methods and findings in science is strange in Spanish, German, Swedish and Japanese.

It was beyond the scope of the present study to further compare the uses and markedness of the historic present in English and the mother tongues of the readers who annotated the three texts. That would have necessitated analysing tense use in a wide range of research articles in these languages. There is clearly a need for more research on this aspect, however.

Conclusions on present tense use in non-anglophone discourse and the implications for the present study

The above selective review of non-anglophone tense conventions shows that outside anglophone cultures it is not unusual to use the present tense to report past events. A conclusion is that writers and readers from cultures that use the historic present more often might be more tolerant of present tense use in scientific English; this tense will not be as marked to them as it is to English NSs. The conclusions following from this are that such readers might therefore be more likely to use historic present when they write in English and be less likely to ‘correct’ this tense to past tense when asked to annotate draft English research articles.

\textsuperscript{12} Keiko Yoshioka (Japanese Prizewinners’ Programme, University of Leiden) and Hugh Gosden (Foreign Language Research Centre, Tokyo Institute of Technology)
Part 2: Why Dutch authors might favour the present tense in their scientific English

The preceding exploration of ways in which tense use differs among written genres in different languages and writing cultures has already indicated ways in which Dutch usage differs from English. It can be inferred that Dutch authors might be inclined towards using the present tense because they frequently encounter the historic present in their writing culture (in the minutes of meetings, in historical narratives that are part of academic or scientific texts). That instances of the transfer of Dutch convention to English do occur is shown in [7]: extracts from minutes of a meeting of a professorial selection committee in the Netherlands in 1999. The meeting was conducted in English because one of the committee members did not speak fluent Dutch. The minute-taker was a Dutch academic. For reasons of confidentiality, names and other sensitive information have been removed. Square brackets surround substitutes; asterisks indicate ellipses. Instances of present tense have been underlined.

[7] Minutes of the meeting held in xxxxxxxxx on ** October 1999

1. Opening and Welcome
The meeting is opened by the Chairman at 14.05 hours. Present are in alphabetical order: [A, B, C, D, E]. Absent with notification [F]. There follows a short round of introduction of the members.

2. Purpose of the meeting
The aim of the meeting is to produce a short list of candidates for the position according to "Reglement * * *
It is noted that this text is slightly dated and that the members have the freedom to interpret some statements according to needs arising.

3. Establishment of the shortlist
Members of the [committee] agree that the text of the task fields in the advertisement reflects indeed the wishes of the division, with emphasis on the input to geo-information technology and management (******). This is also in line with the core business of the [organisation].
The Chairman than constructs a spreadsheet on the blackboard indicating on the X-axe the requirements and the names of the nine candidates on the Y-axe. The listed requirements are:

* * *

In depth discussions follow about the suitability of the candidates as a result of which four persons are listed after this first round of deliberations. They are: * * *.
The [committee] is generally concerned about the quantity and quality of the applicants and feels that the choice between the applicants is too restricted to indicate at this stage the right person for the job. The Chairman summarizes as follows:

1. Would it be in the best interest to go ahead with the selection?

2. Is it advisable to extend the period of application to attract more potential suitable candidates?

3. Shall the [committee] hand back its assignment?

The [committee] proposes to adhere to option 2 and suggests that the time for submission of candidates is extended until *. This would enable a number of potential suitable candidates to respond, who for various reasons were not able to do so for the past deadline. The [committee] feels that this procedure is justified.

6. A.o.b.

There being no other business the Chairman closes the meeting at 16:45 hours.

It is conceivable that this ‘Dutch’ tense convention of reporting meeting minutes in the present tense was adopted from the French, perhaps during French suzerainty (1795-1806). An intriguing – but highly speculative – possibility is that in a similar way French influenced the discourse of Dutch scientists. As explained in chapter 3, French was the international modern language used by Dutch scientists in the early stages of international scientific communication until it was replaced by German in the nineteenth century (van Berkel et al., 1999). The French paradigm of reporting in the present tense might have been incorporated into the Dutch tradition of scientific writing and survive today as a high incidence of present tense use, which is transferred into the latest international language Dutch scientists have espoused: English.

Though, as argued above, ‘culture’ may have some impact on the pragmatics and frequency of present tense use in Dutch scientific English, there are three linguistic reasons that might be more important. These are:

1. Lack of proficiency in English.
2. Influence of Dutch tense meanings (i.e. semantic transfer).
3. Mistranslation/transfer of auxiliaries from Dutch.

I will now present the arguments for and against these reasons, relating them specifically to the three texts used in the reception study.
Lack of proficiency in English

Dietrich et al. (1995: 7) have noted (in the context of learner utterances) that language learners in general consciously avoid tense forms to express temporality; instead, they use other features of discourse, such as temporal adverbs. Hinkel (1997b: 289) has contended that the learning of past tenses in English is particularly complex. Salaberry (2000) is among those who have described the problem. Calling it a feature of ‘inadequate control of language form’, he reported the failure of Uruguayan Spanish learners of English to use past tense marking in written and oral narratives.

Given that the test texts are examples of NNS writing and are therefore likely to contain learner errors, it seems possible that they will contain tense errors. It seems unlikely, however, that the preponderance of present tense in the texts was an avoidance strategy. The three Dutch scientists had been learning and using English for over twenty years and were far more advanced than the learners encountered in Salaberry’s (2000) study. Furthermore, as Salaberry (2000) himself noted, when given a written rather than oral narrative task, NNSs generally opt for past tense marking. Salaberry attributes this to having more time to think about tense choice.

Further evidence to refute the ‘lack of proficiency’ reason is that the texts contain very few instances of verbs that are grammatically or orthographically ‘wrong’ (this will be elaborated later in this chapter). The most convincing evidence that the three authors are able to use past tense forms in English, however, is contained in the Abstracts of the papers from which the texts were taken. See Appendix 5.1 and Table 8.2. (Recall that the readers were given these Abstracts and the paper titles, so that they had some context for the Discussion sections.)

In all three Abstracts (like the papers themselves, these had not been subjected to language correction) there are no errors of verb aspect or verb form or verb spelling. The blanket use of past tense in the Abstract of Text R is particularly striking, because 90% of the verbs in the Discussion section of this text are in the present tense. In the Abstract of Text A, the author used the present tense twice in the final sentence, to state two conclusions. The Text K Abstract contains the most mixing of tenses. Three of its four past tense verbs refer to actions undertaken during the research, as do two of its six present tenses. This leaves one instance of past tense and five of present tense; the former used to present author K’s research findings and the latter his conclusions.
Table 8.2 Tense use in the Abstracts of the three test texts

<table>
<thead>
<tr>
<th>Text code</th>
<th>Present tense verbs</th>
<th>Past tense verbs</th>
<th>Future tense verbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>K</td>
<td>6</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>R</td>
<td>0</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

**Influence of Dutch tense meanings**

Though the authors were able to use tense correctly in their Abstracts, it seems quite likely that their present tense use in the body of the paper might have been influenced by differences between Dutch and English tense systems.

One of the differences in the tense systems of the two languages is in verb aspect. The major difference is that English has progressive (also called continuous) forms of the present and past tenses: ‘she is writing an article’ (simple present progressive); ‘she was writing an article’ (simple past progressive); ‘she has been writing an article’ (present perfect progressive); ‘she had been writing an article’ (past perfect progressive). By contrast, Dutch uses different tenses to fulfil the functions served by the progressive forms in English. For example, the onvoltooid tegenwoordig tijd in Dutch functions as a simple present tense and also as a progressive present tense. This tense (which Sanders *et al.* (1992: 107) contend ‘may well be the most frequently used of all Dutch tenses’) also has a continuative use akin to the present perfect tense in English. An example: ‘They have lived in London since 1972’ (which is compatible with their still living there) is expressed in Dutch by ‘Zij 

[8] In the Gelderse Vallei the possibilities for restoration of peat grassland are investigated in the trial area since 1987.

In the above example (collected from another authentic Dutch-authored pre-publication research paper), the verb should be ‘have been’.

The difference between the English and Dutch perfect tenses is that the Dutch perfect (voltooide tijd) implies that an event or action has been completed (de Haan, 1991: 144-145); it isolates an event. Dietrich *et al.* note that, in Dutch, ‘the Perfectum is regularly used as a simple past tense’ (1995: 119; see also Janssen, 1991: 158). Declerck (1991: 102) notes: ‘Unlike
English, Dutch can use the present perfect to represent a situation as holding at a particular past time’.

There is empirical evidence that the tense meaning in the mother tongue is very important. Coppetiers (1987) studied a group of ‘highly educated’ English NSs with near-native proficiency in French and reported that though her subjects had acquired French tense forms, their perception of tense meanings were not like those of French NSs. She concluded that perception of tense is strongly affected by the mother tongue’s tense meanings.

Mistranslation/transfer of auxiliaries from Dutch

In addition to tense meaning, there is certainly scope for the Dutch tense form to influence the tense form a Dutch author chooses when writing in English. This is because the voltooide tijd (i.e. perfect) form consists of the auxiliary zijn (from the verb ‘to be’) and the past participle of the verb. (There is another form which uses the auxiliary hebben – ‘to have’.) When using a passive construction13 (these are common in science: see e.g. Matthews et al., 1996; Tarone et al., 1981) an author might inadvertently transfer the Dutch third person singular form of the auxiliary (is) into English (where its equivalent is the identical ‘is’). Evidence that this happens is publically visible in another genre in Amsterdam Schiphol International Airport. Here, the bilingual notices at the entrances to all public toilets feature a clock with adjustable hands and the texts:

[9a]  DIT TOILET IS GECONTROLEERD OM …. UUR
     THIS TOILET IS CHECKED AT … O’CLOCK

The correct English translation should be:

[9b]  THIS TOILET WAS CHECKED AT … O’CLOCK

Errors of this type occurring in Dutch scientific English would imply habituality or universal (or established) scientific truth. An example, from the same source as [8] illustrates this:

[10]  In the period 1987-1994 1147 Braun-Blanquet-relevés are made.
     Because of practical consideration is decided to compare the vegetation
     in 4 different years: 1987, 1990, 1992 and 1994. In these years 808

13 Though according to Cornelis (1996) the only one ‘true’ passive form in Dutch uses the auxiliary worden. The zijn form is ‘passive-like’. See chapter 3.
Braun-Blanquet-relevés are made. Table 3 shows the numbers of relevés made in the separate years. Therefore in 1987 a relatively small number of relevés is made.

This hypothesis of a literal translation of the auxiliary verb being responsible for an inappropriate present tense in Dutch scientific English could be tested by looking at the occurrence of passive voice present tense verbs in the three texts. If these are embedded in passages of present tense and (unlike [10] above) there are no dates or other timebounding devices in the text that make the present tense incongruous in English, then it cannot be unequivocally concluded that the authors were simply mistranslating the auxiliary.

There were two passive voice present tense verbs in Text A, one in K and 16 in R. A selection of these is shown in [11 a – e ] (the verbs in question have been underlined).

[11a] The answer may be found in the relation between architecture and tissue density. High values for architecture, which are expressed in (fresh) size / gram dry weight, are negatively related to tissue density expressed in dry weight / fresh weight (Poorter and Bergkotte 1992). (Text A, lines 66-68)

[11b] As a final conclusion we therefore state that species from a fertile environment are growth orientated and are specialized in the capture of light and nutrients while species from an infertile environment are specialized in reducing their biomass and nutrient losses. (Text A, final sentence)

[11c] The effect of adding records is minimal when both bryophytes and Rubus species are included. Thus, adding records affects a classification more, as more species are excluded from the recording. (Text K, lines 50-53)

[11d] …the grasslands are mown at the end of the growing season, whereas the dwarf shrub communities are left undisturbed. High loam percentage is correlated with higher soil pH, higher calcium concentration and lower aluminium concentration in the soil (Fig. 4). Also the nutrient supply ratios are correlated to loam percentage. (Text R, lines 6-9)

[11e] Potassium availability decreases with soil pH too, because in podzol soils soluble potassium is leached more when CEC is low (Bolt and...
Bruggewert, 1976). The availability of nitrogen for plants is primarily determined by the mineralisation of organic nitrogen in the soil which increases with an increasing amount of soil organic matter and is less affected by soil acidity. The accumulation of soil organic nitrogen is largely determined by the atmospheric deposition. (Text R, lines 32-37)

All the simple present passives noted above are embedded within a present tense domain in the text. In [11a] and [11c] they are embedded in paragraphs that are entirely in the present tense, and the passives in [11b] are embedded in a sentence that is in the present tense. Present passives are the most numerous in Text R. With the possible exception of [11d], which is part of a sentence beginning ‘Management has been adapted to the soil and vegetation present’, the instances of simple present passive in Text R are consistent with the tense of the surrounding text. This implies that the authors intended to use the simple present passive form and were not simply mistranslating Dutch is/zijn past tense forms.

Thus, of the three linguistic reasons I suggested might cause Dutch scientist authors such as the three in this study to favour the present tense, it seems that the influence of Dutch tense meaning (reason 2) is probably paramount. In December 2000 the author of Text R (the text with the most present tense verbs: Table 8.1) agreed to be questioned on her tense use. She said that she had thought that in constructions such as “high loam percentage is correlated with higher soil pH” she was using the perfect tense. So, the reason her text contained many such instances of present passives (they account for 20% of the present tense verbs) was that she had misguided transferred Dutch tense meanings (reason 2). She also noted that she felt justified in using the present tense for any of her results that had been demonstrated to be statistically significant, and would certainly do so when writing in Dutch. She had been unaware of the pragmatics of tense in scientific English.

Whatever the generic reasons for a preference for the present tense might be, it will be reinforced within the Dutch scientific and academic writing culture when scientists and academics read draft English-language articles by colleagues who share this Dutch trait.

Having dealt with why the Dutch authors in this study (and Dutch authors in general) exhibit patterns of present tense predominance like those found in the test texts, we are left with the ‘how’ and ‘why’ of the readers’ response. These are dealt with next, in Part 3 of this chapter.
Part 3: Presentation and analysis of the data on tense changes

Let us assume that when reading English written by an NNS scientist, the reader expects the anglophone tense conventions to be adhered to, not the conventions operating in the author’s language and culture. Then, given that the present tense is not supposed to be used to refer to non-universal events or findings, a preponderance – for whatever reason – of the simple present tense in a Discussion of research findings will trigger critical response from that reader. He or she would wish to change many of the instances of present tense in the test texts to past tense, even though the present tenses are not grammatically wrong. This can be stated as a hypothesis:

Comments on and changes to tense made by the readers arise from the texts’ mismatch with genre convention (i.e. to mismatch with the paradigm of tense use in scientific English).

The data on the changes readers made to the verb tenses will be presented and analysed with this hypothesis in mind. I will start by explaining in what form the data were collected, and will then attempt to outline the scope readers had for making tense changes.

The form in which the data on tense changes were collected

The commentarial data collected on tense changes were referred to at the start of this chapter. The remaining, textual, data on tense changes were collected as:
- instances of a present tense being changed to a past tense
- instances of a past tense being changed to a present tense
In both cases, the grid reference of the verb or, where applicable, of the auxiliary verb, was recorded.

The scope for making tense changes

Scope in terms of the verbs present in the text

An indication of the number of verbs available to be changed has already been given in Table 8.1, which showed that present tense verbs predominated in all three texts. However, in the account of tense conventions in scientific English I noted that Discussion sections are supposed to feature past tense when referring to the author’s own findings. Given the signals conveyed by tenses in English science writing, changing a present tense in one of the test texts to
a past tense would change the status of the information presented; it would be
downgraded from a universal scientific truth, to a finding specific to the
research described. Expressed most simplistically, we could therefore assume
that readers who want the tense conventions adhered to would want all the
verbs in the three texts that refer to the authors’ own results and actions to be
in the past tense. To be able to identify which present tense verbs need to be
changed this way, a reader uses textual clues, or his own scientific knowledge.
One textual clue would be an explicit statement that a fact is a research
finding. For example, the following sentence from Text R (lines 20-21)
contains a present tense (‘influence’) that is a candidate for changing to past
tense:

[12] However we found that nutrient supply ratios also influence the
species composition.

But consider the opening of Text R (again, present tenses underlined):

[13] In our study area variation in soil substrate determines vegetation
composition to a large extend. The loam percentage is practically zero
in the sandy soils where species-poor heath is the dominant
vegetation. Grassland communities prevail on soils with a higher
loam content.

Is the first sentence restating a finding of the current research, or presenting
information about the study area gleaned by previous researchers and since
accepted as a given? The second and third sentences appear to be generally
accepted truths; they are not explicitly linked to the current research. A reader
with specialist scientific knowledge might query the generality of the
statements in these three sentences and therefore might change the verbs to
past tense. Because tense changes like this require not only a knowledge of
the tense conventions, but also sufficient scientific expertise (i.e. the
deployment of the reader’s content schema: see Carrell, 1988), it is difficult to
be precise about the scope for changing tenses in the test texts. However, it is
possible to gauge the scope for these changes at discourse level (Figure 2.2)
by looking at how many present tense verbs in each text were changed to past
tense by at least one reader. (Note that the implicit assumption is that tense
changes were motivated by mismatch with tense convention.) It is also
instructive to see how many changes were made from past tense to present (a
process that elevated the information associated with the verb concerned, to a
universal truth). Table 8.3 gives this information. It shows the changes made
to the present and past tense verbs in each of the three texts, as percentages of
the verbs in that tense in that text. The table suggests that a large proportion
(between 41 and 58%) of the present tense verbs in each text could have been in the past tense, to comply with the paradigm of reporting one’s own findings and actions in the past tense. This can be used as a working indication of the scope available for verb changes in the three texts.

Table 8.3 The percentage of present tense verbs changed to past tense and of past tense verbs changed to present tense by at least one reader, per text, and excluding changes made to the ‘wrong’ verbs shown in Table 8.6

<table>
<thead>
<tr>
<th>Text code</th>
<th>Present tense verbs changed to past tense</th>
<th>Past tense verbs changed to present tense</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>41</td>
<td>33</td>
</tr>
<tr>
<td>K</td>
<td>42</td>
<td>0</td>
</tr>
<tr>
<td>R</td>
<td>58</td>
<td>14</td>
</tr>
</tbody>
</table>

Scope in terms of readers’ predisposition to make changes

The 45 readers knew that the three texts were drafts and they had been explicitly instructed to emend them. Predisposed to make corrections, their own perceptions of tense meanings may have influenced them to ‘correct’ the tenses in the texts. We could therefore expect that the non-Dutch and non-French readers might correct the Dutch English tense use. All other things being equal, the Dutch readers would tend to attribute the same tense meanings to the tenses as the Dutch authors had done. The French readers would not be fazed by reporting in the present tense, because that is a convention in their language. The most likely groups to change or comment on the tenses would be the NSs (the Americans and British). For this reason, when analysing the data I compared NSs with NNSs and also looked at the eight country (i.e. mother tongue) groups.

It is not just the ‘NS versus NNS’ distinction that could be a factor in readers changing verb tenses to satisfy the conventions of scientific English. Also important might be whether the reader is a journal reviewer, as reviewers for English-language science journals might be expected to be more likely than ‘normal’ readers to know and uphold conventions of English scientific discourse and be more likely to look out for scientific and genre appropriateness while reading. Elsewhere (Burrough-Boenisch, 1999a) I demonstrated a difference in reading strategy depending on whether a person was reading as a scientist or as a reviewer. Therefore, when analysing the data on tense changes, reviewer status was considered.
From scope to actuality: the tense changes at global level

Taking the data for all three texts together, the number of times readers changed present tense to past tense far outnumbered the changes from past tense to present tense: 295 versus 24. I propose to leave the discussion of the past to present tense changes to later in this chapter and to deal first with the changes of present to past tense. I will consider these in terms of the combined texts, the individual texts, the readers and the actual verbs changed.

Changing present tense to past tense

Table 8.4 shows the magnitude of the shift from present tense to past tense that the readers achieved collectively. It was compiled by counting each verb in a text that had been changed from present to past by at least one reader. The table shows that if all the verb changes were implemented there would be a huge increase in the past tense verbs in Texts K and R and a big increase in Text A (the text that started off with most past tense verbs). The table also shows what these present to past tense changes would mean in terms of the final proportions of past tense verbs in the texts. It can be seen that Texts A and R would have ended up with well over half their verbs in the past tense, but Text K would not.

Table 8.4 The shift from present to past tense that would be achieved by implementing the verb changes made by the readers

<table>
<thead>
<tr>
<th>Text code</th>
<th>Increase in past tense verbs</th>
<th>Proportion of past tense verbs in text if all changes implemented</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>183%</td>
<td>61% (was 33%)</td>
</tr>
<tr>
<td>K</td>
<td>950%</td>
<td>44% (was 5%)</td>
</tr>
<tr>
<td>R</td>
<td>757%</td>
<td>60% (was 8%)</td>
</tr>
</tbody>
</table>

Table 8.5 shows descriptive statistics for the data on present to past tense changes, in relation to native-speakerhood and reviewer status.

To ascertain the statistical significance I performed univariate General Linear Model analysis on the present to past tense changes. This analysis also looked for significant interaction effects; unless mentioned, none were found. In my first analysis I looked for evidence that knowledge of English and of English tense conventions could have been significant in motivating these changes. As fixed factors I therefore used native-speakerhood and reviewer status and – because I was interested in differences between texts – text. There
Table 8.5 Descriptive statistics for present to past tense changes, by native-speaker and reviewer categories

<table>
<thead>
<tr>
<th>Native-speakerhood</th>
<th>Reviewer status</th>
<th>Text</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS</td>
<td>Reviewers</td>
<td>A</td>
<td>5.50</td>
<td>3.47</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>K</td>
<td>2.20</td>
<td>4.32</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R</td>
<td>5.80</td>
<td>12.25</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>4.50</td>
<td>7.67</td>
<td>30</td>
</tr>
<tr>
<td>NS</td>
<td>Non-reviewers</td>
<td>A</td>
<td>7.50</td>
<td>5.07</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>K</td>
<td>0.75</td>
<td>1.50</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R</td>
<td>3.00</td>
<td>5.35</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>3.75</td>
<td>4.90</td>
<td>12</td>
</tr>
<tr>
<td>NS</td>
<td>Total</td>
<td>A</td>
<td>6.07</td>
<td>3.89</td>
<td>14</td>
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<td>K</td>
<td>1.79</td>
<td>3.72</td>
<td>14</td>
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<td></td>
<td>R</td>
<td>5.00</td>
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<td></td>
<td>Total</td>
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<td>6.94</td>
<td>42</td>
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<tr>
<td>NNS</td>
<td>Reviewers</td>
<td>A</td>
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<td>3.78</td>
<td>18</td>
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<tr>
<td></td>
<td></td>
<td>K</td>
<td>0.50</td>
<td>1.47</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R</td>
<td>2.22</td>
<td>7.49</td>
<td>18</td>
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<td></td>
<td></td>
<td>Total</td>
<td>1.83</td>
<td>4.92</td>
<td>54</td>
</tr>
<tr>
<td>NNS</td>
<td>Non-reviewers</td>
<td>A</td>
<td>1.08</td>
<td>1.93</td>
<td>13</td>
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<tr>
<td></td>
<td></td>
<td>K</td>
<td>7.692E-02</td>
<td>0.28</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R</td>
<td>7.692E-02</td>
<td>0.28</td>
<td>13</td>
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<td></td>
<td>Total</td>
<td>0.41</td>
<td>1.21</td>
<td>39</td>
</tr>
<tr>
<td>NNS</td>
<td>Total</td>
<td>A</td>
<td>2.06</td>
<td>3.21</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td></td>
<td>K</td>
<td>0.32</td>
<td>1.14</td>
<td>31</td>
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<td></td>
<td></td>
<td>R</td>
<td>1.32</td>
<td>5.74</td>
<td>31</td>
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<td></td>
<td></td>
<td>Total</td>
<td>1.24</td>
<td>3.88</td>
<td>93</td>
</tr>
<tr>
<td>Total</td>
<td>Reviewers</td>
<td>A</td>
<td>3.75</td>
<td>3.85</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>K</td>
<td>1.10</td>
<td>2.88</td>
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<tr>
<td></td>
<td></td>
<td>R</td>
<td>3.50</td>
<td>9.40</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>2.79</td>
<td>6.14</td>
<td>84</td>
</tr>
<tr>
<td>Total</td>
<td>Non-reviewers</td>
<td>A</td>
<td>2.59</td>
<td>3.94</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>K</td>
<td>0.24</td>
<td>0.75</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R</td>
<td>0.76</td>
<td>2.66</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>1.20</td>
<td>2.90</td>
<td>51</td>
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<tr>
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<td>Total</td>
<td>A</td>
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<td>3.88</td>
<td>45</td>
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<tr>
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<td></td>
<td>K</td>
<td>0.78</td>
<td>2.33</td>
<td>45</td>
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<tr>
<td></td>
<td></td>
<td>R</td>
<td>2.45</td>
<td>7.66</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>2.19</td>
<td>5.20</td>
<td>135</td>
</tr>
</tbody>
</table>
was a significant effect of native-speakerhood: \( F(1, 123) = 8.973, p = 0.003 \). Interpreting this in the light of the data shown in Table 8.5, we may conclude that the NSs (i.e. the American and British readers) were more active in changing present to past tense. The GLM analysis also revealed a significant effect of text: \( F(2,123) = 3.704, p = 0.027 \). A post hoc test (Tukey) revealed that this was because the difference between Texts A and K was significant at the 0.05 level.

I repeated the analysis, substituting country for native-speakerhood (and therefore distinguishing between American and British NSs as well as between the mother tongues of the NNSs). The effect of reader’s country was very significant \( F(7, 90) = 2.977, p = 0.007 \) and at this level of analysis, reviewer status became significant \( F(1, 90) = 4.466, p = 0.037 \). A post hoc analysis (Tukey) revealed no significant difference between the American and British NSs but showed that the British NSs differed significantly from the German and Spanish readers, who made very few, if any, present to past tense changes.

**Explaining the differences at textual level**

Table 8.1 helps explain why the GLM analysis with native-speakerhood as one of the fixed factors found text had a significant effect on the present to past tense changes. That table showed that there were many more present tense verbs in Texts A (69) and R (80) than in Text K (41). This was partly because Text K was the shortest text (695 words, versus the 1425 words of A and 1150 words of R), and partly because of differences in tense deployment: Texts K and R had 90% or more of the verbs in the present tense, compared with 64% in Text A. Furthermore, 20% of Text R’s present tense verbs were in the passive voice (recall the comments of author R, page 229) whereas Texts A and K had fewer than 5% passive verbs. But the GLM analysis revealed that the significant difference in the frequency of tense changes was between Texts A and K, rather than between Texts R and K. Figure 8.1 sheds some light: it shows that the response patterns to the present tenses varied among the texts.

The pattern of tense changes reflects an intertextual difference in readers’ comments. From Appendix 5.5 (the comments elicited by the e-mail questionnaire), it can be seen that more readers commented about verb tense problems in Text A (readers A4, A6, A7, B3, B5, B9, D11) than in Text K (reader B9) or Text R (reader B2), though as noted on page 211, Text R’s tenses did attract commentarial annotations later. Figure 8.1 shows that more readers made more changes in Text A. It also shows that the frequency of tense changes was generally small – much smaller than the potential for change suggested in Table 8.4 – and that Text R caused two readers to make
very many present to past tense changes. Furthermore, the largest category, particularly in Texts K and R, was ‘no changes’. To explicate this complex response, we must evaluate the possible causes for the changes.

Let us first consider the huge ‘zero response’ visible in Figure 8.1. Should it be interpreted as tacit endorsement of the ‘unconventional’ predominance of present tense, or as indicating that verbs were not noticed? (Readers may have been too busy emending other text features.) It can be postulated that if verbs are grammatically correct, only the readers who notice that they deviate from genre conventions on tense use will change them. In essence, this is the hypothesis posed on page 230. From this it follows that if the texts contained verbs that were obviously ‘wrong’ in some way, readers’ reactions to these could usefully augment the data collected on tense changes, by indicating whether readers noticed verb errors at all.

Figure 8.1 Histograms of present to past tense changes
Correcting ‘wrong’ verbs

Texts A and K\(^{14}\) did indeed contain some verbs that were wrong (wrong tense, or wrong aspect, or wrong participle). Many readers noticed and emended these. I recorded these emendations too, because this information, which I will refer to as ‘verb alertness’, might explain why readers did not make any tense changes. I reasoned that readers who neither noticed wrong verbs nor made any tense changes to the other verbs may have been less competent in English or were too involved in reading for content to notice language problems. By contrast, readers who noticed the ‘wrong’ verbs, but did not change the tenses of grammatically correct verbs were competent in English but seemed to be endorsing tense use that might run counter to the paradigm of tense use in Anglo science. They corrected verbs at grammatical level, but not at discourse level. Readers who corrected ‘wrong’ verbs and also made tense changes to otherwise correct verbs, i.e. corrected verbs at both these levels, could be said to be competent in English and sensitive to genre convention.

Table 8.6 shows the ‘wrong’ verbs and frequencies of readers’ response to them. It is clear that NSs made more corrections to these eight ‘wrong’ verbs than the NNSs: in only one instance did the NNSs outnumber the NSs in correcting a ‘wrong verb’. It is not possible to say whether the NSs corrected more ‘wrong’ verbs because they read the texts more closely, or because of their superior knowledge of English.

That the NSs noticed more of the wrong verbs and also changed more of the present tense verbs to past tense is confirmed by the results of a correlation analysis of verb alertness and changes of present tense to past tense for Texts A and K (the two texts with ‘wrong’ verbs). The correlation is significant (Pearson correlation, 1-tailed test, \(r = 0.504\), which is significant at the 0.01 level). This suggests that the large zero response to present tenses (Figure 8.1) is attributable to NNS’s lack of competence in English.

However, to attribute the zero response in the three texts to lack of competence in English is to oversimplify. If this reason did hold, then readers would have responded consistently across all three texts. They did not. Only six of the 45 readers made present to past tense changes in all three texts. In

\(^{14}\) The ‘became’ in lines 31-32 of K was not included as a ‘wrong’ verb, because it can be retained if the adverbial phrase ‘only recently’ is moved to in front of it. (‘Only recently, the taxonomy of Rubus subgenus Rubus in northwestern Europe became clear (Weber 1985, 1995).’)
Table 8.6 The ‘wrong’ verb forms in Texts A and K and their frequency of correction as percentages of NS, NNS and total readers

<table>
<thead>
<tr>
<th>Text &amp; grid ref.</th>
<th>‘Wrong’ verb (in italics) plus some text for context</th>
<th>Readers who corrected verb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>As % of NSs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N = 14</td>
</tr>
<tr>
<td>A 3/8</td>
<td>Comparative studies with respect to plant morphology were often done in short term experiments</td>
<td>71</td>
</tr>
<tr>
<td>A 13/13</td>
<td>Although these species can not be compare directly with perennial species…</td>
<td>71</td>
</tr>
<tr>
<td>A 25/4</td>
<td>Our experiment would have give the same results… [see next example]</td>
<td>64</td>
</tr>
<tr>
<td>A 25/15</td>
<td>[continued from above]… if a growing period of 4 weeks was considered</td>
<td>14</td>
</tr>
<tr>
<td>A 30/12</td>
<td>This trend was generated by high values of two out of 8 tested species and the level of significance was also disappearing at later harvests in the low nutrient treatment</td>
<td>64</td>
</tr>
<tr>
<td>A 103/6</td>
<td>We did not found species from a nutrient poor successional stage to have a superior architecture or allocation</td>
<td>93</td>
</tr>
<tr>
<td>K 2/8</td>
<td>In The Netherlands, vegetation mapping is being carried out routinely by the State Forest Service, the Society for Nature…</td>
<td>36</td>
</tr>
<tr>
<td>K 32/14</td>
<td>Still, many national floras are not fully covering the subgenus</td>
<td>57</td>
</tr>
</tbody>
</table>

other words, only six readers seemed to have been applying the ‘rules’ of tense use in scientific English consistently (remember, the tense changes were not a response to wrong grammar). Twelve readers (one American, one Dutch, two German, two Swedish, two French, two Spanish and two Japanese, together accounting for 27% of the total readers) made no present to past tense changes in any of the texts. Lack of proficiency in English does not necessarily account for their behaviour: eight of them (including the American) corrected at least one wrong verb – indeed, the American corrected several. It seems possible that they did not change the present tenses because they did not find them incongruous or inappropriate.
Only four readers (one German, one French, two Spanish) made no verb-related changes, i.e. did not correct ‘wrong’ verbs or change tenses. These readers might have been less proficient in English, or did not know the genre tense conventions, or both.

Further evidence of readers apparently behaving inconsistently between texts is that 27 of the 33 readers who did change present to past tense made no such changes in at least one of the texts.

The picture that is emerging is that differences in tense use between the texts were influencing the readers’ responses. Given these intertextual differences, with Text A being most different (the smallest percentage of present tense verbs and the most wrong verbs), a simple explanation is that the order in which the readers read and annotated the texts might influence their response. I had, however, acted to prevent such an effect by assigning readers randomly to one of the six possible reading permutations. Univariate GLM analysis with reading order (whether a text was read first, second or third), reviewer status, text and either native-speakerhood or country as fixed factors confirmed there was no effect of reading order.

Extreme reader response

The tense use in Texts K and R provoked extreme responses from two readers: in Text K, one British reader, B3, changed 14 present tense verbs to past tense and in Text R made 39 such changes. (This was not the reader referred to in the second paragraph of this chapter, who made commentarial annotations on tense use in each of the three texts. Nor was it the British reader mentioned in chapter 7, who made many alterations that affected hedging.) Reader B3 is clearly visible as an outlier in the histograms for Texts K and R (Figure 8.1). Also in Text R, a Japanese (J1) changed 31 present tense verbs to past tense. Expressed as proportions of the present tense verbs in the text concerned, B3’s tense changes affected 34% of the present tense verbs in Text K and 49% of the present tense verbs in Text R. This means that he changed the proportions of past tense verbs in Texts K and R from 5% and 8% to respectively 37% and 52%. In other words, this British reader achieved a greater rhetorical shift (changing the status of the information to mark it explicitly as specific to the study) in Text R than in Text K. The extreme behaviour of readers B3 and J1 greatly influenced the data shown in Table 8.4; if their changes are ignored, the shift from present to past shown in that table would be much less dramatic.

The raw data on the tense changes reveal that B3 and J1 disagreed about which verbs needed to be changed from present to past. For example, in Text R they overlapped on 26 of the verbs they changed from present to past tense, but there were 19 present tense verbs that only one of them changed.
J1 was the reader who made the most present to past tense changes (14) in Text A too. In that text, reader B3 was not the NS who changed the most present tenses to past; five other British readers surpassed his eight changes. B3 and J1 seem to have been so preoccupied with tense appropriateness that neither of them corrected any of the ‘wrong’ verbs.

**How reader attitude might affect tense change**

One trigger to a reader’s reaction to tense use in a text may be the way a text starts off, because it is in the opening sentences that the author sets the time frame and reveals his or her command of English. Text A starts off with a wrong past tense verb in the very first line and an infelicitous present tense (a past tense would have been more usual) three lines later. The reader therefore gets an early signal that the author is not skilled in English, so may be less likely to tolerate the tense mixing that occurs throughout the text (remember, this text had the most past tense verbs). Text K also contains a ‘wrong’ verb in its first line (a present progressive which should be a simple present), but its first 14 lines are consistently in the present tense (seven verbs). Text R has no ‘wrong’ verbs. Its first three sentences are in simple present tense. The fourth contains a perfect tense (passive voice), but this does not jar with the simple present tense verbs that follow the colon. Present tense is then maintained consistently for a further six sentences. So, of all three texts, Text A is the one most likely to wrongfoot the reader.

**Which present tense verbs were changed**

In Texts K and R the number of present to past tense changes a reader made per text was generally very small (see Figure 8.1). In terms of the individual verbs changed, rather than of the individual readers making the changes, the frequencies were also generally low. Though many verbs were changed from present to past, few were changed by more than several readers. In Texts K and R the highest frequency of a change from present to past was six, but in Text A there were two verbs that over 15 readers changed from present to past. What was it about these two instances of the present tense that attracted the attention of so many readers? The first (grid ref. 22/13) was a present tense embedded in a sentence written in the past tense. Fifteen readers changed it to past tense; eight of these were NSs (57% of the 14 NSs). In [14], the verb in question is shown, underlined, in its paragraph.

[14] Adapting the theory of Tilman(1985,1988) we would expect species adapted to nutrient poor systems to be specialized to capture nutrients and have a high root fraction and a high specific root length compared
to species from a nutrient rich environment. Results presented here contradict these expectations. At harvest 4 within the species *Holcus* and *Rumex* (from a nutrient rich perennial stage) were found to have the highest root fraction and within the grasses *Holcus* have the highest specific root length.

(Text A, lines 17-23)

Changing the ‘have’ to ‘had’ resolves the tense inconsistency within the sentence which, arguably was an error (the omission of ‘to’ in front of the verb). In this case, therefore the prime motivation for the tense change cannot have been to mark the research-specificity of the information conveyed by the verb. Three NNS readers corrected by inserting the ‘to’, another removed the ‘have’ altogether.

The second present tense hotspot on which readers converged was in the first sentence of the final paragraph of the text, which appeared under the heading ‘Conclusions’:

[15] In this research we examine biomass allocation, architecture and plasticity of species from different successional stages of an old field succession.

(Text A, lines 96-97)

In this case, the 18 readers who changed the tense (nine were NSs, this is 64% of the NSs) presumably did so because they felt it incongruous to refer to completed research in the present tense. We could conclude, however, that because most of the readers did not change the tense, it is acceptable (though possibly not optimal). Arguably, had the sentence appeared at the beginning of the Discussion, before the author had established the tense framework of the Discussion section, fewer readers might have changed the tense from present to past. Readers may even have changed the aspect, to present progressive (‘In this research we are examining…’).

**Changing past tense to present tense**

Having discussed the changes of present to past tense, I propose to consider the changes that went the other way: from past tense to present. According to the paradigm of tense use in scientific English, such a change would elevate the applicability of a piece of information, implying that it is a general truth rather than specific to the research being reported. There were only 23 instances of past tense being changed to present tense. This reflects the lower incidence of past tense verbs in the texts (see Table 8.1).
Looking at reader behaviour across the three texts, it is again clear that Text A elicited a different response. This text, which had the most past tense verbs (36, which represents 33% of the verbs in that text), attracted all but one of the 23 past to present tense changes. The remaining past to present tense change was made in Text R.

Table 8.7 shows the distribution of the past to present tense changes in Text A, by country. The data are too sparse for meaningful statistical analysis. The maximum number of past to present changes, four, was made by two readers: one Dutch and one Catalan (i.e. Spanish). One Briton who made one past to present change in Text A also made one such change in Text R.

<table>
<thead>
<tr>
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<td>0</td>
<td>3</td>
<td>6</td>
<td>1</td>
<td>23/45</td>
</tr>
</tbody>
</table>

Looking at the verbs in Text A that were changed, specifically at those changed most often, two ‘hotspots’ emerge:

[16] Comparative studies with respect to plant morphology were often done in short term experiments (grid ref. 3/8)

and

[17] These species have a higher specific leaf area, specific shoot height and a higher or equal specific root length and were able to adapt their root investment to nutrient poor environment. (grid ref. 43/10)

The first of these was changed to a present tense by four readers, all NSs (two American, two British). The second was changed to a present tense by six readers (two were NSs). As the first hotspot was one of the verbs used to measure ‘verb alertness’ (Table 8.6), the four past to present tense changes
of this verb were included in the data pertaining to this ‘wrong’ verb. In this case, therefore, changing the past tense to the present tense can be seen primarily as a response to a grammatical error; the shift from specificity to universality it achieves could be a secondary consideration. Note that the other nine readers who noticed and corrected this verb opted to retain the past tense but change its aspect to the perfect.

In the second hotspot, the change can be attributed to an attempt to achieve tense consistency within the sentence. Instead of changing the ‘were’ to ‘are’, it is also possible to achieve tense consistency by changing the first verb in the sentence (‘have’) from present to past. Two readers (Spanish and French) did so.

The grid references of the other past tense verbs changed to present tense in Text A are 41/1, 53/2, 77/3, 81/5, 82/1, 86/3, 99/2, 106/12. In five cases (53/2, 77/3, 86/3, 99/2, 106/12), the change can be attributed to a desire to achieve tense consistency within the sentence. In one case (41/1) two NSs changed ‘Grimes stated’ to ‘Grimes states’, a change that Swales (1990) would characterise as emphasising the relevance of Grimes’s work to the work being discussed. The remaining two cases are the clearest examples of a tense change that achieves a shift towards universality. The two verbs concerned occur in the same sentence, and were changed by the same two readers (Spanish and French):

[18] With the increase of nutrient availability the herbs invested more in stems at the expense of roots while grasses invested in both leaves and stems.

(Text A, lines 81-82)

The rhetorical effect of the changes is to mark the findings as a research conclusion that has applicability beyond the study being described.

**Discussion**

Having dealt comprehensively with question 3 (Why did the Dutch authors prefer the present tense?) in Part 2 of this chapter, I propose to restrict this discussion to questions 1 and 2:

1. Why did the readers respond to the tense use?
2. How did they respond to the tense use in the texts, and why?

The explanation of the tense conventions in scientific English given in Part 1 of the chapter revealed that scientists are not supposed to use present tense to report the findings or results of the research or experiment that is the subject
of their paper. So, the simple answer to question 1 is that the readers were responding to unconventional tense use. This is certainly what motivated reader B3 to change so many present tenses to past tenses. In 2000 he responded by e-mail as follows to my request for clarification of his motives:

I think the reasons for my changes were based on correcting unconventional use rather than errors in grammar. I think this is due to an opinion that results and conclusions from experimental studies are reporting on past events. In the context of this paper (Text R) I believe it is correct to say ‘... grasslands are mown at the end of the growing season,’ as this reports ongoing events. However, reporting on your results, for example, ‘both species richness and diversity are strongly correlated’, is actually claiming more than you measured. The correlation holds only for the period over which the information was gathered. Though it probably still holds now, it may not do, and should be reported in the past tense.

It is a long time ago when I was at University (15 years) so I can’t really remember if I was taught it or learned it by imitation. I was never taught directly about how to write, but it must have occurred through comments on written work. It may even have been drummed into me at school. However, I must admit that I still sometimes lapse into the present tense, and have to be on my guard when I revise texts to ensure I am consistent.

If pressed on my opinion on the affects of the present tense on the impact of science reporting, I would have to say that it can bias the impact of what is written. The present tense provides a greater immediacy and certainty to science writing, but at the expense of ‘humbleness’. By that I mean that ‘science’ is a collection of hypotheses of various power and consistency, and our goal as scientists is to ‘refute’ these hypotheses if we can. Science is not a field of certainty and reporting it in such terms is counter productive in the long-term.

Part 3 of the chapter indicated that the readers’ response was not clear-cut; the pooled data on present tense changes conceal a wide variety in the frequency of these changes, in terms of number of changes made per reader, number of changes made per text and also the actual verbs that were changed. To attribute the tense changes recorded in this study to readers’ response to a mismatch between the tense in the text and the genre convention on tense use (the hypothesis posed on page 230) is, therefore, to oversimplify. Such a response would have produced a much clearer signal, one comparable to that of readers B3 and J1.
The differences in readers' response seem to indicate that deciding on appropriate tense use (‘universal present’ versus ‘specific past’) in science reporting is very subjective. The overwhelming zero response to the present tenses in the texts implies that most readers found this tense use acceptable. Readers B3 and J1 could then be seen as applying a genre norm of tense use obsessively.

Whether readers overlooked or concurred with the verb tense, the fact that rarely more than three readers homed in on and emended a present tense also suggests that readers can and do infer a past time domain for the (scientific) information presented in the present tense. This would enable a reader to understand the presented information as being pertinent to the research being described, rather than as being universal scientific truth. It is this acceptance that allows the genre convention to be broken, but for acceptance to be possible, the context must provide the reader with sufficient clues about timeboundedness. For, as Comrie (1985) contends, implicature is crucial to how the tense is interpreted by the reader, who makes use of ‘other features of the structure of the sentence’ and ‘knowledge of the real world’. In the present study, therefore, to answer the ‘why?’ of question 2, the differences between the texts (i.e. between the authors), not only in the degree of tense mixing but also in the presence of other textual features that enabled readers to infer the temporal context, are crucial.

Previous research has demonstrated the role played by textual clues in enabling readers to infer temporal context. In their reception study using three NNS Introduction sections of English-language research articles, Chappell and Rodby (1983) demonstrated that time adverbials send strong signals about the time domain of a tense (fulfilling a signalling role akin to the date heading at the top of Dutch Minutes reported in the present tense). Their English NS readers judged that the most easily comprehensible versions of three test texts were those rewritten to include explicit time signalling by such adverbials. Significantly for my study, most of Chappell and Rodby’s readers had no problems with the tense switching in the texts, whose authors were NNS graduate students. The only readers who showed strong preference for tense consistency (text versions rewritten in a single tense) were the teachers of English as a foreign language!

The readers in my study seem to have behaved like the ‘normal’ readers (i.e. not teachers of English) in Chappell and Rodby’s (1983) study. They presumably relied on textual clues about the temporal context, plus their knowledge of the science involved, and were therefore able to infer that certain present tenses in the Discussion texts referred to research-specific results rather than to universal scientific truths. This would explain why for Texts A, K and R it was possible for the ‘zero tense changes’ category to contain the most readers. With the exception of the tense-alert readers B3 and
J1, those readers who did change present tenses to past tense presumably made strategic changes – at points in the text where they felt it was necessary to be reminded of the timeboundedness of the information being presented. Once this reminder has reinforced the reader’s perception of the reported findings, the reader can then cope with more information being presented in the present tense, because he or she ‘knows’ that it refers to the past (i.e. to the specific results of the reported research). In this way, the occasional past tense would function as a ‘time framer’, in the same way as the adverbials used by Chappell and Rodby. In my study, the readers who changed tenses differed in where they strategically sited the ‘reminding past tenses’, but the fact that they did change a few tenses from present to past suggests that obeying a genre convention (‘past tense signals findings specific to the given research’) does not mean that tense has to be used inflexibly.

When present tense ‘means’ past, but there are not enough other clues about temporality

There is some evidence that readers may have been confused by the predominance of present tense in the texts and were unable to use textual clues to assign timeboundedness to some of the present tenses. Consider the following comments made by two readers in Part 1 of the survey, after reading Text K:

[19] The author does not refer to his own results in the discussion section, so the ideas are exposed in the text without introduction. That caused some confusion to me when I first read the paper.
(Spanish reader C5)

[20] It is very unclear how the results of this study relate to previous findings. No comparisons are made. The Discussion actually gives the impression that only previous studies are discussed.
(Swedish reader S1)

In Part 2, the Spanish reader made only one tense change in Text K (23/11): changing a present tense to past, to preserve tense uniformity in a sentence that had a past tense verb near its beginning. The Swedish reader made no tense changes in Text K.

It seems that the consistent use of present tense throughout Text K caused both readers to interpret all the information presented as drawn from other studies. But the author did use tense to signal a switch from a discussion of generalities and previous findings (lines 2-15) to a discussion of his own findings. The transition, shown in the first line of [21], is where there is a past
tense (all past tenses in this extract are sown in bold) signalling that the author is moving from generality to his own work. The subsequent present tenses (underlined) refer to that work. The switch back to generalisable findings of others is indicated by a past tense in the penultimate sentence in [21].

[21] We studied the ways in which these decisions affect vegetation classifications. For classifying the vegetation of separate, though nearby, areas, a broadscoped classification key is not necessarily preferable to a narrow-scoped key. Imposing a classification of one area to the other area changes the classification of that other area when compared with its original classification. Most precise is to classify these areas separately. Hogeweg and Beeftink (1976) obtained similar results. They separately clustered…

(Text K, lines 16-21)

Had the present tenses in the second, third and fourth sentences of [21] been linked more explicitly with the author’s own research (for example, by starting the second sentence with ‘Our results show that’), the ambiguity would have been removed. It seems likely that many of the 45 readers, especially the NNSs, may have been wrongfooted by such instances of implicit tense signalling – in which case, they will have misinterpreted the significance of the information presented by the author. For this reason, NNSs, who may find it difficult to deploy anaphora and other devices to make their written English cohesive and explicit, would be advised to adhere to the conventions of tense use in scientific English.

The role of readers’ native writing culture and of reviewer status

Though the results show that NSs made more tense changes than NNSs, it is not possible to say whether they corrected more ‘wrong’ verbs because they read the texts more closely, or because of their superior knowledge of English. The results do not allow firm conclusions to be drawn about whether the language background and hence the ‘culture of scientific writing’ of the readers affected their interpretation of the verb tenses in the texts. Neither is it possible to say, in the case of readers from cultures in which present tense is

\[15\] Further evidence of the ambiguity of the present tense is provided by a comment by a French reader (F4) on Text R: ‘I had some problems whether the verbs should be written at the present or past’. In the other texts, this reader tried to apply English tense conventions.
commonly used to describe past events, that they were less likely to change verbs from present to past.

The finding that reviewer status became significant in the second analysis, which took account of reader’s country, suggests that analysing at this level allowed the performance of the NNS reviewers in the country groups with few subjects to emerge as important. The implication is that these reviewer readers (and the NS reviewers) were indeed acting as gatekeepers to the scientific community, by trying to apply the anglophone convention of using the past tense for one’s own research findings. This could explain why neither the Dutch readers (expected to share the authors’ tense perceptions) nor the French readers (recall the French convention for reporting science in the present tense) made the fewest tense changes; in both these groups, the reviewers behaved more internationally than chauvinistically.

It is not clear why the British readers in this study tended to behave differently from the other readers – including the Americans – in their present to past tense changes. The fact that B3 did not correct any ‘wrong’ verbs indicates the possible importance of ability to cope simultaneously with errors at various levels in the text. Noticing and correcting ‘wrong’ verbs requires paying attention to more superficial levels of the text (spelling, grammar); noticing and correcting tense use that contravenes tense conventions in reporting science requires the reader to operate at a deeper level (James’s (1998) ‘discourse’ level, at which the reader relies on knowledge of the genre conventions). Just as in the case of the data I collected on epistemic versus typographical changes (Figure 5.1), it seems that few readers were able to operate simultaneously at several levels of text revision – even when the revision was of verbs (compare the results of Broekkamp and van den Bergh’s (1996) study).

**NSs’ assessment of tense in NNS science writing**

The finding that NSs tended to make more changes to the tenses needs to be discussed in the context of previous research that has considered NS response to NNS tense use. There is certainly evidence that tense use in the scientific English of NNSs is seen as a problem by NSs who are not teachers of English but who have been asked to assess or correct texts in some way. Vann *et al.* (1984) looked at the responses of US university teachers in the sciences and social sciences who had been asked to assess the acceptability of the written English of NNS students studying their subject. One finding was that the ‘least acceptable’ errors were those that ‘for the most part are global and/or are relatively rare violations for native speakers’. This group included syntax, lexis – and verb tense. Fletcher (1995) spent two years in Taiwan as a visiting scientist, during his stay also editing biomedical papers written by his Chinese
colleagues. He analysed the ‘grammatical errors’ of 25 of these papers and reported that the two most important errors were article and tense use. Neither Vann and colleagues nor Fletcher gives examples of the tense corrections, so we do not know if they were a clear-cut response to grammatical error – the progressive instead of the simple form, for example – or to a perceived mismatch with tense conventions. When dealing with manuscripts by NNSs, NSs might correct didactically, their motivation a desire to socialise the foreign writer into the international academic discourse community. (Compare Dudley-Evans’s (1991) study of the changes a UK biologist made to drafts of a British PhD student’s thesis). Three of the NSs’ marginal comments on tense in my study could be interpreted as being didactic in their intent:

[22]  ? Was this observed, in which case use past tense, or is it just a statement of logic, in which case use present tense.  
(British reader B2, marginal comment to lines 41-52, Text K)

[23]  In general, verb should be past tense for experimental results.  
(American reader A4, marginal comment to lines 3-20, Text R)

[24]  Past tense if this sentence reports an observation  
(British reader B2, marginal comment to lines 27-28, Text R)

Of course, an NNS who is aware of the international (i.e. English language) discourse community’s conventions may also feel the need to comment in this way. In the present study, a Spanish reader and a German reader did so:

[25]  Results should be presented in uniform tense.  
(summarising comment by reader G2 at end of Text A)

[26]  Should be in past tense.  
(summarising comment by reader C2 at top of Text K)

Conclusions

The findings on tense use and readers’ response to it described in this chapter confirm that tense conventions in scientific English can be (and are) disregarded. Though suggesting that some readers would like to see the tense conventions adhered to, they also show that readers (even NSs) disagree about which verbs need to be past tense to signal research specificity. Clearly,
presenting tense use in scientific English as inviolable rules oversimplifies actual practice and ignores readers’ abilities to infer meaning from context.

Though the data collected in this study appeared to support the hypothesis that mismatch with genre convention controlled the tense changes the readers made, closer examination of the readers’ response to the three texts made clear that such a conclusion is an oversimplification. What motivated a reader to make an individual tense change (whether from present to past, or vice versa) was often a desire to achieve tense consistency within a sentence or paragraph (a motive that Chappell and Rodby’s (1983) teacher readers would presumably have applauded). The changes were more likely to be made by NSs than NNSs. But, looked at globally, what most of those readers who changed tenses from present to past seem to have done is to apply the tense convention selectively, generally allowing present tense to remain and be implicitly interpreted as referring to the findings specific to the reported research. This acceptance of a tense mix agrees with the analyses of English research articles carried out by, among others, Swales (1990). It seems, however, that ‘overmixing’ (as occurred in Text A) can cause problems to readers.

Given that tense use conventions in English scientific and academic writing are not adhered to slavishly by NSs (as explained at the start of this chapter), it is difficult to be sure about what underlies the way competent NNSs handle verb tenses in written scientific English. When writing or reading scientific English, do they rely on their L1 conceptualisation of the temporality signal conveyed by tense? Or do they behave like NSs who use tense grammatically but ‘unconventionally’ and yet nevertheless pass the scrutiny of journal editors and referees? Though it seems to be acceptable to mix tenses and to break with tense conventions in scientific English, to assist the reader other aspects of the English must be sound. (For example, there must be sufficient explicit clues about the timeboundedness of the verbs). Furthermore, there must not be too much tense mixing within sentences. If a text contains overt verb errors, especially at its beginning, it seems that readers will be less likely to accept tense use that deviates from the conventions in scientific English. They may then also interpret tense mixing as indicating learner ineptitude rather than as the author attempting to signal stance towards the information being presented.

It can be concluded that the easiest way to minimise miscommunication about the generality or specificity of the information being presented is to keep to the tense conventions in scientific English. This is certainly the safest option for NNS writers.

To reinforce the tense conventions, and to avoid misunderstanding or confusion arising from the signals conveyed by verb tenses in scientific English, authors, editors and reviewers should ensure that there are sufficient
other contextual clues indicating whether information has a narrow or broad applicability. If this is done, then even ‘unconventional’ present tense use, whether attributable to learner English, or to ignorance of conventions or transfer of conventions from another language, or to a desire to write vividly and forcefully, will not transmit a misleading scientific message.
Chapter 9

Discussion and conclusions

Recapitulation

This thesis set out to characterise Dutch scientific English and to explain how and why it differs from NS scientific English. It also aimed to find out how this variety of NNS English is received by NS and NNS readers from the discourse community. To achieve these aims, I used a combination of approaches. In chapter 3 I described how Dutch scientists nowadays become proficient in English. To set this proficiency in context, I outlined how, over the preceding centuries, the international reporting of science from the Netherlands has shifted from language to language and only since the mid-20th century has been in English and hence has had to cope with English conventions of reporting science. I suggested that traces of the writing cultures that Dutch scientists operated within up to the mid twentieth century might be discernible in Dutch scientific English. I examined other researchers’ contrastive linguistic and rhetorical analysis of Dutch versus English, and of Dutch versus English and ‘Dunglish’, to identify traits that might occur in Dutch scientific English. I then presented a contrastive analysis of extracts from published Dutch and (British) English research articles, looking for evidence that these traits were indeed discernible, and also to see how other aspects of science writing (hedging, use of personal pronoun) were manifested in these two languages. This resulted in the identification of certain features likely to be transferred from scientific Dutch to scientific English: surface features (alinea’s, short sentences) and rhetorical devices (fewer hedges, and more forward referencing). It was argued that these features can be distinguished from the language-learner errors that may be transferred from Dutch to English.

Subsequently, in two small-scale studies (chapter 4) I looked at how Dutch and NS language professionals coped with inferring cohesion from an NS text from which connectives had been removed and from Dutch-authored English texts whose sentences had been jumbled. In these discussions and investigations two keywords crop up: culture and conventions. ‘Culture’ (in the connotation explained in chapter 1) has been invoked to account for the mindset of a writer or a reader in relation to the tasks of writing and reading. And within this mindset – indeed, within this culture – there are accepted (and thus expected) ways of writing: ‘conventions’. These conventions apply to writing in general (e.g. devices for achieving cohesion) and to the genre of the
research article in particular (e.g. subtle ways of signalling whether a piece of information is universally accepted, or is specific to a particular study).

Chapters 5 – 8 described the set-up and data collected in the reception study. The assessments of 45 NS and NNS readers of the same three texts, and their annotations, were analysed in the light of the insights obtained from the small-scale studies described in chapters 3 and 4. When analysing and discussing the data collected on cohesion, hedging and verb tenses, I referred to conventions relating to English and Dutch writing style in general and to scientific English, Dutch, and, in some instances, other languages. Again, links were sought with discourse culture, particularly that of the NS and NNS readers. Looking at the data in terms of readers’ native-speakerhood and reviewer status gave insight into the interplay between proficiency in English and knowledge of the genre requirements.

Outline of this chapter

This, the concluding, chapter, draws together the information the reception study yielded. From the findings on the texts and their authors, plus the information gleaned from the studies presented in chapters 3 and 4, some general conclusions are drawn about Dutch scientific English. In addition to giving insights into problematic features of the English and discourse of the test texts, the readers’ response also indicates whether there are differences between the reactions of NSs and NNSs on the one hand, and, on the other, those of reviewers and ‘normal’ (non-reviewer) readers. From the readers’ responses it is also possible to infer the revision strategies used.

Having synthesised the findings of the reception study, I then critically assess that study.

This chapter will also note the implications of the findings presented in this thesis for applied linguistics theory and for groups in praxis. Particular attention will be paid to Dutch scientists wishing to publish in English and to the authors’ editors who help them do so. Finally, as is customary in concluding thesis chapters, avenues for further research will be indicated.

General conclusions about the three texts

Table 9.1 (pages 256-257) shows the fate of the texts and summarises the main findings of the reception study. Analysis of the readers’ comments and annotations indicated differences in the texts, which reflect differences in the writing styles and skills of the three authors.

One point that emerges from the reception study is the authors’ lack of proficiency as writers. (An attribute that, in the case of authors A and R, must have contributed to the decision to send their texts to an authors’ editor.)
Whether this lack of proficiency is attributable to writing in a foreign language, or to inexperience in writing per se, or to both of these, it impacts on the three features of Dutch scientific English examined in chapters 6 – 8: cohesion, hedging and verb tenses. In the case of cohesion, it resulted in overuse of sentence-initial ‘This’ by author A, and clumsy repetition by author R. Its impact on hedging was clear in the writing of author A, whose limited lexis stimulated readers to respond by substituting other words, which then affected the strength of the claim being made. Finally, lack of proficiency affected verb tense use, as evidenced by the ‘wrong’ verbs in Texts A and K.

From the above, it is clear that any attempt to draw conclusions about the generic features of Dutch scientific English from this reception study have to take account of the authors’ shortcomings in English. To rule out the possibility that a feature of Dutch scientific English is a learner error, it must be shown that the feature in question occurs in written Dutch, better still, in scientific Dutch. I will return to this later in this chapter.

What the reception study revealed about the readers

In chapter 5 it was noted that the analysis of the annotations was intended to investigate the validity of the assertions I had made about the candidate features of Dutch scientific English proposed in chapter 3. Because of this, I looked at certain categories of annotations and did not attempt to explain each annotation made: by so doing I kept the focus on certain textual features. Below, I will therefore consider the readers’ actions mainly in relation to these features of Dutch scientific English. I will conclude this section by briefly discussing the readers’ general revision strategies.

The importance of native-speakerhood and reviewer status

The different language backgrounds and varied experience in assessing English-language scientific manuscripts of the 45 readers in the reception study allowed me to examine the possible influences of native-speakerhood and reviewer status on their annotations, although the small size of the country groups prevented me from looking in detail at differences in reader response that might reflect differences in writing culture.

The hypotheses tested in chapters 5 – 8 involving native-speakerhood and reviewer status expected the NSs to have a better command of English than the NNSs, and to be more aware of the requirements scientific English should meet. NSs were thus expected to be better able to notice and correct NNS errors and infelicities. The readers who were reviewers were expected to be more experienced in assessing the publishability of English-science texts. (Recall that a reviewer was defined as someone who had reviewed at least one
Table 9.1 The three test texts: an overview of the findings of the reception study

<table>
<thead>
<tr>
<th>Feature</th>
<th>Text A (1425 words)</th>
<th>Text K (695 words)</th>
<th>Text R (1150 words)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fate of text</td>
<td>Corrected by an NS authors’ editor. Published in a PhD thesis in 2000 and after major author’s revision in Plant Ecology.</td>
<td>No further developments. (Had been published in a PhD thesis.)</td>
<td>Corrected by an NS authors’ editor. Published in Biological Conservation (after author’s revision).</td>
</tr>
<tr>
<td>Readers’ assessment of English</td>
<td>Poor to adequate.</td>
<td>Adequate to good.</td>
<td>Adequate to good.</td>
</tr>
<tr>
<td>Assessment of style</td>
<td>Scored worst.</td>
<td>Scored best (Table 5.9).</td>
<td></td>
</tr>
<tr>
<td>Assessment of editing/revision required</td>
<td>Deemed to need the least revision (Table 5.10).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment of sentence length</td>
<td>The most satisfactory mix of sentence lengths.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading time of readers</td>
<td>Greatest variation between readers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moved/deleted chunks of text (&lt;1 sentence)</td>
<td>Fewest deletions and moves of chunks of text.</td>
<td>Most deletions and text moves. Weak beginning and end.</td>
<td>Most confused picture: only 7 lines in entire text were not deleted or moved.</td>
</tr>
<tr>
<td>Sentence focus</td>
<td>Greatest problem with sentence focus (Table 6.1).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paragraphing</td>
<td>No alineas; use of subheadings.</td>
<td>Among the paragraphs there was one alinea.</td>
<td>Longest paragraphs. Also 2 alineas.</td>
</tr>
<tr>
<td>Text coherence as revealed by readers’ actions</td>
<td>Clumsy anaphoric cohesion (overuse of sentence-initial ‘This’). Had the most interventions to shorten sentences (deleting redundant phrases, inserting full stops).</td>
<td>Attracted the most comments on poor flow. Had the most scope for sentence-lengthening strategies. Insertion of connectives was important.</td>
<td>Clumsy use of repetition to create cohesion. Insertion of connectives was most important coherence-improving strategy.</td>
</tr>
</tbody>
</table>
## Conclusions

<table>
<thead>
<tr>
<th>Feature</th>
<th>Text A</th>
<th>Text K</th>
<th>Text R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hedging</td>
<td>Greatest reader convergence to make changes affecting hedging. The response was largely to do with inadequate lexis (overuse of certain verbs).</td>
<td>More hedging-related adjustments than Text A. Hedging tended to be added or intensified.</td>
<td></td>
</tr>
<tr>
<td>Verb tenses</td>
<td>Preponderance of past tense verbs in Abstract: very few present tense verbs. Body of text contained the most past tense verbs (33%) of all 3 texts and therefore had most past to present changes. Readers changed 41% of the present tense verbs to past tense. If all readers’ present to past tense changes had been implemented, the increase in past tense verbs would have been 183%. Text contained 6 ‘wrong’ verbs, and wrong verbs occurred early, wrong-footing readers.</td>
<td>Verbs in Abstract almost equally mixed between past tense and present tense. Most (~90%) of the verbs in the body of text were in present tense. Readers changed 42% of these to past tense. If all readers’ present to past tense changes had been implemented, the increase in past tense verbs would be a massive 950%. Text contained 2 ‘wrong’ verbs.</td>
<td>All the verbs in the Abstract were past tense. Most (~90%) of the verbs in the body of text were in present tense. Large number (20%) of the present tense verbs were passives. Readers changed 58% of the present tense verbs were changed to past tense. If all readers’ present to past tense changes had been implemented, the increase in past tense verbs would be a huge 757%. Text contained no ‘wrong’ verbs. This text attracted the ‘extreme’ responses of B3 and J1.</td>
</tr>
<tr>
<td>Sentence focus</td>
<td>Greatest problem with sentence focus. (Table 6.1)</td>
<td></td>
<td></td>
</tr>
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</table>

*English-language paper.* They could be expected to be more aware than non-reviewers of the genre requirements texts for a scientific journal should meet, so they would be more likely to make genre-based annotations, even if their NNS background made it difficult for them to improve the texts linguistically.
Table 9.2, an overview of the main findings of the analysis of the annotations, shows the influence of native-speakerhood and reviewer status. The NSs and NNSs were equally active in reacting to perceived shortcomings in scientific content – a response that showed that when reading the texts, both groups drew heavily on their content schemata. It is in itself interesting that these readers paid attention to the scientific integrity of the texts, even though they had been asked to focus on the linguistic aspects (the ‘Dutch scientific English’). That reviewers were more likely to make epistemic annotations confirms the role these experienced scientists have within the discourse community: to act as gatekeepers to publication. These findings may be compared with those of Gosden (1995), who reported that 24% of the revisions the seven Japanese PhD supervisors made to their students’ texts were the addition of technical detail, making this the second most important class of revisions in his study. A study of the revisions made to seven biomedical manuscripts as a result of peer review and editorial revision also found that one of the two main triggers of changes was missing information (Purcell et al., 1998).

The other type of annotation in which NNSs were not disadvantaged vis-à-vis NSs and in which reviewers were more active than non-reviewers, was in deleting or moving chunks of text longer than one sentence. The same reasons as those given above apply here too; in fact, it could be argued that recognising and acting on text redundancy is another manifestation of attention being paid to the scientific integrity of the text. Indeed, in their study, Purcell et al. (1998) mentioned changes triggered by extraneous information immediately after changes triggered by missing information. In that study and the reception study, the deletions can be attributed to the readers being content-driven. So can the epistemic annotations of the reception study. Content-driven responses of this type do not fit easily into the three-tiered James (1998) model of error analysis (Figure 2.2), but can be accommodated in the substantive editing part of the revision continuum (Figure 2.3).

From the importance of NS activity in removing full stops, inserting cohesive devices, and correcting ‘wrong’ verbs (Table 9.2) we may conclude that compared with the NNSs, the NSs were indeed better able to emend linguistic and stylistic shortcomings in the texts. That proportionally more reviewers than non-reviewers made the first two of these annotations might be because the reviewers were more accustomed to making stylistic improvements to English-language science manuscripts; here too, the criterion for ‘reviewer’ used in this study could have been important.
Table 9.2 Overview of certain findings about the readers ($N = 45$) and their revisions, considering the readers in terms of native-speakerhood and reviewer status

<table>
<thead>
<tr>
<th>Types of annotation and the motives for making them</th>
<th>Readers’ response, as NSs ($N = 14$) versus NNSs ($N = 31$)</th>
<th>Readers’ response, as reviewers ($N = 28$) and non-reviewers ($N = 17$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epistemic annotations (A response to shortcomings in the scientific content)</td>
<td>NSs and NNSs were equally likely to make such changes (chapter 5).</td>
<td>Reviewers were more likely to make such changes (chapter 5).</td>
</tr>
<tr>
<td>Removal of full stops (A response to short sentences and clumsy cohesion.)</td>
<td>Larger proportions of NSs than NNSs removed full stops in the three texts (Table 6.4).</td>
<td>Larger proportions of reviewers than non-reviewers removed full stops in the three texts (Table 6.4).</td>
</tr>
<tr>
<td>Insertion of cohesive devices (A response to poor text flow.)</td>
<td>Larger proportions of NSs than NNSs inserted cohesive devices in the three texts (Table 6.6).</td>
<td>Larger proportions of reviewers than non-reviewers inserted cohesive devices in the three texts (Table 6.6).</td>
</tr>
<tr>
<td>Moving/deleting text chunk of &gt;1 sentence (A genre-driven response, motivated by opinion of what a Discussion section should contain.)</td>
<td>Larger proportion of NNSs made this type of annotation: 48% NNSs versus 28% NSs (chapter 6).</td>
<td>This type of annotation was made more by reviewers than by non-reviewers: 50% of reviewers versus 29% non-reviewers (chapter 6).</td>
</tr>
<tr>
<td>Adjustment to hedging (A genre/rhetorical response, motivated by opinion of how assertive a claim should be; also a response to poor NNS lexis)</td>
<td>NSs removed hedges rather than added them (chapter 7). NSs more likely to adjust hedging (chapter 7).</td>
<td>Reviewers tended to add hedges, rather than delete them, but only when readers were considered in terms of country groups (chapter 7).</td>
</tr>
<tr>
<td>Changing present tense to past tense (A response motivated by flouting of genre convention; also a rhetorical response, toning down the assertiveness of a claim.)</td>
<td>NSs more active in changing present tense to past tense (Table 8.5).</td>
<td>Reviewer status only became significant in changing present tense to past tense when readers were considered in terms of country groups (chapter 8).</td>
</tr>
<tr>
<td>Correcting the ‘wrong’ verbs in the text (A response motivated by NNS error.)</td>
<td>NSs more active in correcting the wrong verbs (Table 8.6).</td>
<td></td>
</tr>
</tbody>
</table>
The influence of native-speakerhood and reviewer status on annotations that affected hedging and verb tenses is less clear-cut. In chapter 7 (see also Table 9.1) I showed that one of the triggers of annotations that adjusted hedging was the clumsy lexis in the texts. This problem was greatest in Text A. NSs reacting to the overuse of certain verbs (notably ‘cause’) by substituting another verb, often produced a subtle change in the strength of the claim being made. Their substituting of less blunt verbs for the over-used ‘cause’ in Text A contributed to the confirmation of the hypothesis that NSs were more likely to adjust hedges. It also led to the rejection of the hypothesis that hedges would be added, rather than removed, a hypothesis postulated because in chapter 3 I had shown that Dutch scientific English tends to be under-hedged. It was the British readers who were responsible for the unexpected rejection of the hypothesis: they removed significantly more hedges than the Germans and Spanish. They may have also been motivated by a desire to eschew ‘vague qualifiers’ (O’Connor, 1991) and ‘unnecessary hedging’ (Matthews et al., 1996). When the analysis considered readers in terms of their country (i.e. language), reviewer status was found to have an effect: reviewers tended to insert or strengthen hedges. This could have been because as gatekeepers to publication they were more critical of the authors’ justifications for making certain claims.

The way I recorded data on adjustments to hedging affected the above findings on NS and reviewer behaviour in changing hedges. It will be recalled that I did not merely count deletions and insertions that affected hedging, but also looked at substitutions, and gauged how these modified the author’s claims (strengthening or weakening them). I have already noted that some of these substitutions were triggered by clumsy and repetitive lexis, rather than by lexis that was inappropriate given the scientific justification for the claim. Furthermore, had I added the changes of present tense to past tense to the ‘hedges added’ category (on the grounds that changing present to past tense restricts the claim to the study described, rather than signalling that it is a widely held tenet of science: see Hyland, 1998a), then the NS changes would have swung in favour of inserting hedges. That reviewer status had no effect on the incidence of present to past tense changes suggests that the hedging signals transmitted in scientific English by verb tense are not as important as some scientists (e.g. Day, 1995) assume. The results I have reported on verb tense changes confirm what Swales and Feak (1994) and Weissberg and Buiker (1990) found in their analyses of published scientific research articles: that tense conventions are flouted. This reception study has shown the varied and generally unsystematic reaction to such ‘transgressions’. Only two readers (one NS and one NNS; both reviewers) emended present tense to past tense systematically. I argued that what causes NSs and NNSs or reviewers and non-reviewers to emend a tense from present to past is not simply better
knowledge of English or a desire to uphold convention, but has to do with other shortcomings in the text. For example, a sentence may contain an infelicitous mix of tenses, or lack explicit signals that the information it contains refers to the author’s findings or actions.

When they adjusted hedging and changed verb tenses, readers were operating in the ‘interpersonal’ domain of the text (Gosden 1995), i.e. modifying the relationship between the writers and their audience. These annotations can therefore be positioned in the discourse level the James model shown in Figure 2.2; in the revision continuum, Figure 2.3, they would again be within the zone of substantive editing.

Magnitude of the response and its relation to readers’ proficiency in English

When discussing the readers’ annotations, I noted that the response was generally patchy and often inconsistent. For the two broad categories of annotation that attracted the greatest reader response, hedging and verb tense changes, the reader participation was respectively 47% and 69%. Participation in the cohesion-related categories was generally well below 50%. Had the commentarial epistemic annotations and the typographical corrections not been counted, in some cases there would have been few annotations to record (chapter 5). At one extreme was reader J7, who only made five annotations – correcting typographical errors, making epistemic comments and correcting a wrong verb. At the other extreme was his compatriot J1, who rewrote many of the sentences in the texts and assiduously changed present tense verbs to past tense. J1 spent a very long time reading and annotating the texts; 295 minutes. Yet J7 spent 82 minutes – and was thus by no means a skim reader. Nine readers (two of them NSs) spent an hour or less in total on the reading and annotation. Spending a long time reading, but making very few annotations suggests that a reader has difficulty in reading English, particularly in reading an unfamiliar NNS type of English. But it could also indicate that the reader became so engrossed in extracting the science content of the text that he or she forgot to annotate: ‘…when we read to comprehend, we do not attend much to text problems’ (Hayes, 1996: 14-15). Evidence to support this comes from the comments reader J7 sent with his e-mail assessments (see Appendix 5.5). His comment on Text K was: I am so interested in this paper. If possible, could you send me a copy of this paper?”

In addition to proficiency in English, the readers’ commitment to the reception study will have affected the time spent reading and annotating, and the number and type of annotations.
Levels of revision

The inconsistency of individual readers in their responses within and between texts reflects differences between the texts, differences in readers’ ability to notice and make changes (NSs at an advantage here), but also the difficulty of operating at various levels of revision simultaneously. It will be recalled that the study by Broekkamp (Broekkamp, 1995; also Broekkamp and van den Bergh, 1996) found that when NNS readers were told what specific textual aspects they should incorporate in a heavy revision (in effect, a rewrite) of a text, they corrected fewer ‘lower-order’1 (spelling, grammar) errors than when they were merely given a general instruction about what the purpose of the revised text should be. This was even though they had been explicitly instructed to correct the spelling and grammar. That readers in my reception study found it difficult to operate simultaneously at different levels of the revision continuum is also indicated by Figure 5.1: only one reader (the Swedish editor of a renowned biology journal) scored high on number of proofreading (i.e. typographical corrections) changes and on epistemic (content) changes, which represent respectively the top and lower part of the revision continuum. It should be remembered that the readers in the reception study were not language professionals, so cannot be expected to have worked through the texts systematically. They probably read the texts once only and the annotations reflect problems they bumped up against while so doing. They used both top–down and bottom–up reading strategies (see chapter 2): the word-for-word top–down reading brought them up against the problems of lexis and syntax, whereas when they made suggestions about deletions or moves of chunks of text, they were being driven more by the text and were therefore using a bottom–up approach.

Intervention and abstention

In studies such as this, what readers do not do is as interesting as what they actually do. Various reasons for readers not ‘doing’ have already been mentioned in this chapter: their attitude, their competence in English, the time they allocated to the task, the difficulty of reading for comprehension but simultaneously identifying textual shortcomings, and their knowledge of the genre conventions – particularly as these apply to English. Except for J1, the readers did not rewrite extensively, but instead focused their rewriting on

1 Because, following James (1998) and Hayes (1996), the revision continuum (Figure 2.3) envisages increasing intervention in the text as going deeper into the text, in that continuum these changes would be positioned near the top. Broekkamp and van den Bergh’s ‘higher’ and ‘lower’ refer to levels of cognitive process.
problem areas in the text: see [18] in chapter 6. That section of Text K illustrates interventionist versus non-interventionist strategies. Confronted with a combination of shortcomings, including short sentences, poor cohesion and problems with lexis, some readers merely marked this section of the text as problematic (see Figure 6.2), but did not intervene; others did intervene, by lengthening the sentences and rephrasing. The rephrasings of six readers had repercussions on the hedging (see Appendix 7.1). Another strategy applied to the texts was the systematic correction of a perceived ‘error’ (for example, J1’s changing of present tense verbs to past tense); Broekkamp and van den Bergh (1995) also refer to this type of response (triggered by a cue); they call it the ‘focus effect’ and point out that once a reader’s attention has become focused on emending a particular type of textual shortcoming, less attention is paid to other shortcomings. In my reception study, many readers paid attention to the scientific integrity of the text and its genre appropriateness (epistemic annotations, deletions and moves of out-of-place chunks of text). When they followed this strategy, it could be said they were primarily revealing shortcomings in the authors’ competence as scientists, rather than shortcomings in the Dutch scientific English.

What motivated readers to deem a chunk of text to be out of place in the Discussion, however, was often a certain feature of the Dutch English. Earlier in this chapter, I noted that the authors’ tendency to reiterate results in the form of bald statements, coupled with their preference for the present tense of verbs, caused problems to the readers. Readers presumably expected that when an author discusses results in the Discussion section, that author will remind the reader of the result, not present it as if it were new information (universally applicable, because in the present tense). Readers’ response to this problem (which was particularly acute in Text R) was to delete the result or recommend that it be moved to the Results section. They seemed to be generally unable to amend this type of rhetorical shortcoming. The only strategy they applied was to change the verb tenses to past tense (to signal that the statement concerned referred to the author’s research). There were two exceptions: see [1] and [2] (the inserted text is given in italics).

[1]  *Our results indicate that* For classifying the vegetation of separate, though nearby, areas, a broadscoped classification key is not necessarily preferable to a narrow-scoped key.  
(reader F4, Text K, lines 17-18)

[2]  *Our results show that* Both species richness and diversity are strongly correlated to loam percentage.  
(reader F2, Text R, lines 10-11)
There are various plausible reasons for readers’ failure to emend these bald reiterations of results. One is that to solve the problem by inserting metadiscourse (e.g. ‘As noted in the Results section’) they would have had to know what the Results section contained: in this study they were not given these sections to read. Another possible reason is that scientists tend not to write discursively – space in journals is too precious (Sharp, 2000). The third, most likely, reason is that it takes more time and effort to think up and insert new text than to delete, paraphrase, or correct. Such rhetorical adjustments are more likely to be routine for language professionals than for scientists, so the latter may well opt for a satisficing strategy. Furthermore, NNSs are more likely to find it difficult to insert metadiscourse than NSs (Intaraprawat and Steffensen, 1995).

**Overall conclusions from the reception study**

The readers’ reactions to the texts were triggered by the scientific content, the authors’ lack of proficiency in English and unskilled writing, and by ‘Dutch’ features. The most clear-cut of these triggers was the scientific content. The other three triggers are difficult to disentangle. The choppiness of text flow, a ‘Dutch’ characteristic identified earlier by Hannay (1997) and discussed in chapters 3 and 4, did attract reader attention. All three texts attracted negative comments on their flow – not only from NSs but also from NNSs (Spanish, French, Swedish: Appendix 5.5), and readers attempted to remedy this by lengthening sentences and inserting connectives (Figure 6.2). That Text K attracted the most response to poor flow strengthens the argument that choppiness is primarily a ‘Dutch’ feature, rather than a manifestation of unskilled or NNS writing; this was the text that had been published, and had thus been read and commented on not only by Dutch colleagues and Dutch research supervisors, but also by Dutch editors.

The reason the Dutch alinea’s did not attract more emendations was probably because they were too few and too subtle to act as cues. Reader response in the form of refocusing sentences – a reaction to frontal overload – was also small. As I did not perform an error analysis of the texts, I cannot say whether this is because there were few frontally overloaded sentences. I seems more likely that it is difficult for naïve readers to correct frontally overloaded sentences, because they do not know why a sentence written in correct English ‘feels wrong’. They do not realise that the problem is rhetorical, not grammatical (Hannay, 1991, 1994). Norris (1998), however, has shown that once the trait is pointed out (in her case, to Finnish scientists), readers systematically refocus sentences when revising, dramatically improving the rhetoric (the flow!) of the text.
Conclusions

The authors’ shortcomings as writers, and as writers in English often triggered the annotations that affected hedging adjustments. Their preference for the present tense cannot be unequivocally seen as a Dutch trait reflecting a different convention on tense use for reporting methods and results, but it is certainly ‘Dutch’ in the sense of being the transfer of a Dutch verb meaning or the transfer of a Dutch auxiliary verb to the passive form.

A critical assessment of the reception study

Some of the limitations of the study were noted in chapter 5. One major shortcoming was that the ambitious target of recruiting equal-sized groups of reviewers and non-reviewers from the eight countries was not achieved, with the result that the country groups of readers were small, with uneven numbers of reviewers and non-reviewers. The Swedish group, for example, consisted entirely of reviewers. This made the analysis of the data difficult; a very strong signal was needed to produce a statistically significant result. Another problem was the degree of freedom the readers were given to decide when they would read and annotate the texts and how long they would spend doing so. The variation in time spent (Table 5.12) suggests that some skim-read, whereas others read more thoroughly. The disparity in reading time reflects the real-world situation, in which busy scientists must read efficiently, at moments that best suit them, but it probably had repercussions on the type and number of annotations. It will be recalled that statistical analysis revealed that there were significant differences between the country groups in the time spent reading, with the Japanese readers spending significantly longer than the UK, US, German and Spanish groups. The Japanese group included a very assertive text reviser (J1), but also at least one reader who was not very proficient in English (J7: see earlier in this chapter, and his comments in Appendix 5.5).

There seems to be an obvious way to test the influence of time spent reading on the number of annotations: total the annotations each reader made and total the time each reader spent reading the texts, and perform a correlation analysis. There were several reasons for not doing this. One was that because the overall aim was to characterise Dutch scientific English and to look at the possible problems it causes to readers, I did not record each and every annotation. To record, analyse and interpret every annotation would have given undue emphasis to the readers’ performance. Another reason was the overlap in the classes of annotations. This issue was mentioned in chapter 5, but below I will expand the discussion, as in research of this type it is important to be aware of the difficulty of defining and counting revisions, and to take account of differences in their quality.
Difficulty of quantifying revisions

It will be recalled (see chapter 5) that the recording and classification of the annotations was based primarily on candidate features of Dutch scientific English (chapter 3), augmented with categories created to take account of annotations that were numerically important and/or affected large chunks of text. The annotations were comments (usually in the margins), deletions, insertions and substitutions. The comments were not revisions in the sense of changes being made to the text, but if the annotated texts had been returned to the authors, the authors might have revised in reaction to them. They gave clues about what attracted readers’ attention and what motivated them to annotate. Many annotations were based on specialist subject knowledge, rather than primarily on the English: these were what I called epistemic changes. I counted the epistemic comments, but took no account of their length, even though some were several sentences long and so readers must have spent time and mental effort writing them. These comments, of course, also took up space on the page. So, not to include them in an account of readers’ text preoccupations and activity would have given a misleading picture of readers’ response. To include them merely as ‘counts’, however, without noting that they varied greatly in length and in style (some were in telegrammese) would have been irresponsible.

The deletions, insertions and substitutions also varied greatly in length. For example, at one extreme, a full stop could have been deleted; at the other extreme, an entire paragraph might have been deleted. The counts of deleted and inserted full stops are inevitably less contentious and more accurate than the counts of less crisply defined features – notably the epistemic comments mentioned above. But deletions of several lines or whole paragraphs effectively removed the need to emend the deleted text, so will have affected the number of other changes a reader made (e.g. changing verb tense, inserting connectives, adjusting the hedging). By having separate classes for deletion of connectives, the deletion of phrases of three or more words, and the deletions of at least one sentence, I aimed to distinguish between deletions that impacted primarily on sentence length (and thus on text flow) and deletions that impacted primarily on the scientific discourse (removing redundancy from the Discussion). By using a combination of presentation in tables, statistical analysis when the data sets were sufficiently large, qualitative presentation and discussion of the solutions to revision hotspots, and maps of the position and frequency of certain annotations, I have tried to do justice to the diverse annotations in this study.

To have confidence in the quantitative results of a study, it is important to know how a text change or text feature has been delineated and classified, and whether the units are large or small. However, the difficulty of
counting text revisions is not always mentioned. Broekkamp and van den Bergh (1995), for example, do not go into detail about what they counted. Their ‘revisions’ were what their subjects commented on in ‘cued recall interviews’. It is not clear whether and to what extent these revisions involved single words, phrases, or longer units of text.

Gosden has admitted that he had difficulty in classifying the revisions in his corpus: ‘Linguistic categories are rarely cut-and-dried’ (1995: 44) and ‘the criteria for distinguishing between categories of revisions are certainly not cut-and-dried’ (Gosden, 1995: 53). In his analysis of textual revisions, he counted the number of revisions, classified them into five broad classes (the fourth had three subclasses), and related them to the number of T-units (a T-unit being ‘an independent clause together with all hypotactically related clauses which are dependent on it’). He is not explicit about the range within his classes. Could ‘additions of technical detail’ have covered both the insertion of an omitted symbol or reference, and also the insertion of several consecutive sentences clarifying a method? In a footnote, he acknowledges the difficulty of assessing textual revisions per T-unit quantitatively. He gives an example in which a revision could be given a count of one, or a count of three, the latter being possible if each component of the revision is counted separately. He allocated a count of one, arguing that the three components could be subsumed under a single rhetorical purpose: ‘rhetorical machining that relates to the writer’s claim’. As explained in chapter 2 of this thesis, his aim was to identify the function of the revisions in terms of the ‘ideational/interpersonal/textual’ tripartite model. It could be argued that he therefore did not need to discuss the implications of the size range of the revisions; in my study, however, the size of the revision (in terms of words or sentences added or deleted) was more important, as I was also looking for readers’ possible reaction to or influence on sentence length and text flow. So, a deletion that shortened a sentence and removed a hedge would have been included under the broad heading of ‘cohesion and coherence’ and would have been dealt with in chapter 6, but would also have been included in chapter 7 (adjustments to hedging) which, together with chapter 8 (verb tense changes) considered more rhetorical aspects: the annotations that affected the claims made in the texts.

An illustration of the difficulty of counting an annotation was given in chapter 7, in relation to hedging. I noted that the technique I developed of recording revisions in terms of the number of editable units they affected would allow the components of compound hedges to be counted. In the event, I merely referred to the editable units in my qualitative analysis of the hedging annotations. Following Hyland’s (1998a) example, I treated each compound

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hedge as a single hedge. As a result, long, complex hedges were given equal value to short, simple hedges.

In some instances, the problem was not the counting of an annotation, but its low frequency. The decision to base my classification of the annotations on the basis of the candidate features of Dutch scientific English identified in chapter 3 resulted in some of the classes containing very few data. One such class was the class created to accommodate clause shifting within sentences (as a possible response to frontal overload), another was the class created for annotations that were reactions to the alinea’s in two of the texts. The argument for keeping these classes is that because the group of readers was large, when only a few of them responded to a textual feature I was able to use a case-study approach to examine their reaction. This was justifiable because in this study, 'few readers' compared favourably with, for example, the group size in the case studies by Gosden (1995: seven supervisors) and Mauranen (1997: three revisers). Thus, for example, the discussion based on [1] – [5] in chapter 6 shows how four readers in this study responded to an infelicitously focused sentence. What is interesting is the diversity of the readers’ solutions. This underlines the ‘highly individualistic nature of textual revisions’ (Gosden, 1995: 53). The response to alinea’s; which are subtle visual cues of a slight change in the topic of discussion, may be seen as evidence of their inconspicuousness to those unfamiliar with this orthographic convention. (The Dutch readers may have noticed them, but will have thought them acceptable in English.) The response of nine readers to convert one of the alinea’s into a standard paragraph also reveals that alinea’s can be interpreted as being equivalent to a standard Anglo paragraph.

The quality of the revisions

The final point to note about the revisions recorded in this study has to do with their quality. The changes made to the text were not always improvements. Examples of what appeared to be ‘change for change’s sake’ were given in chapter 7 [10b], [11b]). And an indication of the infelicity of some of the changes can be seen from [57] (a rewrite by an NNS) in chapter 6. Once more, it is important to remember that this study was not intended to assess the readers’ skill as text revisers, but to interpret their response in terms of a reaction to textual features. So the fact that a reader made a wrong or infelicitous change is less important than the fact that something in the original text caused him or her to make that change. The interpretation of readers’ motives for making changes (or, indeed, for not making changes) was important; the correctness of the change was not at issue in this study.
Ascertaining readers’ motivation

Because of the way I set up and ran the reception study, when I interpreted the annotations and the results of their statistical analysis, I often had to speculate about readers’ motives for their actions. Commentarial annotations, augmented by comments received in the e-mail assessments of the texts, reinforced some of my arguments. The only way to have confirmed many of my speculations about motives would have been to conduct follow-up interviews, possibly by e-mail. There were so many readers, however, and they had spent so much of their time completing both parts of the study, that I was reluctant to impose on their goodwill any further. Similar but smaller-scale case studies in the future could usefully incorporate follow-up interviews, however. In my study, one Dutch reader spontaneously responded to the progress report I sent all participants in summer 1999. His comment on giving less priority to correcting English if a text contains scientific shortcomings was useful for my discussion of the implications of epistemic annotations (chapter 5). A reviewer of English for Specific Purposes urged me to find out why two of the readers in the study made so many changes of present tense to past tense. I approached them by e-mail, and one did indeed send a carefully considered justification, which has been reproduced in chapter 8. These anecdotal contributions certainly give valuable insights, and their inclusion in this thesis underlines the hybrid nature of this reception study: having both the features of a small-scale experiment and of a large-scale case study.

With hindsight, the reception study would have benefited from the inclusion of NNSs in the dry run, as this would probably have revealed ambiguities in the wording of the e-mail questionnaire. (It will be recalled (chapter 5) that two readers – Spanish and Japanese – had difficulty understanding Question 5.) Another improvement would have been to have texts more similar in length; Text A was very much longer than the other two texts and may have been perceived as much more daunting (needing more time) by the readers: this may have affected the attention they gave it. Finally, as already mentioned, systematic follow-up interviews would have enabled me to be less speculative.

The reception study’s strong points

Counterbalancing the study’s shortcomings were the numbers of readers involved, their characteristics, and the authenticity of the texts. The 45 readers were mature professionals from diverse linguistic backgrounds and they all read and annotated the same three texts, which had been written by practising
scientists. In this respect the study meets Silva’s plea for research on NNS writing that leads to theory that is

...less narrow, less monolingual, less monocultural, less ethnocentric, less fixated on writing by eighteen-year-old native speakers of English in North American colleges and universities, and more inclusive, more realistic, more generalizable, and ultimately, more valuable
(Silva, 1997: 216)

Inferences that can be drawn about Dutch scientific English from the research described in this thesis

Thanks to earlier research and the small-scale studies described in chapters 3 and 4 it is possible to look beyond the language-learner ineptitude and traits of novice writing discussed above in relation to the reception study and to identify generic Dutch attributes in Dutch scientific English. This type of English has features that can be ascribed to its genesis within the culture of Dutch writing in general and of Dutch science reporting in particular. In terms of writing style, some of these (shorter sentences than in NS English, alinea’s and inferred connectives) result in a distinctive cohesion: a choppy style. The implicit ‘Dutch’ cohesion, coupled with a tendency to hedge less and the preference for using present tense verbs to report one’s own research findings result in an assertive rhetoric. These characteristics are overlain by linguistic transfers, of which the tendency to frontally overload sentences impacts on cohesion, adding to the text ‘choppiness’.

The choppiness and directness of Dutch scientific English is thus less a product of learner ineptitude (writing ‘easy’ short sentences, not knowing how to use connectives and modal verbs, and not knowing how to form the past tense of English verbs), and more a product of the culture of Dutch scientific writing at the turn of the second millennium. In its directness (deductive writing), it has an advantage over types of NNS English that retain the long and complex sentences and allusive (elusive?) inductive style of the author’s mother tongue (Connor, 1996: 52-53; Burrough-Boenisch, 1999b). All other things being equal, short sentences are easy to understand, as are direct statements. But, as I hope to have demonstrated in this thesis, too many too short sentences consecutively are disturbing in scientific English and, paradoxically, direct statements can raise doubt about the scientific justification for the claims they contain.
Implications of this research

Implications for the theory and practice of applied linguistics

As already noted, this thesis goes some way to meeting Silva’s (1997) plea, rearticulated by Reichelt (1999), for research redressing the skewdness and incompleteness of theory on NNS writing that ignores the writing in the mother tongues of the NNSs. It has looked primarily at the features of Dutch writing culture that are reflected in Dutch scientific English, but has not ignored the possible influences of other writing cultures on Dutch scientific writing in the last 400 years. This revealed that the writing in English is but the latest NNS variant for Dutch scientists; their predecessors wrote NNS Latin, NNS French and NNS German to communicate internationally. This suggests that theory on NNS writing should have a historical perspective, to take account of features of earlier NNS variants that are discernible in present-day ‘hybrid’ mother tongue writing, such as scientific Dutch.

The annotations of the readers in the reception study indicate the extent to which reviewers – NNS or NS – might intervene in a text’s language and discourse: rhetorically (hedges), organisationally (text moves and deletions), and stylistically (lengthening sentences). These changes, together with corrections to technical detail (epistemic changes) may subsequently be incorporated by the NNS author, who may also adjust the text in response to the reviewers’ comments. In the contrastive analysis presented in chapter 3, it was noted that editors’ decisions (i.e. journal policy) can also impact on article style. The contrastive analysis presented in that chapter indicated some of the linguistic and rhetorical revisions that may be made in the final editing stage (adjusting the use of the personal pronoun and sentence length) to satisfy journal house style and the journal editor’s preferences. In the light of this, it is therefore most important that theory on scientific writing, particularly on the research article genre, take account of the influence of the actors depicted in Figure 1.1. And textlinguistic studies of published research articles should, as a matter of course, refer to the journal house style and editor’s practices, and to the role of reviewers and language professionals. This background information is as essential as an explanation of the physical geography in a description of a landscape.

In the review of theory presented in chapter 2 I argued that, traditionally, revision theory has assumed that the writer does the revising, whereas error analysis assumes that it is a language teacher who triggers revision, by pointing out the author’s errors. From this thesis it is clear that neither of these theories adequately covers what happens when peers from an international professional discourse community are involved in the revising. They revise in accordance with their perception of the genre conventions,
their knowledge of science, and their knowledge of English. There is inevitably a trade-off between these (compare the findings of Broekkamp and van den Bergh, 1996), and an influence from their own writing culture, especially if the latter is not an Anglo culture. Though the revision response can be described simplistically in terms of a revision continuum (Figure 2.3) whose terminology reflects the jargon of the publishing industry, in reality the true picture is very much more complex. Among the factors affecting the nature of each revision are the reviser’s language skill, assertiveness, mother tongue and writing culture, and the time available (often, self-imposed).

Another area to which the findings reported in this thesis contribute is theory on text cohesion. Both the reception study and the two studies described in chapter 4 provide useful insights for this. A form of text cohesion different from the English type has been identified: the Dutch type of cohesion, which relies on inference of connectives and on the *alinea*. In other words, there is a cultural perception of what is required for cohesion. The second study in chapter 4 suggests that bi-cultural NSs are better able to cope with this ‘un-English’ cohesion than monocultural (monolingual) NSs, which is not surprising. But this finding, coupled with the performance of the bi-cultural NSs in the first study described in that chapter, also has implications for applied linguistics research and theory. It suggests that theory on NS versus NNS writing and reading should also consider the backwater NSs, i.e. NSs who work in their mother tongue but also operate in the language of their country of residence: they thus live and work outside mainstream English. Its corollary is that studies involving NSs carried out in non-anglophone countries should be clear about how these backwater NSs might differ from prototypical NSs.

This thesis also has implications for contrastive rhetoric. The brief overview in chapter 3 of how Dutch scientific reporting has shifted languages over the centuries shows the potential for contrastive rhetoric to incorporate a historical dimension into the description and explication of cultural writing styles.

Finally, the discussion of the readers’ annotations that impacted on hedging also has implications for theory. In chapter 7 it was shown that readers’ changes could add, intensify, remove or weaken a hedge – or they could preserve the status quo. And it was also argued that many of these changes were in fact triggered by poor learner lexis. These aspects should be incorporated into hedging theory, to augment the discussions of the importance of culture, author’s status and genre conventions on the manifestation of uncertainty and certainty in scientific texts.

This thesis has produced some tangible products, in the form of methods that deserve wider application in applied linguistics research. All these methods stem from my background in geography: a science in which the
visual representation of spatial relationships is important. But text on the printed page also has a spatial dimension, and texts ‘have important spatial features’ (Hayes, 1996: 19). The technique of mapping text changes (Appendix 5.4) could be refined and applied in other studies. Such visual representations are more striking than tables. The cartogram technique used to show sentence sequencing also has potential for application in studies investigating how successfully subjects reinstate jumbled textual features.

**Implications for Dutch and other NNS scientists writing in English**

Most Dutch scientists, (and, indeed NNS scientists in general), will undoubtedly have had the experience of receiving comments and revisions from two reviewers on the same paper that are very different (even contradictory). The reception study gives an idea of the range of peer readers’ opinions of the scientific content and genre appropriateness among 45 readers from the discourse community (see Appendix 5.5). Given this diversity of views, Dutch scientists should therefore not be surprised to find that when two reviewers review a paper they may disagree on its suitability and readiness for publication. Reviewer disagreement is a feature of the peer review process and is not restricted to NNS papers. Sharp (2000), for example, notes that in only 25 of 50 consecutive papers reviewed for the British medical journal *The Lancet* did both reviewers agree closely on the paper’s suitability for publication (in terms of the score they awarded).

Reviewers’ and journal editors’ comments on the English of a Dutch text are often vague and therefore unhelpful: ‘...it would be best if the manuscript were rewritten for clarity (sentence structure, terminology)…’. The description and analysis of the readers’ annotations in the reception study highlight Dutch and learner-English features that cause problems to reader and can give rise to comments like these. And chapters 6 – 8 give examples of possible problem-solving strategies. For example, one strategy needed to improve ‘sentence structure’ might be to refocus sentences. Sentence refocusing is also one of the strategies to consider when addressing vague negative comments on ‘text flow’; others are described in chapter 6 (on cohesion). Knowing what specific textual problems could underlie reviewers’ adverse comments will help Dutch scientists to address the problems – either themselves, or with the help of an authors’ editor. They will certainly be better able to understand the reasons for text changes made by authors’ editors and others in the run-up to publication.

The reception study has also indicated the variation in what readers (reviewers and non-reviewers) notice and emend when reading a text critically. From the data I presented in chapters 6 – 8 on reader participation in making changes to cohesion, hedging and verb tense, percentages, it is
clear that they did not emend comprehensively and systematically (the notable exception was J1). This should not be held against them: they are not language professionals, and they are more used to reading a paper for its science content than to correct its English. For this reason, Dutch and other NNS scientists should not rely on reviewers to provide a free language-correction service. The reception study also showed that readers may disagree about the best solution to a text problem (e.g. chapter 6, [31] – [34]) and that, in some cases, their solutions produce very different text meanings, and may be opposite to what the author was trying to articulate (e.g. chapter 6, [5]). The uncharitable conclusion to draw here is that some readers in the reception study were not very proficient in English. Be that as it may, the range of solutions demonstrates that there is no single ‘optimal’ solution for some text problems, but rather a variety of options, and that even among NSs there is scope for personal preference; this is why a ‘correct’ solution may be replaced by a different ‘correct’ solution further along the spiral leading to publication (Figure 1.1). Dutch and NNS scientists should therefore not be surprised if ‘corrections’ they have incorporated in their text (be they from an authors’ editor or from a reviewer) are subsequently emended by someone else; sometimes these changes do improve earlier improvements, but sometimes they are change for change’s sake (personal preference), as illustrated, for example, by [10a], [10b], [11a], [11b] in chapter 7.

The discussions of the text deletions and moves (chapter 6) and of the changes made to verb tenses (chapter 8) illustrate that a reviser’s perception of what conventions should be adhered to affects some of the changes made. Dutch and NNS scientists should therefore be aware of the conventions of scientific English in general and of the research article in particular, as they should then be able to recognise that changes are being made not because of ‘wrong English’ but because of a perceived mismatch with conventions.

When it comes to the actual writing of a research article, there are clearly some principles that can be distilled from the readers’ reactions to the Dutch-authored texts used in the studies described in this thesis. As already noted, some are to do with improving cohesion, as this will improve the text’s coherence for non-Dutch readers and make it easier to concentrate on the text’s scientific content. Thus, Dutch scientists should be careful of writing too short sentences (< 20 words) in English, and should be especially careful to avoid writing stretches of text consisting of short sentences. They should try to introduce more connecting words and phrases, to make it clearer how successive sentences link together to form an argument. And they should not use alinea’s, as these are unknown in English writing.

Both the cohesion and the rhetoric of many Dutch-authored research articles would benefit if their authors deployed more words and phrases to make it clear that they were writing about their own results or – in Methods
sections – their own actions. This is especially important because of the tendency for Dutch authors to use the present tense to report their own findings and what they have done (by analogy with the Minutes of meetings). To be on the safe side, the Anglo convention of reporting one’s own actions in the past tense should be adhered to. It is possible to flout the convention of reporting one’s own results in the past tense and reserving the present tense for ‘general truths’, but Dutch authors should do so only if they are sufficiently skilled in English to be able to give other clear signals about whether statements are specific to their experience or are more generally valid.

The final conclusion of relevance to Dutch scientists is, perhaps not surprisingly, that the textual shortcomings noted above and, more especially, any linguistic transfers from Dutch into English, are best identified and remedied by a language professional. (Preferably one who is familiar with Dutch.) Whereas NS subject experts are able to improve the technical lexis (see Benfield and Howard, 2001), they cannot be expected to notice and amend mother tongue interference from languages they do not know.

**Implications for language professionals helping Dutch scientists to publish in English**

The three groups of language professionals who will benefit particularly from the findings of this thesis are authors’ editors, ESP teachers and translators. All of them help Dutch or other NNS scientists prepare their work for publication, so need to know what aspects of Dutch scientific English can be problematical to journal reviewers and readers at the review stage, and why. Authors’ editors working with Dutch scientists will have encountered features of Dutch scientific English identified in chapter 3, but may not have thought of them as transfers from a Dutch writing culture that has conventions that differ from those in Anglo writing culture (e.g. in cohesion and verb tense for reporting). Once they realise that many of the problems in Dutch scientific writing are not necessarily language-learner errors, but rather the results of ‘transfers to nowhere’ (Kellerman, 1995), they should be better able to justify their emendations to their authors and help them avoid such problems in the future. ESP teachers should find chapter 3 very relevant to their teaching. It will be particularly useful for them to see the features of Dutch scientific English underpinned by contrastive analysis. Translators will be able to apply the findings of the contrastive analyses to their own work; these findings will make them aware (if they were not already) of specific ways in which their translations should be adapted to be effective in the target language. Moreover, the discussions on different systems of cohesion and different conventions in science writing will provide them with the rationale for these
adaptations. This applies especially to translators who have not had a formal training in translation, but who have become translators by virtue of their bilingualism or an academic, not vocational, qualification in a foreign language.

For these language professionals as well as for Dutch and NNS scientists, the reactions (as comments and annotations) of the readers in the reception study, as described in chapters 5 – 8, also provide insights into which textual shortcomings attract attention. This is useful for authors’ editors, because it allows them to compare their strategies and solutions – and also the time they invest in the systematic correction of such texts. It will be particularly gratifying for authors’ editors to see that the scientist readers in the reception study (reviewers and non-reviewers alike) were generally unsystematic in their emendations. This underlines the advisability of using an authors’ editor before a text is submitted to a journal, to remove the onus of language correction from the reviewers and perhaps increase a paper’s probability of being accepted.

I have explained that the readers’ unsystematic and uneven response is partly attributable to the difficulty of reading/revising simultaneously at higher and lower levels of text processing: they were reading primarily for content, doing so at the expense of identifying and dealing with all the shortcomings at the text and discourse levels. Recognising this, and with Figures 2.2 and 2.3 in mind, authors’ editors will be able to see their task as one of solving problems at substance, text and discourse levels (Figure 2.2), i.e. operating primarily in the copy-editing and language revision zones of the revision continuum (Figure 2.3). By removing textual shortcomings at these levels, authors’ editors expose deeper problems in the text, to do with genre appropriateness and content. Authors’ editors will often be able to emend some of these too, but if they do not, these are precisely the sorts of shortcomings that the reviewers will be looking for. The authors’ editor’s cleaning up of the text exposes these shortcomings, making the reviewers’ task easier. This is what authors’ editor Mary Ellen Kerans had in mind when she defined the ‘realistic goal’ of an authors’ editor as:

> to ensure that the material submitted is given a respectful reading by the peer reviewers, editors, regulatory authorities, or whomever will pass judgement on the suitability of the content for wider dissemination

(Shashok, 2001: 116)

Freed from the need to operate in the copy-editing and language revision part of the revision continuum, the reviewers can suggest substantive revisions for the author to implement.
Authors’ editors could also benefit from the theoretical implications of this thesis. As well as clarifying the role of the authors’ editor in the spiral outwards from author to publication (Figure 1.1), this thesis identifies a possible niche for authors’ editing in existing theory: in the zone of overlap between NNS writing, text revision and translation. The theories in these fields, and also those on interlanguage and error analysis, contrastive rhetoric and genre (see chapter 2) at the very least should be part of the training of authors’ editors: at present, these editors usually arrive at their insights into NNS writing and the rationale for text emendation by trial and error, learning from having to deal with their authors. I hope that the discussion of the readers’ responses to the test texts will have convinced authors’ editors of the usefulness of existing theory in applied linguistics in explaining editorial responses and the textual features that trigger them. And authors’ editors who can place their actions in the framework of applied linguistics theory will understand why they do as they do, and be better able to explain their actions to their authors.

A very relevant point for authors’ editors and to ESP teachers that emerged from the reception study was the finding that some readers feel strongly that the conventions of the scientific research article in English should be maintained. At first sight, the practical implication of this for authors’ editors and ESP teachers is that to placate such exacting readers, the conventions of scientific English must be rigidly adhered to (notably by adhering to the verb tense conventions and ensuring that results are reported only in the Results section). In the discussions of the readers’ responses to the text, however, I have pointed out that such conservative reactions were largely a response to the authors’ clumsiness in English. If results are alluded to, rather than boldly stated as if they were new information, they can remain in Discussion sections for, after all, it is the convention for results to be discussed in such sections. The readers in the reception study tended to rely on verb tense adjustments to remove ambiguity about whether an author was referring to his or her own findings and actions, but authors’ editors can consult with the author and insert more explicit clarification. ESP teachers using writing manuals based on corpus research (Swales and Feak, 1994; Weissberg and Buer, 1990) will know that the conventions of scientific English are not inviolable; the readers’ reactions to Dutch authors’ violation of the conventions provide useful case study material for classroom use.

The diversity of the responses of the readers, and their sometimes contradictory solutions to textual problems (strengthening, weakening or ignoring one and the same hedge, for example) illustrate the scope for individual judgements about an author’s intended meaning. (Or rather, about the meaning it behoves the author to have.) As noted above, when discussing the implications for Dutch scientists, this thesis illustrates that there is rarely
only one ‘correct’ answer to a textual problem. For authors’ editors, this means that their solutions may be reversed or modified by someone revising the text further along the spiral to publication (Figure 1.1). Such a revision may be based on personal interpretations of genre fidelity or of scientific integrity. Given the range of opinions and solutions that this thesis has shown were elicited from 45 reviewers and non-reviewers from the authors’ discourse community, the inevitable conclusion is that language professionals should be flexible, and should justify their modifications not in terms of ‘right versus wrong’ but as a response from a different part of the revision continuum, based on a different content schema.

Implications for journal reviewers and editors

Many of the points discussed above in relation to Dutch scientists and language professionals will also be relevant to journal reviewers and editors. However, there are a few specific ways in which the findings of this thesis could be useful to the latter two groups. One way is in clarifying what could lie at the root of a reviewer’s conclusion that an NNS text ‘does not flow’. From this thesis it is clear that unsatisfactory flow in an NNS text is the result of a combination of factors. Knowing this, instead of making vague comments about the need to improve flow, reviewers should be able to be more specific about how this can be done. This would be welcomed by NNS authors who, as this thesis has shown, may be applying writing conventions that apply in their writing culture, without realising that these are alien to English. Journal editors could help here by priming their reviewers on what to bear in mind when assessing the English of NNS texts. The reviewer’s assessment form could certainly specifically ask about the text flow and mention some features that reviewers could tick if they felt they contributed to their dissatisfaction with the text flow.

Though I have noted that reviewers should not be used as language revisers, and have argued that bi-cultural authors’ editors are the best people to solve the language and discourse problems of NNS scientist’ texts, this option may not be possible for NNS scientists from certain countries – largely for financial reasons. In such cases, an NS scientist known to the author, or the journal editor aided by copy-editors, may be prepared to ‘correct the English’. The shortcomings of NNS scientific texts discussed in relation to the reception study could usefully be applied in drawing up a protocol for this and a checklist of the features that should be looked for and remedied.

A final conclusion that can be drawn from this thesis as being relevant to all the actors depicted in Figure 1.1 is that for NSs and NNSs alike, it would be useful to envisage scientific English and its conventions as a writing culture, and to take into account that there are other cultures of writing science
Conclusions

279

(Dutch, French, German, Russian, for example) which may have different conventions. Ideally, writers and readers should consciously keep these writing cultures and their conventions as parallel formal schemata in their minds, drawing on the appropriate schema for a writing or reading task in a particular language. This thesis indicates what the Dutch and English schemata might be. It is clearly impracticable for the actors depicted in Figure 1.1 to have many such parallel schemata in their heads, but at the very least, awareness of the existence of such schemata would help them in their reading, writing and revision.

Avenues for further research

In the course of the research described in this thesis, various interesting subsidiary topics emerged, which merit further research. They have been mentioned in the chapters to which they pertain, but by way of rounding off this thesis they are summarised below, beginning with topics that are of more scholarly interest, and moving on to topics that have more practical application.

- The evolution of Dutch scientific writing. Chapter 3 included an outline of how Dutch academics and scientists have, over the centuries, chosen to publish in Latin, French, German and English, in order to reach an international audience. The impact of these changes on Dutch scientific discourse merit further study, as they would show how the discourse in a minority language adapts to and is modified by different, more widely spoken, languages. Contrastive rhetoric has so far been applied to present-day writing, in order to provide material for language teachers. But the approach could be used diachronically, for example, to examine the changes that occurred in scientific Dutch in the 20th century, the first half of which was dominated by Germanic ideas on scientific discourse, with Anglo ideas taking over in the second half. To what extent did the Dutch discourse mirror contemporary German discourse in the early years of the 20th century? And was Germanic rhetoric discernible in mid-20th century Dutch and has it waned since then, to be replaced by Anglo discourse? Were there ‘Dutch’ features in the written German of Dutch academics and scientists in the early years of the 20th century?

- The role of *alinea’s* in cohesion. The Anglo versus Dutch difference in paragraphing conventions described in chapter 3 raises questions of how Dutch writers exploit the *alinea* option. In chapters 4 and 6, some evidence was presented for the use of *alinea’s* as cohesive
devices. This aspect deserves further empirical study, involving Dutch and NS writers and readers. Comparisons should also be made with *alinea*-type features in other writing cultures\(^3\). The aim would be to ascertain the role of paragraph orthography on text coherence, and to bring paragraph-related cohesion into discussions about explicit and implicit cohesion in texts.

- NS scientists’ and academics’ perception of the signals transmitted by present and past tense in research articles. It is not clear why the British readers in this study tended to behave differently from the other readers – including the Americans – in their present to past tense changes, as shown in chapter 8. To clarify this and other relationships between language/culture and acceptance and interpretation of verb tenses in English research articles, a study would have to be done with much larger groups of readers, using a questionnaire or some form of test to gauge views on appropriate tense use in written scientific English.

- The deployment of compound and simple hedges. As noted earlier in this chapter, the ‘editable units’ approach offers potential for more precise counts of the components of compound hedges. Using this technique, the subtleties of adjustments to writers’ claims could be examined.

- Language attrition and hyper-intolerance of presumed NNS errors in writing in expatriate NS language professionals. The small-scale studies described in chapter 4 suggested that compared with colleagues living in the UK, the NSs who were not embedded in their mother tongue culture were less tolerant of Dutch-authored sentences. One would expect them to be influenced by having to operate in a foreign language, and by being exposed to written NNS English. A systematic study taking into account how long the NSs have lived in the host culture could reveal which features of the host writing culture they are likely to adopt and in what ways their mother tongue might have atrophied. The results of such research could be applied in training programmes and refresher courses for expatriate NS authors’ editors and translators and also in raising the awareness of editors and reviewers living in an anglophone country but dealing with NNS texts.

\(^3\) From discussions with authors’ editors in Spain and Germany, I conclude that *alinea* equivalents occur in the writing of those two cultures, at least.
The constraints and potential of editing on screen versus editing on paper. The lack of agreement among professional editors about the merits of editing on paper versus editing on screen was alluded to in chapter 1. It seems possible that editing on screen rather than on paper gives editors and text revisers more scope to edit drastically. If this were so, the ‘authentic voice’ of NNS authors whose texts have been edited on screen by NS authors’ editors could be expected to have been altered more than would have been the case if the editors had worked on paper. This has implications for the linguistic analysis of published texts by NNS authors. Empirical research could yield interesting insights on this. By giving the readers in the reception study print-outs of the three test texts, I mimicked a real-world situation in which most scientists (and journal reviewers) read paper versions of texts. However, scientists are increasingly reading research papers on-line, and the reviewing and editing of journal articles is also being done on-line (Dayton, 1998; Tenopir and King, 2000, Wood and Hurst, 2000). It would therefore be useful to investigate on-screen revision, possibly using the on-line technique Smit (2002) used, to track revisions made while writers compose text.

With the exception of the diachronic contrastive rhetoric research, the findings of all the foregoing suggestions for further research could usefully be fed back into praxis. For, as I hope this thesis has shown, there is great potential for applied linguistics research to enrich and improve the writing, editing and publishing of science. But I have also argued that there is much that scientist-authors and language professionals can contribute to applied linguistics. This thesis was intended to be a bridge to link the academic applied linguists to scientists and language professionals. It is a makeshift bridge, like the trees felled across rivers that I encountered in the Borneo rainforest many years ago. I started off from the side of the river on which the language professionals and scientists have their camps, and have gone to and fro between them and the applied linguists on the far shore. There are better, stronger, bridges to be built in the future and the communication across them will benefit both sides.
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Appendices

Appendix 3.1 The articles from which the text extracts were drawn for the contrastive analysis of scientific English and Dutch

**English journals**

**Biological Conservation**


**Journal of Applied Ecology**


Journal of Ecology


Dutch journals

Landschap


De Levende Natuur


Appendix 4.1a The test administered in Maastricht in 1996

INSTRUCTIONS: This short English text (an extract from an academic article) has been broken down into its ten component sentences (1-10). Read it carefully. Indicate the paragraphing. Add extra words if you feel this would be appropriate.

1. In a recent study on 5- to 6-year-old children, Asington confirmed that they see a strong link between promising something and actually doing it: ‘To promise’ means ‘you do it’.
2. This link is much stronger for children than for adults, which leads children to assert that an unfulfilled promise was not a promise in the first place but a ‘lie’.
3. For young children promising is not simply a speech act but something that includes execution of the promised action as well.
4. It seems likely that children of 5 years or so understand that the use of the word promise entails commitment, but this understanding may be based on a simple rule, ‘If you have said “I promise” then you must do what you said you would.’
5. Although the use of the word promise may often be a sufficient condition for becoming committed, it is certainly not a necessary condition.
6. It is seldom used in everyday exchanges between adults, who tend to say ‘I will meet you at 6 o’clock’, ‘I’ll return your book tomorrow’, and so forth.
7. The commitment, though informal, is binding.
8. What distinguishes a commitment (I will return your book) from a statement of intention (I will stay in tonight) or a prediction of a future event (I will get wet) is the knowledge that someone else is relying on one to carry out the commitment and the knowledge that the other person is aware that one has made a commitment.
9. The interesting question is whether young children can recognize commitment without the help of the word promise.
10. Our aim in this study was to investigate whether children of between 5 and 10 years are aware of reliance as the essential and necessary condition for commitment.

Before handing in the completed test, please answer these questions:

What is your native language? ....................
What is your country of residence? .........................
Appendix 4.1b The authentic text

(In the restored words have been underlined)

In a recent study on 5- to 6-year-old children, Asington confirmed that they see a strong link between promising something and actually doing it: ‘To promise’ means ‘you do it’. However, this link is much stronger for children than for adults, which leads children to assert that an unfulfilled promise was not a promise in the first place but, rather, a ‘lie’. In other words, for young children promising is not simply a speech act but something that includes execution of the promised action as well.

It seems likely, then, that children of 5 years or so understand that the use of the word promise entails commitment, but this understanding may be based on a simple rule, such as ‘If you have said “I promise” then you must do what you said you would.’ Although the use of the word promise may often be a sufficient condition for becoming committed, it is certainly not a necessary condition. Indeed, it is seldom used in everyday exchanges between adults, who tend to say ‘I will meet you at 6 o’clock’, ‘I’ll return your book tomorrow’, and so forth. The commitment, though informal, is nonetheless binding. What distinguishes a commitment (I will return your book) from a statement of intention (I will stay in tonight) or a prediction of a future event (I will get wet) is the knowledge that someone else is relying on one to carry out the commitment and, furthermore, the knowledge that the other person is aware that one has made a commitment.

The interesting question is, therefore, whether young children can recognize commitment without the help of the word promise. Our aim in this study was to investigate whether children of between 5 and 10 years are aware of reliance as the essential and necessary condition for commitment.
Appendix 4.2 The ten edited versions of the first three sentences of the Coasts text

In this text extract [1], there is a lack of cohesion between the first two sentences. In the subsequent emended versions I have italicised the two problem sentences (or what remains of them). At the end of each extract, in brackets, I have indicated the sequence in which the particular subject arranged the sentences of Coasts. Furthermore, for the EN/NL editors, I have indicated the duration of their residence in the Netherlands, from which it is clear that four of the five had been immersed in Dutch writing culture for a long period (> 9 years).

[1] Studying the impact of coastal water movement on the environment has been a geographical necessity for the Netherlands throughout its history. The Netherlands is a country that depends on water. Many people still vividly remember the storm surge disaster of February 1st, 1953, when the dikes in southwestern part of the Netherlands broke.

In [2] and [3], the editors ignored the problem. No changes were made to the first two sentences, but minimal changes (to word order, spelling and lexis) were made to sentence 3.

[2] Studying the impact of coastal water movement on the environment has been a geographical necessity for the Netherlands throughout its history. The Netherlands is a country that depends on water. Many people still vividly remember the storm surge disaster of February 1st, 1953, when the dikes broke in the southwestern part of the Netherlands.
(EN/NL; 34 years; 2, 1, 3, 4, 5, 6, 7)

[3] Studying the impact of coastal water movement on the environment has been a geographical necessity for the Netherlands throughout its history. The Netherlands is a country that depends on water. Many people still vividly remember the storm surge disaster of 1st February 1953, when the dykes burst in southwestern part of the Netherlands.
(EN/NL; 21 years; 2, 1, 3, 4, 5, 6, 7)

In [4] and [5] the subjects (both were Dutch) tackled the lack of cohesion by inserting an alinea break (i.e. they have started a new line: I have marked this with ¶) after the first sentence. They also made a few minor changes to lexis.

[4] Studying the impact of sea water movement on the coastline has been a geographical necessity for the Netherlands throughout its history. ¶The Netherlands is a country that depends on water. Many people still remember vividly the storm surge disaster of February 1st, 1953, when the dikes in the southwestern part of the Netherlands bursted.
(DU/NL; 2, 3, 4, 5, 6, 7, 1)
Studying the impact of coastal water movement on the environment has been a geographical necessity for the Netherlands throughout its history. The Netherlands is a country depending on water. Many people still remember vividly the storm surge disaster of February 1st, 1953, when the dikes in the southwestern part of the Netherlands broke. (DU/NL; 2, 1, 5, 6, 7, 3, 4)

In [6], sentence 2 has been reworded and the cohesion between it and sentence 1 has been improved: instead of cohesion being provided by the repetition of ‘the Netherlands’, it is provided by assuming the reader knows that the Netherlands is a country.

The study of the impact of coastal water movement on the environment has been a geographical necessity for the Netherlands throughout its history. The country is threatened by water. Many people still vividly remember the storm surge disaster of February 1st, 1953, when the dikes in the southwest of the Netherlands broke. (DU/NL; 2, 1, 3, 4, 5, 6, 7)

In [7] the order of sentences 1 and 2 has been reversed, the sentences have been partially rewritten and a connective (‘Therefore,’) has been inserted. Semantically, the text is still incoherent. (Why should abundance of water necessitate the study of coastal water movement?)

In [8] clauses combining, by adding a connective so that sentence 2 is incorporated into sentence 1 is the solution. This improves the cohesion:

Studying the impact of coastal water movement on the environment has always been a geographical necessity for the Netherlands, as it is a country that has depended on water throughout its history. Many people still remember vividly the storm surge disaster of February 1st, 1953, when dikes in the southwestern part of the Netherlands broke. (EN/NL; 9 years; 2, 3, 4, 1, 5, 6, 7)
The Netherlands is a country abounding in water. Therefore, studying the impact of coastal water movement on the environment has been a geographical necessity throughout its history. Many people still vividly remember the flood disaster of 1 February 1953, when the dikes in the southwestern part of the Netherlands broke.

(EN/NL: 2, 1, 3, 4, 5, 6, 7)

In [10] and [11] there has been a drastic reordering and rewriting of sentences, insertion of connectives and reparagraphing. In 10, though the first four sentences are now coherent, the incoherence is merely relocated to the start of the next paragraph, where the rogue sentence ‘The Netherlands is a country dependent on water’ has been inserted, unaltered.

[10] Studying coastal water movement and the impact it has on the environment has been a geographical necessity for the Netherlands throughout history. Accurate predictions of storm surges along the entire Dutch coastline are therefore important. They indicate if dikes are at risk and whether the storm surge barrier in the eastern Scheldt should be lowered. Closing this barrier unnecessarily could damage the fragile environment of the eastern Scheldt.

The Netherlands is a country dependent on water. Many people still recall vividly the storm surge disaster of February 1st, 1953, when the dikes in the southwest of the Netherlands burst their banks, inundating 136 000 ha of land and killing almost 2000 people.

(EN/NL: 20 years; 1, 5, 2, 7, 6, 3, 4)

In [11], it is the original sentence 1 (‘Studying coastal water movement…’) that remains disconnected from its surrounding text after a drastic repositioning. In the rewrite of problem sentence 2, ‘water’ has been replaced by ‘sea’; this dramatically improves the coherence (assuming that readers know what storm surges are). After its drastic repositioning, however, the original sentence 1 remains disconnected from its surrounding text.

[11] The Netherlands is a country that is permanently involved in a fight against the sea. Many people still remember vividly the storm surge disaster of February 1st, 1953, when the dikes in the southwestern part of the Netherlands broke. A total of 136 000 ha of land was inundated and almost 2000 people lost their lives. To prevent such inundations, a storm surge barrier was constructed in the eastern Scheldt. Unnecessary closing of this barrier, however, can cause damage to the fragile environment of the Eastern Scheldt. Studying the impact of coastal water movement on the environment has been a geographical necessity for the Netherlands throughout its history. Accurate predictions of storm surges for the entire Dutch coast indicate whether the dikes are at risk and whether the storm surge barrier should be closed.

(DU/NL; 2, 1, 3, 4, 5, 6, 7)
Appendix 5.1 The three reception study texts

The texts sent to the readers did not have numbered lines. As noted in chapter 6, they varied in their paragraphing indications: indentations and line spaces were used. In the line-numbered versions below, which preserve the original line lengths, a ¶ at the start of a line indicates that in the original text the preceding line had been left blank.

TEXT A:
Biomass partitioning, architecture and plasticity of eight herbaceous species in relation to their position in an old field succession

Abstract [solely to provide context. Do not annotate!]

In order to evaluate plant allocation, architecture and biomass turnover in relation to the successional position, eight species, viz. four grasses (*Poa annua*, *Holcus lanatus*, *Anthoxanthum odoratum* and *Festuca ovina*) and four herbs (*Chenopodium album*, *Rumex obtusifolius*, *Plantago lanceolata* and *Hieracium pilosella*), were grown in a greenhouse at 3 different nutrient levels.

Four harvests were done at intervals of 4 weeks. Various plant traits related to biomass partitioning, plants architecture, biomass turnover and performance were determined. Differences in nutrient supply induced in a high functional response in the species shoot-to root allocation while architecture and turnover showed little or no response. Results indicated that species from more nutrient rich successional stages were characterized by a higher specific leaf area and specific shoot height (height/shoot biomass), resulting in a higher RGR and total biomass. No evidence was found for superior growth characteristics of species from nutrient poor environments. The only advantage species from a nutrient poor successional stage was a lower leaf turnover.

We concluded that species from a nutrient rich successional stage are specialized in capturing of light and nutrients while species from a nutrient poor successional stage are specialized in reducing their biomass and nutrient losses.

Discussion
Method and annual performance
Comparative studies with respect to plant morphology were often done in short term experiments (Poorter and Remkes 1990, Olff et al. 1990, Olff et al. 1992, Gleeson and Tilman (1994)). The advantage is that many (small) plants can be tested quickly. In this experiment we choose to follow eight species during their development of 16 weeks. Productivity levels at the end of these 16 weeks were 330, 825 and 1650 g/m² for the N1, N2, N3 treatment respectively (including dead leaves) which is a realistic productivity range for poor, medium rich and rich grasslands.

Initially, *Poa* and especially *Chenopodium* developed very quickly and were fully flowering at week 8. At harvest 3, *Chenopodium* had already lost all of its living leaves. This fast development of the annual plants may be caused by the short day length at the start of the experiment (Warwick 1982). Although these species can not be compare directly with perennial species their architecture and turnover generally fit the pattern of the perennials as discussed blow.

Adapting the theory of Tilman(1985,1988) we would expect species adapted to nutrient poor systems to be specialized to capture nutrients and have a high root fraction and a high

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specific root length compared to species from a nutrient rich environment. Results presented here contradict these expectations. At harvest 4 within the species Holcus and Rumex (from a nutrient rich perennial stage) were found to have the highest root fraction and within the grasses Holcus have the highest specific root length.

However, Elberse and Berendse (1993) found indeed higher SRL values in grasses from a nutrient poor environment which contradict our results and confirm the expectations. Our experiment would have give the same results if a growing period of 4 weeks was considered (Fig. 3). However the SRL of both Anthoxanthum and Festuca (from a nutrient poor habitat) showed a downward trend in time while the SRL of both Poa and Holcus stayed at the same level which resulted in higher values of both latter species at the final harvest. In the experiment of Elberse and Berendse (1993) this trend was generated by high values of two out of 8 tested species and the level of significance was also disappearing at later harvests in the low nutrient treatment. This together with our results leads to the conclusion that there is little evidence for the hypothesis that species from a nutrient poor habitat have generally a higher specific root length.

In nutrient rich environment light in considered to be the limiting resource and therefore we expect species from a fertile successional stage to have a high shoot fraction and high values for their shoot architecture. With respect to the shoot architecture results generally confirm this expectations. Specific shoot height and specific leaf area were higher in species from a fertile environment. However species from a nutrient poor successional stage were found to have a higher or equal shoot fraction.

Compared to Tilmans theory our results fit better in the notions of Grime (1979) who stated that species adapted to nutrient rich environment (Ruderals/Competitors) are better in capturing all resources. These species have a higher specific leaf area, specific shoot height and a higher or equal specific root length and were able to adapt their root investment to nutrient poor environment. This means in general that these species are more efficient (size/gram biomass) in increasing their size related parameters like leaf area, height and root length which cause a higher uptake for both nutrients and light under all nutrient conditions. Their higher values for the SLA result in high values for the RGR (Grime and Hunt 1975, Poorter and Reemkes 1990). This causes a higher biomass also in nutrient poor conditions as shown by our results. On the other hand Grime (1979) related low RGR with the toleration of nutritive stress. The mechanism why these slow growing plants perform better at low nutrient levels can, in our view, be found in their lower biomass turnover.

Results show that the dead leaf fraction in grasses adapted to nutrient poor environments were lower than in the grasses adapted to nutrient rich environment. In the herbs, no such trend was found, but at a low nutrient availability both Hieracium and Plantago have a lower leaf turn over than Rumex. This may indicate that the mortality rate of the species adapted to nutrient poor conditions is lower in both grasses and herbs. The low biomass turnover has two important consequences: 1) it will result in a higher biomass on the long term (Schloper & Ryser 1996) and 2) species with a low turnover will lose less nutrients to the environment (Berendse & Elberse 1990). This effects in a more efficient nutrient economy and relatively high biomass which make them successful competitors in nutrient poor environment (Aerts 1995).

The above section induces the question; why are there no species with high values for architecture and with a low biomass turnover which will be superior competitors in all environments. In other words: why is there a negative correlation between architectural parameters and biomass turnover. The answer may be found in the relation between architecture and tissue density. High values for architecture, which are expressed in (fresh) size / gram dry weight, are negatively related to tissue density expressed in dry weight / fresh weight (Poorter and Bergkotte 1992). This low tissue density may be the cause for the short longevity since this density can be regarded as a measure for solidity of the plants tissue (Ryser & Notz 1996).

If we consider both architecture and allocation, allocation was found to be more sensitive for the nutrient level than architecture. Within the grasses, no evidence was found for any
Appendices 309

plasticity with respect to architecture but especially in Plantago and Rumex major changes in
the specific shoot height occurred due to the nutrient level. This effect was caused by a
change in leaf angle. Species growing in the high nutrient treatment have more vertical
leaves which resulted in taller plants while in low nutrient conditions leaves and stems of both
species have a more horizontal orientation (Olff 1992). Especially the plasticity of the shoot-
to-root allocation was responsible for the change in dry matter partitioning at different
nutrient levels. This effect was already noticed by Brouwer (1962). With the increase of
nutrient availability the herbs invested more in stems at the expense of roots while grasses
invested in both leaves and stems. Noticeable was the difference in root allocation in both
higher nutrient treatments. In this condition species from a fertile environment invested
relatively more in their roots than species from a nutrient poor environment. This effect
might be explained by the higher relative growth rate of these species. The fact that they
grow faster caused an increased need for nutrients and may induce a poorer environment in
the pots which results in a functional response in the shoot-to-root ratio. This effect might
also explain the results of Olff et al. (1990), Elberse and Berendse (1993) and Gleeson and
Tilman (1994) who found also lower shoot-to-root ratios in species adapted to nutrient rich
environment. If we include this depletion effect, the function response of the tested
perennials with respect to the root fraction can be regarded as comparable between the
species. This comparable functional response of the root allocation may support the
hypothesis that species are able to optimize their shoot-to-root allocation with respect to the

Conclusions
In this research we examine biomass allocation, architecture and plasticity of species from
different successional stages of an old field succession. The availability of nutrients primarily
affects the shoot-to-root ratio of the species while the effect of nutrient on the plant
architecture was limited. Results of this experiment indicate that species from a nutrient rich
successional stage have a generally higher specific leaf area and specific shoot height. This
makes these species more efficient growers and competitors because the higher specific leaf
area causes a higher RGR and the taller plants makes these species a better competitor for
light. We did not find species from a nutrient poor successional stage to have a superior
architecture or allocation to compete for nutrients nor did we find evidence for any
compensating growth related properties in which they were superior to species from a nutrient
rich successional stage. The only advantage later successional species have was a lower
biomass turnover. This may have a significant effect on the biomass and nutrient loss in the
long run. As a final conclusion we therefore state that species from a fertile environment are
growth orientated and are specialized in the capture of light and nutrients while species from
an infertile environment are specialized in reducing their biomass and nutrient losses.
TEXT K:
Effects of choice of sampling variables on a vegetation classification used for mapping

Abstract [solely to provide context. Do not annotate!]
In 1996, the vegetation of the Schinveld woods and the Brunssum moor was recorded in 410 plots. The records were classified in various ways using TWINSPAN, and mapped. The classifications are compared by means of the kappa statistic. The kappa measure of agreement is judged against the boot-strap-mean kappa. Vegetation classifications for mapping are affected by the addition of recording plots, the systematic groups included in the recording, and by the scope of the vegetation classification used. Within the range studied, the number of vegetation records had a moderate effect on the vegetation classification. Excluding or including bryophytes, strongly affects the second and third-level classifications. Aggregating Rubus species or distinguishing them far less affects a classification. A classification key with a broad scope does not necessarily identify the vegetation of an area better than a classification key with a narrow scope.

Discussion and conclusions
In The Netherlands, vegetation mapping is being carried out routinely by the State Forest Service, the Society for Nature Conservation in The Netherlands (Natuurmonumenten) and a few other organisations for land-use management. The methods used derive from Braun-Blanquet 1928, 1951; Küchler 1967; Leys 1978; Zonneveld 1988; Stortelder et al. 1995. This mapping procedure requires great skill. Stand recognition and documentation of communities ask for many personal decisions because of stand diversity and often vague community boundaries (Tansley & Chipps 1926; Braun-Blanquet 1951; Poore 1956; Greigh Smith 1964; Gauch 1983). A well-known trait of vegetation mapping is the great number of observer decisions involved in field work (Ashby 1956; Poore 1953; Goodall 1970; Goldsmith & Harrison 1976; Gauch 1983). More objective methods of vegetation mapping reduce the number of observer decisions needed during field work by taking these decisions beforehand (Greigh Smith 1964; Smartt & Grainger 1974; Nelder et al. 1995). Nevertheless, most decisions remain to be made deliberately, such as the number of recording sites, the taxonomic groups to be recorded, and the scope (areal extent) of the classification to be used. We studied the ways in which these decisions affect vegetation classifications. For classifying the vegetation of separate, though nearby, areas, a broadscoped classification key is not necessarily preferable to a narrow-scoped key. Imposing a classification of one area to the other area changes the classification of that other area when compared with its original classification. Most precise is to classify these areas separately. Hogeweg and Beeftink (1976) obtained similar results. They separately clustered the vegetation of three mud flats that came up from the sea. A conclusion was that the application of the classification obtained on one of the islands to an other island does not always optimally reflect the local classification. The more the classification applied molds the other classification, the greater its relative strength. Strong classifications are insensitive to molding by other classifications. A practical consequence of these observations is, that in mapping the vegetation of an area in the usual way (Braun-Blanquet 1951; Zonneveld 1988), it would be better to start mapping parts with a weak vegetation pattern than to start with strongly patterned parts, provided that the relative strength of a classification may be inferred from the distinctness of boundaries between vegetation patches.

Only recently, the taxonomy of Rubus subgenus Rubus in northwestern Europe became clear (Weber 1985, 1995). Still, many national floras are not fully covering the subgenus
Appendices

311

(Van der Meijden 1996; Stace 1997). Most phytosociologists treat the species of *Rubus* subgenus *Rubus* in a broad sense: *R. fruticosus* coll. Yet, it is to be expected that vegetation classifications with the *Rubus* species lumped distinctly differ from those with the *Rubus* species kept separate. Since we aim at a flora-based vegetation classification, this flora should be taken as comprehensive as possible. Therefore, it is advisable to fully incorporate *Rubus* species in vegetation recording. However, usually the full identification of the species of *Rubus* takes a lot of time (Weber 1981). In everyday practice, this extra effort can only be justified by a special purpose of vegetation classification.

Omitting bryophytes in recording vegetation more profoundly affects a second- and third-level classification than lumping *Rubus*. This may be explained by the far more ecologically diverse bryoflora than *Rubus* flora. Bryophytes include many genera and inhabit a great diversity of soils (peat, sand, loam) and substrates (decaying wood), whereas *Rubus* only represents one subgenus inhabiting a smaller variety of habitats and with less species. Most species of the subgenus *Rubus* prefer loamy sand or loam, both rich in humus and nutrients (Weber 1995). If, in recording vegetation, a choice must be made between fully incorporating bryophytes or *Rubus* divided in species, the bryophytes deserve preference. Adding 18 records to the set of 137 records changes the second- and third-level classifications to an extent comparable to that of lumping or splitting *Rubus*. The effect of adding records is minimal when both bryophytes and *Rubus* species are included. Thus, adding records affects a classification more, as more species are excluded from the recording.

General-purpose vegetation classification (flora-based), and thus vegetation mapping, involves many decisions to be taken before field work starts. These decisions, all to different extents, may distinctly affect the resulting classification.

The effects result in different, incomparable classifications of one area and likewise in incomparable vegetation maps of that area. This incomparability between classifications and between vegetation maps impedes the advancement of phytosociology. Standardization may alleviate the impediment.
Acidification and changes in nutrient supply ratio as possible causes of declining plant species diversity in grassland and heathland communities.

Abstract [solely to provide context. Do not annotate!]

During the last decades plant species diversity has strongly declined in heathland and nutrient poor grasslands in the Netherlands. We investigated the relative effects of acidification and changes in nutrient supply ratio due to atmospheric deposition of sulphuric and nitrogenous compounds on plant species-richness and the abundance of threatened plant species in the nature reserve "De Leemputten" at Staverden, The Netherlands. We selected 68 plots in the study area evenly distributed among both species-rich and species-poor parts. For each plot we collected data on soil characteristics, above-ground biomass and vegetation composition. We used phytometers planted with Molinia caerulea tillers to measure the nutrient supply in the soil. Phytometers appeared to be an appropriate tool to measure nutrient availability. Soil acidity was most strongly correlated with plant species diversity in heathland and grassland communities. We found that increased N..P and N..K ratios in plant biomass had additional negative effects. All species in the data set that strongly declined after 1950 were growing in soils with pH exceeding 5 and most of these species were growing in soils with balanced nutrient supply ratios.

Discussion

In our study area variation in soil substrate determines vegetation composition to a large extent. The loam percentage is practically zero in the sandy soils where species-poor heath is the dominant vegetation. Grassland communities prevail on soils with a higher loam content. Management has been adapted to the soil and vegetation present: the grasslands are mown at the end of the growing season, whereas the dwarf shrub communities are left undisturbed. High loam percentage is correlated with higher soil pH, higher calcium concentration and lower aluminium concentration in the soil (Fig. 4). Also the nutrient supply ratios are correlated to loam percentage. N/P- and N/K ratios are high on the sandy soils and much lower on the silt and clay soils. Both species richness and diversity are strongly correlated to loam percentage. Species richness varies but is relatively high in grassland and low in heath. In this data set, the parent material is the determinant of several measured parameters including management type. Therefore we first analysed the data set as a whole but subsequently analysed the two major vegetation types separately. The soil pH is the strongest predictor of species composition of a whole set of interrelated variables, including sand, silt, clay, Ca, Al and biomass (Table 1, Fig. 4). In Figure 1 and 2 the effect of decreasing pH on species diversity is clear. We conclude that increased acidity of the soil can be the principal cause for the declining species richness in nutrient poor grassland and heathland communities, which is in agreement with the results of other studies (Grime, 1979; Houdijk et al., 1993; Roelofs et al., 1996). However we found that nutrient supply ratios also influence the species composition. The effects of the nutrient supply ratio in the vegetation biomass are rather independent of the pH effect (Fig. 4). For species richness the multiple regression results indicate also a significant additional effect of the nutrient supply ratios measured in the vegetation biomass (Table 2). N/P and N/K ratios in phytometer plants are stronger correlated with loam percentage in the soil than these ratios in the vegetation are. Phytometer plants, all of one species, would be expected to give the most reliable information on soil nutrient availability. Vegetation composition is stable during a long time but differs between
the plots, which can explain the lower correlation with soil acidity or loam percentage (Fig. 4).

The amount of phosphorus and potassium available to plants is related to soil acidity in podzol soils. For plants the availability of soluble phosphates in the soil decreases below pH 6. Potassium availability decreases with soil pH too, because in podzol soils soluble potassium is leached more when CEC is low (Bolt and Bruggewert, 1976). The availability of nitrogen for plants is primarily determined by the mineralisation of organic nitrogen in the soil which increases with an increasing amount of soil organic matter and is less affected by soil acidity. The accumulation of soil organic nitrogen is largely determined by the atmospheric deposition. Total atmospheric deposition of nitrogen, corrected for canopy uptake of ammonium, is 30-45 kg/ha/year in comparable heathland sites (Bobbink & Heil, 1993). Nitrogen deposition increases N mineralisation but it may also accelerate soil acidification. Yet nitrogen deposition may increase N supply, but decreases the supply of P and K and thus, strongly increases N:P and N:K supply ratios. Our results (Fig. 4) support the hypothesis that nitrogen deposition has additional negative effects on plant species diversity in heathlands by inducing high N:P and N:K ratios.

In this data set most plots are located at sites where the N:P ratio of the vegetation exceeds 16 (Fig. 1, 2). This indicates that phosphorus is the most important limiting nutrient for vegetation growth (Koerselman and Meuleman, 1996), which is usual in heathland vegetation on podzol soils in the Netherlands (Dienmont, 1996). However, the high heterogeneity in soil and vegetation composition of the nature reserve is illustrated by the broad range of N:P ratios in the data set including N:P ratios indicating nitrogen limitation. Also, the variation in N:K ratio in the data set is high. Potassium seems to be a limiting nutrient for vegetation growth in at least part of the plots. The aboveground biomass of the vegetation on these nutrient poor soils is at its maximum at intermediate nutrient ratios, indicating that not one single nutrient is strongly limiting (Fig. 3). Balanced nutrient supply ratios favour plant growth. Also, most of the endangered species are found in vegetation with balanced nutrient supply ratios (Table 4), when more than one nutrient is limiting vegetation growth. Nitrogen deposition will cause an increase in N:P and N:K supply ratios, and is therefore a serious threat for the species richness in nutrient poor grassland and heathland communities.

The nutrient concentrations and nutrient ratios measured in phytometer plants are strongly correlated with number of species and diversity (Table 1). The weight of phytometer plants is strongly correlated with aboveground biomass of the vegetation. In this data set a phytometer appears a good tool to measure the nutrient availability for vegetation in the soil.

Six species in this data set are on the red list or are protected in the Netherlands. All these species strongly declined since 1950. Other species in the data set that strongly declined after 1950 are Succisa pratensis, Euphrasia stricta and Rhynchospora alba (Mennema et al., 1980, 1985; Van der Meijden et al., 1989). All declining species were growing in soils with pH exceeding 5 (Table 4). In Dutch heathlands soil pH nowadays is usually below 5 (Dienmont, 1996). Due to the exceptional soil conditions with Ca rich loamy layers which maintain relatively high soil pH despite the high deposition of acidifying compounds, our study area has an almost unique vegetation with many species that have strongly declined in other areas. Only the common heathland species C. vulgaris and E. tetralix and S. cespitosus are growing in soils with low pH. Even the common grass species Molinia caerulea which is growing all over the nature reserve, prefers soil pH above 5.

The N:P ratio measured in individual species can differ considerably of that of the total vegetation in which they are growing (Table 5). Competition for nutrients may affect the uptake ratio and some species certainly are better competitors for one or more nutrients (Braakhekke, 1980). Gentista anglica (leguminoses) can easily acquire nitrogen by N2 fixation which is shown by an N:P ratio higher than that of the surrounding vegetation. The N:P ratios in plants of Parnassia palustris, Gentiana pneumonante, Succisa pratensis and Rhynchospora alba are lower than those in the whole vegetation. These species seem to be relatively strong competitors for phosphorus. Specially G. pneumonante and R. alba were found in vegetation with high N:P ratio.

Summarising, we can conclude that increasing acidification can be seen as the most important
threat for all declining species in this data set. Increasing N/P and N/K ratios have additional
negative effect on the abundance of endangered species. Further research will focus on the
influence of N/P and N/K ratio on plant growth in some of the declining species.
Appendices

Appendix 5.2a The 6 questions used in Part 1 of the reception study

1. Choose ONE of the following to describe the English of this Discussion:
   - very poor
   - poor
   - adequate
   - good
   - excellent

2. Choose ONE of the following to describe how the author presents and develops the Discussion:
   - very poorly
   - poorly
   - adequately
   - well
   - excellently

3. Choose ONE of the following to describe how the text flows from sentence to sentence:
   - jerkily
   - unevenly
   - smoothly
   - Sentence flow isn't an important issue to me

4. Choose ONE of the following to describe the overall sentence length:
   - generally too short
   - generally too long
   - an unsatisfactory mix of lengths
   - a satisfactory mix of lengths
   - Sentence length isn't an important issue to me

5. Choose ONE word from EACH of the following 3 pairs to describe the writing style:
   - plain / elaborate
   - appropriate / inappropriate
   - direct / indirect

6. How much editing and revision does this text require prior to publication? (You may choose more than one):
   - copy-editing (minor corrections of grammar, spelling, punctuation)
   - revision by an editor specialising in non-native English texts
   - revision by author
   - drastic editing (reorganisation of text, rewriting)

Your comments:
Appendix 5.2b The e-mail questionnaire to elicit personal data

Attached (in Word6) is Text …. Let me know if you cannot open and read the file. Please read the text and assess its effectiveness and acceptability AS A DISCUSSION SECTION. After you’ve read the text, please answer the following questions and return the e-mail. You will then be sent another of the three texts, or Part 2 of the survey. Part 2 will be sent by regular post. It consists of print-outs of the same three Discussion sections, which you will be requested to annotate and return.

QUESTIONS:
IF THIS IS YOUR FIRST TEXT, PLEASE ANSWER THE FOLLOWING QUESTIONS ON YOURSELF FIRST, OTHERWISE GO STRAIGHT TO THE QUESTIONS ON THE TEXT, BELOW.

I. READER DATA:

Your age:. Your sex: Your science:

Which language(s) do you read research articles in?
Which language(s) do you write research articles in?
Appendix 5.3 The instructions sent out with Part 2 of the study

Survey of the style of Dutch-authored research papers written in English:
Second and final part

Earlier you read and judged three Discussion sections from unpublished Dutch-authored research papers. This second (and final) part of the experiment seeks to find out in more detail what aspects of these texts readers with different mother tongues experience as problematic, and why. Therefore, please reread the test texts, but with a pen or pencil in your hand, making changes that you think would improve the English and the text’s effectiveness and appropriateness. (There is enough space to write between the lines.) If you are dissatisfied with a part of the text, but cannot think of a satisfactory way of improving it, or think it would take too much of your time and effort to improve it, please underline or circle the problem word(s) and indicate the nature of the problem in the margin. Examples of marginal comment might be ‘unclear’, ‘repetition’, ‘wordy’. Marginal comments suggesting strategies for improving the text are also welcome. Please write clearly.

Once again, please read the texts in the order you receive them. Please remember to record the time you started and finished reading and annotating each text.

Please use the preaddressed label to return the annotated texts to:

J. Burrough  
c/o Center for Language Studies  
Dept. of Applied Linguistics  
Room 504  
University of Nijmegen  
Erasmusplein 1  
6525 HT Nijmegen  
Netherlands

Thank you very much indeed for taking the time to participate in this experiment. Please e-mail me (…..) if you would like to receive my final report.
Appendix 5.4 Mapping the textual changes

In order to be able to map textual changes, I used the Excel spreadsheet program to convert the texts into grids. The two principles followed were:

1. Each grid cell contained an ‘editable unit’ or EU. An EU could be a single or hyphenated word, or an abbreviation (‘e.g.’, ‘et al.’, ‘N/P’, ‘Fig. 4’, ‘Ca’) or a punctuation mark. The punctuation marks that were EUs were:
   - comma (COMMA)
   - full stop (STOP)
   - opening bracket (LBRA)
   - closing bracket (RBRA)
   - semi-colon (SEMI)

2. Each horizontal line of the grid represented one line of text. Note that because an EU could be a single punctuation mark (a comma, for example), lines with numerous punctuation marks were longer in the grid than on the page. Numbering the x and y axes of the grid yielded a code whereby the exact location of a grid cell could be specified by its grid coordinates, in the same way that a geographical location can be specified by the coordinates on a topographical map. The result is a grid reference comprising the line number, then a slash, and then the column number.

   To make it easier to work with the maps I used the downsizing option on the spreadsheet program to reduced each textual map to a size that would fit onto an A4 sheet. Fortunately, each of the test texts could be fitted onto an A4 in this way, though the longest text (A) was barely legible when its map had been shrunk to A4 size. Paragraph indents were visible on the text maps as a blank grid square at the start of the line. In Text R I did not leave blank rows in the text map where blank lines had separated unindented paragraphs in the original text. On all text maps I used a * in the line-number column to indicate that the line in question had been the first on a new page. In Text A, I used ! in the line-number column, to indicate a subheading.

   The readers’ textual annotations could be to single EUs or to contiguous units (a phrase, with or without a punctuation change). The annotations might be a deletion, or a substitution, or the insertion of punctuation or one or more words. Deletions and substitutions were straightforward to record: as one grid reference (e.g. Text R grid ref. 25/4) or (for several EUs), the first and last EU affected (for example, Text K grid ref. 45/11-15). In the case of an insertion, I noted the grid reference of the EU immediately to the left of where the insertion was made.

   Hotspots (i.e. reader convergence on EUs) can be depicted by varying the shading or colouring of the EU, to reflect the degree of convergence. The convention is to use pale shades or colours for low frequencies, grading up to dark shades or colours for the highest frequencies.

   One advantage of converting texts into maps and of plotting textual changes by colouring or shading the relevant grid cells is that this gives a far better overview of the ‘hotspots’ in a text and their mutual relationship than merely totalling and tabulating the changes. As shown in chapter 8, when presenting some results as maps, it is often the position of a changed EU in terms of its rhetorical function (in a
sentence, in a paragraph, towards the beginning or towards the end of the Discussion) that is important.

As the grid references of all the textual annotations studied were recorded, it would have been possible to produce maps showing annotation hotspots for each class of annotation. For example, prior to statistically analysing the verb tense changes, I created maps of the occurrence of verbs and of the tense changes. Unfortunately, it proved too expensive to reproduce the maps in colour in this thesis. The few monochrome examples included indicate the potential of this technique which, I hope, will be refined and used by other researchers to effectively illustrate where in a text certain features occur. Atlases of textual features could prove useful for researchers, teachers and students.
Appendices

Appendix 5.5 Readers’ comments (uncorrected!) collected from Part 1 questionnaire ‘Comments’ section

(codes to reader’s mother tongue: A=American English, B=British English, C=Catalan, D=Dutch, E=Spanish, French, G=German, S=Swedish
The number appearing immediately after the slash indicates the permutation in which the texts were read: 1 = AKR, 2 = ARK, 3 = KAR, 4 = KRA, 5 = RKA, 6 = RAK)

TEXT A

A4/2 35 years, male, reviewer: Biggest problem was verb tense agreement. Some sentence construction was confusing. For a few sentences, I could not definitively understand what the author was trying to state. Some reorganization would be helpful. Better organization might be achieved if Architecture was made a separate subheading from Allocation and Turnover.

A5/1 48 years, male, non-reviewer: Thought processes seemed OK, but at times a little jerky. Overall Good for non-English speaking author.

A6/1 38 years, male, reviewer: In terms of content, this discussion is fine. It needs to be revised for sentence structure, especially for tense and case-matching. In my experience with copy-editors, they don't do that particularly well (often mangling the intent of the author), so I would prefer to have a collaborator/editor specializing in non-native English do the revisions as opposed to a copy-editor.

A7/6 29 years, female, reviewer: I found the structure of Text A’s Discussion to be appropriate, but the sentences and the repetitive nature of the writing make the conclusions difficult to ascertain from the writing. I think the author needs more guidance in summarizing his/her own work and that of others. In some of the summaries there is too much detail about a study (usually a study that the author is citing), in others, the detail is lacking (usually in relation to the author's own study) so that the point is hard to follow.

In most instances the English mistakes are not difficult to correct, or to understand the author's true meaning. However, it is obvious that the author has difficulty with choosing the correct prepositions, singular/plural forms of words, and the past/present tense of verbs. Some of the word choice is wrong, making the author sound more carefree or sloppy than is intended. Thus, I recommend an English speaker go through the text with this author. I think an editor specializing in non-native English speakers is not really necessary and a bit extreme (but it is the closest option listed above that I can recommend, as it is obvious the author needs someone more familiar with English to go through the article with him/her).

A8/6 60 years, male, reviewer: The paper should begin, "We are testing the hypothesis of Tulip and Jonquil (1989) that nutrients affect plant architecture, etc. To test this hypothesis, we did the following: blah, blah, blah."
"The hypothesis fails for the following reasons:  blah, blah, blah."

"The competing hypothesis of Narcissus and Scilla (1991) argues that . . . . Our data support this hypothesis, in that . . . ."

Tell me exactly what hypothesis you are testing, tell me how you propose to test it, and tell me whether the hypothesis is supported or refuted. Please do not introduce abbreviations like SLA and SLR without defining them. In the copy I received, they were not defined, and the result is that many sentences became incomprehensible.

I was given no idea why the test plants were chosen. Who says a weed has to be adapted to low nutrient levels? Many favor over-fertilized cornfields, for example. Plant architecture just among common weeds varies enormously; that is, there are self-evidently many different architectures that are equally adaptive. There are many different strategies for being weeds, too: make a zillion seeds as quickly as possible, hang on for the long haul, and so on.

This paper is not a fair test of non-native English, I think. If it is incomprehensible, and I think it is, then that results from careless organization of one's thoughts, from lack of coherence and logic. It would suffer the same faults in Dutch, I feel sure.

B1/2 25 years, male, reviewer: The general message comes across. However, I felt that the main problems are with the grammar and text flow, which mean that the intricacies of the message are not easy to extract. Although the presentation of each separate point is clear, editing would be essential in order to improve the flow and clarify the development of the argument. Given that the author has presented the text in this condition, then editing should perhaps be carried out by somebody with more practice in editing/writing English language texts.

(I'm now worried that there are grammatical errors in the above comments!)

B2/1 59 years, male, reviewer: The lack of commas separating clauses makes the text difficult to understand. Also hyphens are not used to show word groups acting as single adjectives e.g nutrient-rich, short-term, leading to irritating big stacks of apparent adjectives.

B3/3 33 years, male, reviewer: The message was clear, but there was some work needed. Many of the problems are highlighted by the automatic spelling and grammar checking in Word 7. The biggest problem was the use of tenses. Most journals prefer work carried out to be reported in the past tense.

B5/4 56 years, female, reviewer: English here bad: tenses of verbs mixed, singular and plural often wrong and hyphens for linked adjectives (nutrient-poor) universally missed. Not always clear what were predictions and what were facts or conclusions. Poor English interfered, sometimes seriously, with comprehension of the text.
Appendices

B8/1 34 years, male, non-reviewer: English is poor, making some sections almost impossible to understand. Couldn’t read the whole thing through, gradually it becomes more and more complicated and poorly written.

B9/5 48 years, male, reviewer: This text article has faults rather similar to the first one I looked at. Basically the science is fine and the arguments are presented in a logical and sensible fashion, but the message is somewhat obscured by poor sentence construction or incorrect word usage. More commas are required, some in crucial parts of the sentence: without them, the meaning is lost. …Tense still wrong in places …[in the Conclusions].

C1/4 34 years, male, reviewer: I find hard to answer question 5.

C2/1 38 years, female, non-reviewer: There is nearly no punctuations in the text. Abbreviations are not explained. The reading of the text is heavy.

C3/5 34 years, male, reviewer: The author should state his ideas more precisely and he should be more careful with the terminology.

C5/1 28 years, female, non-reviewer: Sometimes it is difficult for me to understand the ideas the author wants to express. It might be due to different causes: poor English, some explanations are too short to understand the whole idea... The subject of discussion seems to me a little bit complicated.

D1/1 52 years, male, reviewer: Before any copy editing or linguistic checking can take place, the author needs to rewrite the discussion, focusing much more clearly on the research questions. As it stands now, even with the abstract given large parts of the discussion are too implicit to make sense.

D2/4 53 years, male, reviewer: In general the text is easy to understand and well structured. One point might be that the authors open with the remark that most studies are short term but do not make explicit what they mean by short term. Apparently 16 weeks is long term. Another confusing item is that the experiments refer to nutrient levels but in the discussion this is equated with successional stage, implying that early stages are nutrient rich and later stages are nutrient poor. That is typical for Dutch systems that are overfertilised and now been managed for reduction of nutrient levels. This is confusing especially since in other countries and other ecosystems the reverse is true (and also the "normal" way successions develop). This makes the discussion somewhat myopic. Lastly, the second section uses absolute and relative measures of biomass and these fit the terms architecture and allocation, respectively. It takes a while for the unaware to understand this. This also applies to the use of the term plasticity. Their is a lot of debate what the term implies but the reader is left guessing what these authors (or this author) mean by the term. That part of the discussion was not particularly clear to me at least.
D5/3 56 years, male, reviewer: An old-fashioned descriptive approach. Predictions of theory are not really tested. Reading this discussion did not make me happy.

D10/6 34 years, male, non-reviewer: Apart from the sometimes very poor English, obvious typing errors or omissions spoil the reading or rather blur the view on the true scientific content of the discussion.

D11/5 37 years, male, non-reviewer: Many spelling mistakes, mixing of tenses (?). Structure of the discussion is OK, but the language used does not make it pleasant reading.

E4/4 35 years, male, reviewer: Too short sentences make the style very direct but is not easy to follow. May be longer sentences should made easy to understand the discussion, specially during the first paragraphs.

F1/6 28 years, male, reviewer: My opinion could be biased since I think the scientific interest of this experiment is reduced.

F2/3 25 years, female, non-reviewer: The discussion is well-developed with a lot of references illustrating different results which have been found in other experiments; the style is clear.

F3/1 43 years, male, …: Although my research field is different, I easily understood the discussion. I find the text synthetic and clear. Only the unknown abbreviations (SRL, SLA, RGR…) bring some darkness.

F4/2 30 years, female, reviewer: There are quite a few minor spelling and grammatical mistakes which can be easily corrected. Some sentences need rewriting because they are very difficult to understand. Overall I found it difficult to understand what point the authors wanted to make in each paragraph and I missed the logic links between them. This might be due to my lack of knowledge on the topic of the paper.

G1/5 47 years, male, non-reviewer: Every abbreviation has to be explained (in brackets) at their first use. What is RGR for example? The discussion should be structured optically i.e. with paragraphs or new lines or with numbers, for better reminding the results.

G3/2 42 years, male, reviewer: Individual sections of the Discussion have contrasting quality: "Method and annual performance" is rather weak (e.g. no comparison to results from other authors), the title "Plasticity" does not indicate "of what?", and within the "Architecture, allocation and turnover" section more emphasis should be put on turnover - but on the whole the discussion is quite interesting for somebody being not specialized in this subject, whereas for an expert it might give too little new ideas since in most cases only reference is made to existing literature but this is not evaluated for making predictions or developing new hypotheses.
G6/2 38 years, male, non-reviewer: topic and results are not a scientific revolution ;-)

J1/5 36 years, male, reviewer: This is very good ms and I am personally interested in this paper because the topic of this paper is very relevant to me. However, I found some punctuation and syntax errors. I also felt that a few sentences gave an impression that this ms was written by a non-native speaker of English (e.g., the last sentence of the text; As a final conclusion, ..., and nutrient losses.

J2/4 45 years, male, reviewer: This article includes information which would contribute to enhancing our understanding on the ecological characteristics of the two contrasted groups of plant species from nutrient-poor and nutrient-rich habitats. The discussion is well-written. However, discussion of the authors is rather qualitative, in spite that they have quantitative data on plant growth and partitioning in response to different nutrient levels. If I were a reviewer for an international journal, I would suggest the authors to include some quantitative analyses/discussion by referring previous works which deal with quantification of plant growth and/or architecture.

J4/2 30 years, male, reviewer: Your discussion is very interesting, and this paper should be acceptable after suitable revision. Main problems of this article are the complexity of English. There are many too long sentences and some of them are hard to be understood. The first paragraph of discussion and part of conclusion are redundant. We recommend you to reduce the number of such redundancy and to simplify the architecture of discussion.

J6/2 32 years, male, reviewer: I think that the structure of this discussion is adequate and reasonable. However I think that this is not ascribed to linguistic ability. Because I think that the study on the growth dynamics of herbaceous plant is more refined than other study theses of vegetation science. For example, in vegetation science of forest community, there are still descriptive studies. In the papers of these descriptive studies, the flows of data are more important, rather than the flows from sentence to sentence. In this case, I think the shortage of methods and results is more emphasized by linguistic ability. Therefore, I think that the study thesis and their method (experimental study or field study) should be considered for linguistic research.

J7/1 32 years, male, non-reviewer: I think your English is so excellent compared with "Japanese English". The education in English of school in Japan is not useful at all. In case of me, manuscript written in English for scientific papers was checked several times by my supervisor and company of correcting service in English. I hope to write excellently in English such as your paper.

S4/6 37 years, male, reviewer: I noticed that my judgements are more 'negative' when I read the paper as a 'reviewer' than as a 'researcher' that focus on the scientific contents. The comments above are a compromise between the two approaches.
TEXT K

A3/3 35 years, male, reviewer: English prose is generally most effective when it is concise, simple, and direct. This is an essential principle for any author of scientific papers, whether the author is a native English speaker or a native Swahili speaker.

In this case word choice seems to be author's greatest stumbling-block. To some extent this difficulty can only be overcome by careful reading and conscientious vocabulary-building in the English language literature. However, short, concise sentence structure can greatly assist in correct word choice.

One final comment: To some extent my negative impression of the passage has to do with what I perceive as lax scientific content as well as poor language use. My opinion, however biased, is that "phytosociology" as a discipline is plagued by unclear methods, objectives, and questions. It stands to reason that the prose in this field will also tend to be obtuse and poorly-constructed. My prior experience is also that papers in this field tend to be convoluted and unclear, regardless of the language medium used.

A4/2 41 years, male, reviewer: Overall, the discussion was clear and easy to follow. Occasionally there were some poor word choices or phrases that confused my initial reading of a sentence, but the intent was clear.

A5/1 48 years, male, non-reviewer: I recommend copy editing prior to publication …with a concentration on the paragraph that begins "For classifying the vegetation---------." This particular paragraph departs from the direct style displayed in the remainder of the text. Sentences that begin "For classifying...,", "Imposing...", "Most precise is to....", A conclusion was that ...", and "A practical consequence of these observations is,......" are awkward and this paragraph should be revised before publication.

A6/1 38 years, male, reviewer: This is more a mix of results & discussion, and does not present a good synthesis of the work. My conclusion here is independent of the writing style/english usage, which needs only a little bit of clean-up. The style issues might become more apparent once the content was cleaner/more readable.

A7/6 29 years, female, reviewer: Text K has two sets of problems, one is the discussion itself, and the other is the use of English. Based upon what is written in the abstract, there must be an entire section of the discussion that is missing, that would address the results for the different types of statistical tests (e.g., kappa, bootstrap-mean kappa). The second paragraph is trying to say that different methodologies have different levels of subjectivity. Unless the papers the author cites as examples are extremely well-known in the field, the author's points would be much stronger if he/she described what makes the methods used by (Greigh Smith, 1964; Smartt & Grainger, 1974; Nelder et al., 1995) so objective. The conclusion is very weakly stated. Based upon the author's findings for bryophytes versus Rubus
inclusion/exclusion, and potentially the points made in the beginning of the Discussion, the author could make a stronger conclusion.

Most of the English mistakes can be figured out, but there are actually a few sentences where it is very difficult to comprehend what the author is trying to say. The misuse of certain English words or phrases weakens the author's points, as they sound sloppy or informal. A few sentences are much too long, but a few in the conclusion are too short and clipped. Unfortunately much of the author's arguments and points are lost or made weaker by the confusing English mistakes. I think that this paper has a lot of interesting results, but until it is more clearly written, I believe those points will be missed.

A8/6 60 years, male, reviewer: The subject matter of these pieces of non-native writing has been ecology and phytosociology. Both are notoriously vague and difficult-to-quantify areas. That makes writing about them very difficult, which may be why you chose them for this test. Still, it leaves the reader in a quandary: is the author's command of English fuzzy, or is it the subject matter that is fuzzy. It seems to me these things just sort of end, but don't come to any conclusions. An explicit statement up front of the hypothesis to be tested would force a conclusive statement at the end. I guess this is why I don't do this kind of work; it seems so unsatisfying, so open-ended, so lacking in revealing anything lasting and permanent. Give me vascular plant taxonomy any day: the species are these, their types are these specimens, they can be distinguished by these characters, their known distributions are here, here, and here.

A9/3 34 years, male, reviewer: This discussion is generally well-written. There is a bit of jargon used, but I assume these terms would be defined earlier in the manuscript. Some of the paragraphs are a little choppy, but this is not a serious problem. The authors should make more of an effort to make smooth transitions from one paragraph to the next.

B1/2 25 years, male, reviewer: A clear, legible text. One or two minor grammatical problems, but on the whole it flowed well, and the separate points that were dealt with stood out clearly. There were one or two small points that I didn't understand, but I think this is probably the result of my ignorance rather than a lack of clarity.

B2/1 59 years, male, reviewer: Some unusual traits show the foreign origin of the text even though the style is pleasant and easily comprehended e.g. placing adverbs early: paragr 4 "Only recently, the - - - became clear". "Still, many - - - are not fully covering", and there is a blunt sentence in paragr 3: "Most precise is to classify these areas separately", where "It is most precise - - " would be normal.

B3/3 33 years, male, reviewer: If I were refereeing this, I would not be overly worried by this text. It needs some work to make it flow, but the message is clear.

B5/4 56 years, female, reviewer: Poor English is a minor irritation unless it obscures the SENSE: in a few places in this extract the sense is unclear, mostly because of
inappropriate choice of words. Co-operation between a skilled editor and the author would be needed to clarify the sense in these instances.

In some places, e.g. the last paragraph, I think the sentences are too short but regard this as a minor problem.

**B8/1 34 years, male, non-reviewer:** English is much improved on previous [A], but it doesn’t flow well. I’m not sure what they are getting at precisely.

**B9/5 48 years, male, reviewer:** The science as described in this article is fine, but the understanding of what is being said is definitely obscured by poor English. …I think the message is important, but it will be sad if it is not clearly recognized due to poor sentence construction and poor use of appropriate wording. Interestingly, the actual structuring of the sentences and paragraphs is fine, as is the scientific development of the arguments of the discussion.

In brief, some sentences need rearranging, some words need omitting, some need replacing by more appropriate words and one or two sentences actually need rewriting to make the message come across loud and clear. The length of sentence is generally all right, although some effort to mix lengths would improve ‘impact’. In paragraph 5, the tense goes a bit haywire i.e. "Adding 18 records to the set of 137 records changes the second- and third-level..." (should be "changed"). At the end of the Discussion, the words "the impediment" should, in my view, be replaced by "this problem".

**C1/4 34 years, male, reviewer:** In general, I think the style is fine, however, there are some unclear sentences and concepts.

**C5/1 28 years, female, non-reviewer:** The author does not refer to his own results in the discussion section, so the ideas are exposed in the text without introduction. That caused some confusion to me when I first read the paper.

**D1/1 52 years, male reviewer:** Some revision by author needed to clarify some conclusions, followed by copy editing (and some linguistic work - the linguistic editor who checked this paper is himself Dutch, and that shows up in a few cases, I think).

**D5/3 56 years, male, reviewer:** the author tells us that he, or she, will discuss effects of the number of plots and the taxonomic groups that were selected on vegetation classification. The number of plots (or records) is not really discussed. There is only one sentence about record number and I donot understand it. There is much information about Rubus but there is no discussion about taxonomic groups in general.

**D11/5 37 years, male, non-reviewer:** the discussion is not used for discussing the results of the research. The first part of it should be part of the introduction of the manuscript.
E3/4 41 years, male, reviewer: It is difficult to judge on a Discussion text when you have not read the rest of the article, but I find it all right (I will not discuss my opinions about phytosociology here).

E4/4 35 years, male, reviewer: Very direct and short sentences, not smoothly bind to next ones. Is not a elaborate style (probably as mine is).

F2/3 25 years, female, non-reviewer: The discussion is clear but transitions between ideas (for example, effects of Bryophytes, Rubus species..) are missing. The conclusion is not forceful enough; the ideas are here but it would be more efficient to develop a little bit more to point out how important these results are.

F3/1 43 years, male, ...: The different themes of the discussion are not clearly introduce. It is not easy to understand directly (at the first reading) the target of the author. Also the sentences sometimes don't flow each from others.

F4/2, female, 30 years, reviewer: it is a little difficult to move from one paragraph to the following the end of the discussion is a little too abrupt but I think it is globally pleasant to read.

G1/5 47 years, male, non-reviewer: excellent ! A little bit too many foreign words.

G3/2 42 years, male, reviewer: The Discussion starts rather general (more like an Introduction). The relationship between the authors' own results and the topics discussed do not become fully clear. The critical evaluation of the own data is rather week.

J1/5 36 years, male, reviewer: I had great difficulties to understand this ms. One of the reasons is that I am not a specialist on this topic. However, I think this ms is not very good. Because the structure of discussion was not well organised. It is obvious that the first two paragraphs should be moved to introduction. In addition, the order of points that were described in abstracts was not the same as the order in discussion.

J2/4 45 years, male, reviewer: If I were a reviewer of this article to be submitted to a scientific journal, I would recommend to an editor to decline it, simply because the article concerns only technical points on vegetation classification. This type of article would be more suitable to be published in more practical-oriented journals rather than those of ecological sciences.

J7/1 32 years, male, non-reviewer: I am so interested in this paper. If possible, could you send me a copy of this paper?
J8/5 34 years, male, reviewer: Needs a stronger conclusion. Authors need to discuss how they can standardize the vegetation classification based on their results.

S1/1 58 years, male, reviewer: It is very unclear how the results of this study relate to previous findings. No comparisons are made. The Discussion actually gives the impression that only previous studies are discussed. What conclusions could be drawn from this study? The heading is "Discussion and conclusions" - what are the author's conclusions? Moreover is it fuzzy - for example, the abstract speaks about "plots", the discussion about "records". Are these identical, or what? And other such terminological questions can be put.

S2/4 39 years, male, reviewer: Not streamlined for rapid and efficient transfer of info. I thought the part where the discussion of Rubus appears was included by mistake. Unfortunately, it seems not so. Too much repetition, unsmooth transfer between paragraphs and a prominent lack of logic sequence.

S4/6 37 years, male, reviewer: [re: how author presents and develops Discussion’] - I would prefer more detailed discussion of particular observations made in the present study. If this is considered an aspect of ‘how to present and develop the Discussion’, I would change the judgement [‘adequately’] to ‘poorly’

‘[re: ‘how much editing/revision required’ and his reply ‘editor specialising in non-native English’]’ - For a better choice of terms and word combinations in some sentences

Again, I have a feeling that my evaluation is influenced by the situation (which resembles that of a reviewer of a manuscript). There is no guarantee that I would make the same evaluation if I read the paper as an ordinary reader or if the paper was in my own field.

TEXT R

A4/2 41 years, male, reviewer: Lack of cohesive organization is the biggest problem. There also appeared to be some redundancy of certain topics previously discussed. Commas could have been used more frequently to aid the reader with the longer sentences. I often had some difficulty following the authors' logic from one sentence to the next. There was also a lack of consistency (N:P versus N/P).

A6/1 38 years, male, reviewer: This is the clearest of the three I've read. Although sentence length isn't of real concern to me, the consistent use of short, declarative sentences makes this discussion less interesting to read than one with a mixture of lengths and voices, but as an editor/reviewer, this wouldn't be a relevant concern.
A7/6 29 years, female, reviewer: Most of the Discussion section is clear and not difficult to understand what is actually written. There are a few minor English grammar errors and errors on word choice, but nothing that could not be understood by someone familiar with English. At the beginning some of the sentences were very abrupt, but near the end there were several that were too long. I think the Discussion needs some organizational work, some of the points the author brings up in the final two paragraphs (before the summary), I would have expected to appear earlier in the Discussion. The summary is very abrupt and not very effective based upon what has been said in the Discussion prior to it. Overall I think a few more guiding sentences in each paragraph would be helpful for readers, so that the Discussion doesn't seem to ramble so much from one topic to another.

A8/6 60 years, male, reviewer: I don't think I am being much help here, because the sample is too truncated. And there's some funny science: It says soil pH is the strongest predictor of species composition, but it may well be that species composition determines, to some extent, the pH of the soil. Can the authors exclude the possibility that they are confusing cause and effect? Nutrient availability varies with pH in many soils, especially those with a silt or clay component. Is it the English or the science that is causing me so much trouble -- I cannot tell.

A9/3 34 years, male, reviewer: Paragraphs tend to be too long and cover too many topics. Shorter more focused paragraphs would improve the style of this paper.

B1/2 25 years, male, reviewer: Statements of fact need some elaboration and reference to examples to back them up. In some cases that arguments need to be expressed more fully. I get the feeling that because the flow of the argument is clear to the author, they assume it is also clear to the reader. As a result in some places I felt that ceratin steps in the development of the arguments were missing. At a large number of points there are sudden changes in the subject that is being discussed, which makes the flow seem jerky. The paragraphs seem too long, and by the time I got to the end of them I had forgotten what the initial subject of the paragraph was.

B2/1 59 years, male, reviewer: The first three paragraphs are far too long, and contain too many strands of thinking. Paragraph 1 reports conclusions, methods, site description, similarities with other studies, etc. And it deals with acidity effects and nutrient-supply ratio, which each would make topics for single paragraphs. I would prefer to see more hyphens e.g. dwarf-shrub communities. The last sentence of the Abstract is very confusing. The last sentence of paragraph 1 has two non-standard English usages, needing perfect tense rather than present, and a change of preposition -“composition has been stable for a long time”. And there are more similar examples.
B3/3 33 years, male, reviewer: The text is very bitty, with little flow from sentence to sentence. I was very interested in the science as this is related to some work I am involved with. Perhaps this affects my judgement.

B5/4 56 years, female, reviewer: Presentation good in the first (long) paragraph of the Discussion but more difficult to follow and less good in the second and third paragraphs.

Overall, the English is reasonable and in only a few places does it obscure the sense: careful re-reading of obscure sentences was enough to sort out the problem - but this does make reading the paper more difficult and requires more time.

B9/5 48 years, male, reviewer: Generally, a very well written text in clear, easy to understand English. A few commas are needed here and there

C3/5 34 years, male, reviewer: The text is not easy to read but it is understandable. The author should check the terminology.

C6/4 35 years, male, non-reviewer: Although english level is adequate, some grammatical mistakes are persistent (mostly an inadequate use of article "the").

C7/3 33 years, female, reviewer: The first paragraph belongs to Results and not to Discussion

D1/1 52 years, male, reviewer: The text is a bit repetitive, with some elements turning up in various places. Some restructuring might prove worthwhile, e.g., putting together the bits and pieces on pH, on nutrient ratios, and on the phyto meter approach. Although the English is good, a check by a specialist linguistic reviewer would lead to further improvements. Some copy editing will still be necessary.

D8/1 25 years, female, non-reviewer: The content of this text would definitely be more clear if the figures were there. But that’s more due to the topic then to the writing, i guess.

D10/6 34 years, male, non-reviewer: First part of the discussion was okay but it gradually deteriorated. The English became rather Denglish. Knowledge of Dutch was an asset as things appeared to be translated word by word. Furthermore sometimes the author simply jumped from one subject to the other. Facts and assumptions suddenly popped up. Or maybe the author just skipped some lines. In general it became less balanced towards the end

D11/5 37 years, male, non-reviewer: I do not have many comments on style and grammar, although it is not written attractively. The discussion however is not what a
discussion should be like: namely, a proper discussion of the results, and proper organised. It lacks a pleasant structure which makes it hard to understand.

**E1/6 22 years, male, non-reviewer:** The two basic ideas are well understood, but I think that the author replays in excess the results to reach that two ideas. I think that the discussion could have been better if shorted or summarized. Also, with regards to the scientific value of the text, I think that the results are not completely innovations. Sorry.

**E3/4 41 years, male, reviewer:** I would like to receive this article!

**E4/4 35 years, male, reviewer:** Better than previous text [text K]. But VERY SHORT AND DIRECT sentences, it flows not smoothy but the text is clear and it’s very understandable

**F1/6 28 years, male, reviewer:** Too much editing mistakes (symbols, abbreviations, punctuations). Problems with the discussion which in part sounds like the presentation of the results. Some sentences are too long

**F2/3 25 years, female, non-reviewer:** The argumentation is hard to follow; the logic of the text structure doesn't appear. The analysis of the effects of acidification on one hand, and nutrient supply on the other hand, are mixed all along the discussion. The text alone without tables and graphs is sometimes insufficient for the understanding.

**F3/1 43 years, male, reviewer** It is difficult to follow the thought process of the autor in this discussion. Sentences are often complicated and need to be read several times.

**F4/2 30 years, female, reviewer:** I did not really understand how the authors can draw their conclusion but the discussion flows well (except the first paragraph actually) and I found it interesting. I would think some points need clarification but this would probably be an easy job.

**G1/5 47 years, male, non-reviewer:** The understanding and readability of the complex text will be better, if it is better structured in spaced paragraphs. Every new topic or idea needs a new line. Often I had to read many sentences twice to understand, what the author wanted to say.

**G3/2 42 years, male, reviewer:** Discussion is very much fragmented, it jumps from item A to item B and C, them back to A without clarifying the relevance of any one of them, but repeating the same arguments to a great extent --- it is not clear what causes and consequences of the results are

**G5/6 28 years, male, non-reviewer:** More structere like bullets are very helppfull to emphasize the important facts
**G6/2 38 years, male, non-reviewer:** Sometimes it was hard to understand the logic of the discussion, especially without tables and figures. But: The language is a minor problem of the article.
What is the motivation of research? What are the conclusions for the nature reserve "De Leemputten"? What are the conclusions for further research? result: "increasing acidification...most important threat"; conclusion: "further research......N/P and N/K ratio" doesn’t make that much sense to me.

**J1/5 36 years, male, reviewer:** In general, the style of writing was clear and plain. The first paragraph, however, seemed not straightforward to me. I could not fully understand the author's arguments on a few points. Especially from l. 10 - 14; Species richness varies ....vegetation types separately. I also found some gaps in the author's logic between l.16 and l.20. I did not look at figures so it may not be fair to accuse the authors but the decrease in species diversity along with the decrease in pH did not necessarily mean that the increase in acidity of the soil was the principal cause of the decline of species diversity (in the text, the author wrote 'species richness but I guessed the author meant the species diversity but not the species richness). I am afraid that the author did not present enough evidence to support this conclusion. I think that these two points should be revised by the author.
I also had a general impression that not many papers were cited in the text. For example, the sentence in the second paragraph, l.4 to l.7; the availability of nitrogen .... by soil acidity, should be supported by a few cited papers.

**J2/4 45 years, male, reviewer:** The contents of this article seems to include scientifically interesting information. However, the logic of the discussion is basically poor although the English is not bad at all. If I were an editor or a kind reviewer, I would suggest the author to consult to his/her senior colleagues or advisor(s)/supervisor(s) for improving the manuscript.

**J5/6 31 years, male, non-reviewer:** It was too difficult to understand the opinion of the authors without any graphs and tables.

**J8/5 34 years, male, reviewer:** Hard to follow the interrelationships among multivariate and the logics to reach the conclusions

**S1/1 58 years, male, reviewer:** A clear discussion relating present findings to previous ones and to general knowledge. No question marks remain to be straightened out in the reader's mind. No problem with terminology

**S4/6 37 years, male, reviewer:** I understood most of the contents and the grammar of the individual sentences was OK (aside from a few expressions that sound 'unenglish'), but it was difficult to get the 'take home message' because of the uneven flow of sentences, the large number of repetitive arguments and the poor structure of
the text. A reorganisation would lead to more distinct, non-overlapping sections and reduce the length of the text. Many sentences probably belong to the Results section.

As a reviewer of manuscripts for journals, I have always tried to focus on overall structure, argumentation and scientific content rather than grammar and style (which must be the responsibility of the author or the editor).

**S5/5 47 years, male, reviewer:** My main criticism on this text is the bad flow sentence to sentence.
Appendix 7.1 Hedging annotations and the readers who made them

**TEXT A:** Hedging hotspots (italics indicate word(s) emended) and the readers making the annotations (reader codes: A = US, B = UK, C and E = Spanish, D = Dutch, F = French, G = German, J = Japanese, S = Swedish)

<table>
<thead>
<tr>
<th>Grid ref.</th>
<th>Text extract</th>
<th>Hedge added by</th>
<th>Hedge removed by</th>
</tr>
</thead>
<tbody>
<tr>
<td>32/14</td>
<td>…species from a nutrient poor habitat have generally</td>
<td>A6 B6</td>
<td></td>
</tr>
<tr>
<td>35/10-11</td>
<td>…we expect species…to have</td>
<td>A6 B8 C2</td>
<td></td>
</tr>
<tr>
<td>42/7</td>
<td>These species have a higher specific</td>
<td>F4 S4</td>
<td></td>
</tr>
<tr>
<td>44/7-8</td>
<td>This means <em>in general</em> that</td>
<td></td>
<td>A6 D10</td>
</tr>
<tr>
<td>46/2</td>
<td>…which <em>cause</em> a higher uptake</td>
<td>B5 B6 D1 D2 D10</td>
<td></td>
</tr>
<tr>
<td>48/7</td>
<td>This <em>causes</em> a higher biomass</td>
<td>B1 B3 B6 D1 J1 S4</td>
<td></td>
</tr>
<tr>
<td>59/12</td>
<td>This <em>effects</em> in a more efficient…</td>
<td>F4 C2</td>
<td></td>
</tr>
<tr>
<td>60/7</td>
<td>…which <em>make</em> them successful competitors</td>
<td>A4 F4</td>
<td></td>
</tr>
<tr>
<td>63/9</td>
<td>…which <em>will</em> be superior competitors</td>
<td>A6 F4 S1 J1</td>
<td>B6</td>
</tr>
<tr>
<td>85/1</td>
<td>This effect <em>might</em> be explained</td>
<td>A6 J1 B6 B9</td>
<td></td>
</tr>
<tr>
<td>86/3</td>
<td>The fact that they grow faster <em>caused</em></td>
<td>A6 A6 B1 B3 B9 D1 S4</td>
<td></td>
</tr>
<tr>
<td>86/10</td>
<td>…and <em>may</em> induce a poorer</td>
<td>A4 A6 B1 B3 B9 D1 S4</td>
<td></td>
</tr>
<tr>
<td>87/4</td>
<td>…which <em>results</em> in a functional response</td>
<td>A6</td>
<td></td>
</tr>
<tr>
<td>91/8</td>
<td>The functional response <em>can be regarded</em></td>
<td>A6 B9</td>
<td></td>
</tr>
<tr>
<td>92/11</td>
<td>This comparable functional response… <em>may</em> support</td>
<td></td>
<td>B5 B9</td>
</tr>
<tr>
<td>99/9</td>
<td>Results of this experiment <em>indicate</em> that…</td>
<td>B8 J1</td>
<td></td>
</tr>
<tr>
<td>102/2</td>
<td>…higher specific leaf area <em>causes</em> a higher RGR</td>
<td>A6 B3 B6</td>
<td>B8</td>
</tr>
</tbody>
</table>
Specification of changes shown above:
32/4 …species from a nutrient poor habitat have generally: DELETED
35/10-11 …we expect species…to have: should have/would have
42/7 These species have a higher specific: are expected to have/should have
46/2 which cause a higher uptake: permit/allows/resulting in/enables
48/7 This causes a higher biomass: leads to/can produce/leading to/resulted in/As a result such species reach/A higher biomass was shown
59/12 This effects in a more efficient: would result
60/7 …which make them successful competitors: may make them/would make them
63/9 which will be superior competitors: would/should/are
85/1 This effect might be explained: could/brings/may
86/3 The fact that they grew faster caused: may have caused/could lead to/may lead to/resulted in/produced/may have exhausted/may have/DELETED
86/10 …and may induce a poorer: caused/DELETED
87/4 …which results in a functional response: could result/producing
91/8 The functional response …can be regarded: could/may
92/11 This comparable functional response… may support: would support/DELETED
99/9 Results of this experiment indicate that…: DELETED
102/2 …higher specific leaf area causes: produced/leads to/produce/results in

TEXT A: The one-off changes (+ = hedge added (claim weakened), - = hedge removed (claim strengthened)) were:
12/7(+) J1 may → might
12/8-9 (-) B3 be caused → have resulted from
17/12(-) G6 expect → would expect
25/2(+) B1 would → may
29/12(+1) D1 generated by → strongly influenced by
31/11(-) D1 This together with our results leads to the conclusion → we conclude
35/2(+1) C5 expect → would expect
37/1(-) A6 general → DELETED
51/4-6(-) J1 in our view → DELETED
55/12(-) D1 may → DELETED
57/10(+1) J1 will → would
58/16(+1) J1 will → would
67/7(+1) S4 are → tend to be
72/12-14(-) J1 no evidence was found → did not show
87/16(-) B6 might → may
103/6(-) J1 We did not find → No species had
107/5(+1) E3 may → might
108/10(+1) F4 state → suggest
108/17(+1) F4 are → may be
110/4(+1) F4 are → may be
TEXT K: Hedging hotspots (italics indicate word(s) attracting hedging annotation) and the readers making the annotations (italics indicate word(s) attracting hedging annotation). Reader codes same as in table for Text A.

<table>
<thead>
<tr>
<th>Grid ref.</th>
<th>Text extract</th>
<th>Hedge added (claim weakened) by</th>
<th>Hedge removed (claim strengthened) by</th>
</tr>
</thead>
<tbody>
<tr>
<td>14/3-4</td>
<td>...most decisions remain to be made...</td>
<td>J1</td>
<td>A4 A9 D2</td>
</tr>
<tr>
<td>20/3</td>
<td>Most precise is to classify these areas...</td>
<td>C1 C6 S4</td>
<td></td>
</tr>
<tr>
<td>20/5</td>
<td>Most precise is to classify...</td>
<td>A7 F4</td>
<td>A5 B9</td>
</tr>
<tr>
<td>27/13-14</td>
<td>...it would be better to start mapping...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>34/13-17</td>
<td>...it is to be expected that</td>
<td>B3 B8 B9</td>
<td>A6 F2 J1</td>
</tr>
<tr>
<td>38/9</td>
<td>However, usually the full identification of the species...</td>
<td>B4 S4</td>
<td></td>
</tr>
<tr>
<td>47/15-18</td>
<td>...a choice must be made</td>
<td>B8</td>
<td>B9</td>
</tr>
<tr>
<td>56/4</td>
<td>The effects result in</td>
<td>B2 D11</td>
<td></td>
</tr>
</tbody>
</table>

Specification of changes shown above

14/3-4 ...most decisions remain to be made: have to be made/must be made/should be decided
20/3 Most precise: more precise/It appears most precise to/A better approach is
20/5 Most precise is to classify...: would be to classify/it appears more precise to classify
27/13-14 it would be better: is better
34/13-17 it is to be expected: may be expected/can be expected/ is likely/we found/DELETED
38/9 usually: DELETED
47/15-18 a choice must be made: it would be preferable to/is made
56/4 The effects result in: may result

The one-off changes (+ = hedge added (claim weakened), - = hedge removed (claim strengthened)) were:

7/12(-) A7 often → DELETED
12/1(+) J1 reduce the number → may be done
17/1(+) F4 Our results indicate that [modifying phrase added!]
21/4(-) B2 obtained similar results → demonstrated that
29/7(-) S4 may → can
35/6(+) F2 distinctly differ → differ slightly
37/12-13(+) C5 is → would be
39/3(+) B1 usually the full identification takes a lot of time → the full identification may be very time consuming
39/20(-) B9 can only be → is
Appendices

42/8-9(-) A6 may be explained by is due to
54/4(-) B9 decisions to be taken must be taken
55/3(-) B9 may can

TEXT R: Hedging hotspots (italics indicate word(s) attracting hedging annotation) and the readers making the annotations (italics indicate word(s) attracting hedging annotation). Reader codes same as in table for Text A.

<table>
<thead>
<tr>
<th>Grid ref.</th>
<th>Text extract</th>
<th>Hedge added (claim weakened) by</th>
<th>Hedge removed (claim strengthened) by</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/9</td>
<td>…variation in soil substrate determines…</td>
<td>A4 A6</td>
<td></td>
</tr>
<tr>
<td>12/9-11</td>
<td>…is the determinant of</td>
<td>A9 B3</td>
<td></td>
</tr>
<tr>
<td>17/14</td>
<td>…can be</td>
<td>B3 B6 F4 J1</td>
<td></td>
</tr>
<tr>
<td>21/15</td>
<td>…are rather</td>
<td>B3</td>
<td>B6 J1</td>
</tr>
<tr>
<td>26/8-9</td>
<td>…would be expected</td>
<td>B3 D2</td>
<td></td>
</tr>
<tr>
<td>28/5</td>
<td>…can explain</td>
<td>B1 B6 J1 B3 B4 B5 B9</td>
<td></td>
</tr>
<tr>
<td>38/5</td>
<td>…is</td>
<td>C1 F4</td>
<td></td>
</tr>
<tr>
<td>46/13-14</td>
<td>…is usual</td>
<td>A7 S2</td>
<td></td>
</tr>
<tr>
<td>53/11</td>
<td>…favour</td>
<td>B1 B3 B4</td>
<td></td>
</tr>
<tr>
<td>55/13-14</td>
<td>…will cause</td>
<td>A6 C5 F4 J1</td>
<td></td>
</tr>
<tr>
<td>69/3</td>
<td>…almost unique</td>
<td></td>
<td>J1 J2</td>
</tr>
<tr>
<td>73/8</td>
<td>…can differ</td>
<td></td>
<td>B9 J1</td>
</tr>
<tr>
<td>75/6</td>
<td>…certainly are</td>
<td>B6</td>
<td>B3</td>
</tr>
<tr>
<td>82/4</td>
<td>…can conclude</td>
<td>B5 B9 D1 D11 S4</td>
<td></td>
</tr>
<tr>
<td>82/10-11</td>
<td>…can be seen</td>
<td>A6 B5 B9</td>
<td></td>
</tr>
</tbody>
</table>

Specification of changes shown above

2/9 …variation in soil substrate determines: appears to determine
12/9-11 …is the determinant of: influenced/the main determinant of
17/4 …can be: could be/may be/is
21/15 …are rather: appeared/DELETED
26/8-9 …would be expected: should be expected/are
28/5 …can explain: may explain/could explain/explains
38/5 …is: is about/is reported to be
46/13-14 …is usual: has been frequently found/is common
53/11 …favour: appear to favour/appeared to favour/would therefore favour
55/13-14 …will cause: could cause/It can be expected that
69/3 …almost unique: DELETED
73/8 …can differ: differs
75/6 …certainly are: may be/being
82/4 …can conclude: DELETE
82/10-11 …can be seen: is
The one-off changes (+ = hedge added (claim weakened), - = hedge removed (claim strengthened)) were:

10/9(+) F2 Our results show that [this phrase was added]
17/7(+) F4 we conclude → this indicates
19/2(+) F4 is → would be
27/6(+) A6 is → appears to be
30/12(-) B8 is related to → depends on
34/6(-) F1 is primarily determined [underlined + comment: ‘be direct!’]
36/10(+) B3 is determined → in the Netherlands is currently
40/6(-) S4 may → DELETE
40/12(+) F4 decrease → may decrease
43/4(+) S4 by inducing → presumably by inducing
50/6(+) S4 is high → was observed
53/1(+) D2 strongly → DELETE
53/11(+) F4 favour → would therefore favour
56/10(+) A6 is → may be
63/3(+) S4 strongly → DELETE
63/14(+) S4 strongly → DELETE
69/11(+) S4 strongly → DELETE
76/12(-) A7 can → DELETE
76/13(+) B6 easily → DELETE
83/12(+) E3 will focus → should focus