

HEDGING IN OCCUPATIONAL THERAPY REPORT WRITING

by

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Submitted in fulfillment of the requirements for the degree of

MASTER OF ARTS

In the subject

LINGUISTICS

at the

UNIVERSITY OF SOUTH AFRICA

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JUNE 2002



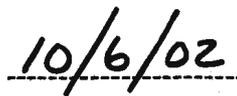
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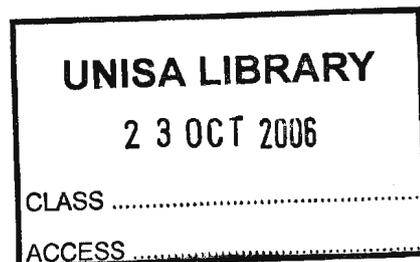


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SUMMARY

The study examined research writing. The aim was to establish the nature of the relation between the quality of article and report writing in occupational therapy and the density of hedges in such writing. The texts comprised undergraduate reports, which were divided into two achievement groups, namely high and low achievers, and journal articles by occupational therapists. Articles were included because it was assumed that they exemplify good writing, and accordingly, would be appropriately hedged, and would provide a reliable basis for comparing the student groups. Hyland's (1998b) analytical framework was used. While statistical tests revealed no differences between the student groups, overall, the tests revealed significant differences in the use of hedges between the professional and student writers. In light of these findings, it is suggested that hedging in research writing be studied and taught to students in order to assist them in their studies and careers.

ACKNOWLEDGEMENTS

I would like to express my thanks and appreciation to all my colleagues, friends and family who supported and encouraged me during the period in which I was involved in this study. In particular, I would like to thank the following people:

- * My supervisor, Prof Hilton Hubbard, for his patient and invaluable expert and professional guidance throughout the research process and the writing of the dissertation.
- * Mr Hennie Gerber, in the Department of Computer Services at UNISA, for finding the time, in spite of his own busy schedule, to assist with the statistical tests, and for providing literature on the tests.
- * Prof S M Mogotlane, Head of the Nursing Science Department, Allied Health Sciences, a sub-faculty of the Faculty of Medicine at the University of Southern Africa (MEDUNSA), for granting me permission to use MEDUNSA data.
- * Prof Estelle Shipham, Head of the Department of Occupational Therapy at MEDUNSA, for her leadership, availability, flexibility, and the many hours of stimulating discussions on matters pertaining to integrating English and Occupational Therapy.
- * The staff of the Department of Occupational Therapy for their administrative and academic assistance, and their hospitality.
- * The fourth year occupational therapy students, for their enthusiasm and co-operation.

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- * Mrs Karin van der Merwe, for formatting and compiling the final draft of the dissertation.
- * Mrs Linda Lombaard, for assisting me with EXCEL.
- * Dr Lilli Pretorius, senior lecturer in the Department of Linguistics at UNISA, for her friendship, sense of humour, and moral support.
- * The staff of the English Language Department at MEDUNSA, for their support and interest.
- * My family and friends, for their loving friendship and constant support.
- * My niece, Laura, who constantly reminds me that teaching is, indeed, a privilege. This research is dedicated to her and to all children everywhere. “Child by child we build the future” (World Vision of South Africa).

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CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

The main aims of this chapter are to give some background as to what prompted the undertaking of the present study, which comprises the analysis of hedging in occupational therapy report writing, to state the aims of the study, describe the method of research, and to outline the structure of the dissertation as a whole.

1.1 BACKGROUND

The focus of this study is on hedging in occupational therapy report writing, which is a type of scientific writing, in the sense that occupational therapy is a health science. In this study, the report writing encompasses research writing, in the sense that research reports by occupational therapy undergraduate students at the Medical University of Southern Africa (MEDUNSA), and journal articles by health professionals, mainly occupational therapists, are analysed.

There appears to be widespread support for the need for further research into scientific writing, particularly into student scientific writing within an academic context, such as MEDUNSA. One reason for this is that the language of scientific publications is generally English, and while first language speakers of English may well experience difficulty in scientific writing, this has been found to be more so for students of other language communities (Angelil-Carter, 1995; Braine, 1989; Casanave & Hubbard, 1992; Darian, 1995; Deckert, 1993; Horowitz, 1986; Hyland, 1998b; Lachowicz, 1981; Olivier-Shaw, 1996; Pennycook, 1995; Rice, 1998; Thesen, 1994; Zamel, 1993).

Besides being unfamiliar with the conventions of scientific discourse, MEDUNSA students may not be accustomed to the notion of scientific argument and the language of scientific argument. One of the reasons for the latter may be students' previous school experiences of textbooks and teacher-talk. Both the textbook and teacher

generally present information as “fact” or indisputable truth. Pupils seldom experience information, or what has become accepted knowledge, as the outcome of recursive scientific enquiry which is characterised by questions, a lack of certainty, and often, unresolved issues requiring further investigation (cf. Crismore & Vande Kopple, in § 2.1.1). Hyland (1998b) and others have drawn attention to students most likely not being sufficiently aware that there are two main types of scientific statements, namely statements which present information as “fact” or factive statements, and statements which present information tentatively, or non-factive statements. Factive statements are made when it is assumed that the information is regarded as being “true” by an expert audience, or by experts in the field of knowledge. Such statements would not normally be rejected. In contrast, non-factive statements present “new” information to a specialist audience, which may either accept or reject the new claims. In presenting new claims, it is important that the writer expresses these according to appropriate levels of tentativeness, or degrees of certainty. This is important not only in terms of reflecting “truth”, but also in having one’s claims heard, which is why scientists write.

In addition to the above, MEDUNSA students may not have had the opportunity to explore or enquire, and to appreciate the role of uncertainty or tentativeness in learning, and by implication, in critical thinking (cf. Rowland in § 2.5), and are most likely not aware of the difference between interpretation and “fact”, and how “facts” have originated and evolved. They have probably not needed to use or develop any skills in the language of scientific argument, and may be unaware of how writers use language to strengthen or weaken claims, and to what purpose. Because doing science is understood as being a reflective, critical thinking undertaking, the writing about science should reflect this type of thinking.

An important language resource that facilitates critical thinking and our expression of it, is hedges or expressions of tentativeness. Dewey’s definition of reflective or critical thinking (in Pienaar, 2001:126) implies the need for using language that expresses tentativeness in science:

Reflective thinking, in distinction from other operations to which we apply the name of thought, involves (1) a state of doubt, hesitation, perplexity, mental difficulty, in which thinking originates, and (2) an act of searching, hunting, inquiring to find material that will resolve the doubt, settle and dispose of the perplexity.

The current study is of particular relevance to me personally as a lecturer at a science and medical university where the language of instruction is English, and where English is a second language (L2) for the majority of students. My interest in scientific writing stems from my involvement in the Occupational Therapy Department at the Medical University of Southern Africa (MEDUNSA). In 1995, the English Language Department was approached to assist the fourth year occupational therapy students with their research report writing. The task was assigned to me. After a year, we realised that the scientific writing programme in the fourth year only was insufficient, and it was decided to extend this to the third year level. However, towards the end of the second year of the programme, we found that the students needed scientific writing and reading exposure from their first year through to the fourth year, and currently the programme is spread across the four years of study. The ultimate outcome is that students should be able to produce an acceptable research report based on their own research. This is a degree requirement.

My involvement with the Virology Department, for which I have been conducting mini-workshops on scientific writing for the honours and masters students, also points to the need for such training at postgraduate level. I was recently also made aware of the need for scientific writing training among science teachers at a MEDUNSA Faculty of Sciences Workshop in 2001, in which participating teachers indicated that their knowledge of and experience in science writing was inadequate. This sense of inadequacy in terms of research writing among South African teachers is confirmed by the recent enquiry into a teacher development workshop that focused on creating language and composition awareness in the teaching of the Human and Social Sciences in the Outcomes-Based Education curriculum of Gauteng Department of Education schools (Henning, et al., 2001). The main purpose of the workshop was to show history teachers how they could teach the research essay in history. The workshop yielded two relevant findings. First of all, the teachers' emphasis on content indicated that they saw history knowledge as conceptual and declarative. Other types

of knowledge, such as procedural and conditional types, did not play an important part in their view of history. Secondly, they saw the teaching of writing as the language teacher's task. They believed that "the organisation of knowledge and understanding and the arguing of a point of view could be taught without explicitly attending to issues of language". The concern expressed by Henning et al. (2001:120) is that "these teachers are depriving their students of the opportunity to create their own knowledge, using text sources and arguing their point of view". Although the workshop was successful in at least raising teachers' language awareness, the findings, nevertheless, highlight the need for in-service training in research writing.

1.1.1 The concept 'scientific writing'

There are two views of scientific writing, the empirical view and the rhetorical view. The former view regards science as an empirical undertaking in which the facts are believed to "speak for themselves". Accordingly, writing science should be objective, impersonal and informational. In contrast, the rhetorical view claims that knowledge is negotiated, and that the scientist's task is in interpreting data; therefore language is viewed as being at the centre of the knowledge negotiation (cf. § 2.0). The rhetorical view, which is also referred to as the social constructionist view, has been adopted in the current study.

The literature on scientific writing indicates that this text type has arisen within and has developed for a particular discourse community which has, in turn, codified the language of scientific presentation (cf. Chapter 2). It is, therefore, important to understand what the specific language and discourse forms are for the sake of facilitating agreement and thereby acceptance of claims. For most novice science writers, these forms or conventions are either unknown, or culturally foreign. This unfamiliarity usually presents difficulties, which may be exacerbated if the writer is not competent in English, the common language of science publications, or more specifically, research articles. A crucial aspect in getting one's claims accepted is understanding the notion of tentativeness in science and interpretation, and being able to express tentativeness appropriately in terms of content (data; evidence) and in relation to the reader. One such language or communicative resource is hedging

devices which enable the writer to express “possibility rather than certainty and collegiality rather than presumption” (Hyland, 1998b: Preface).

1.1.2 The concept ‘hedging’

Butler (1990:138) states that “one of the most important aspects of doing science is the weighing of evidence and the careful drawing of conclusions from data”. This means that the scientist interprets information, and does not simply recount objective “truths”. According to this view, knowledge is negotiated between the writer and an expert audience. This negotiation rests heavily on the writer’s knowing when and how to express certainty, and when and how to express tentativeness. Hedges help writers to express tentativeness:

Hedging enables writers to express a perspective on their statements, to present unproven claims with caution, and to enter into a dialogue with their audiences. It is therefore an important means by which professional scientists confirm their membership in research communities (Hyland, 1996a:251-252).

Hedging does not include all devices used to express attitudes or to comment metadiscoursally on the text, nor does it comprise epistemic devices which convey the writer’s conviction in the truth of a statement. Similarly, while hedges have been understood as mitigating devices to save face (Myers, 1985a; 1985b; 1989), not all expressions of politeness act to qualify writer commitment.

Hedging is defined as the writer’s withholding of full commitment to statements. Hedging refers to “any linguistic means used to indicate either a) a lack of complete commitment to the truth value of an accompanying proposition, or b) a desire not to express that commitment categorically” (Hyland, 1998b:1).

It is also important to note that the effects of hedges cannot be understood without a consideration of the writer, the audience, the nature of the subject matter, and the text. In other words, context and co-text are important in the interpretation of hedges.

1.1.3 The model for hedging analysis used in this study

Although numerous studies have been conducted on hedging in scientific writing, very few have concentrated on all the possible linguistic realisations of hedging. For example, Butler (1990) focused on the use of modal auxiliaries, Lachowicz (1981) and Riley (1991) concentrated on passive structures, and Webber (1994) investigated the role of questions as markers of uncertainty. Several studies have also included the analysis of affective comment, for example, Adams Smith (1984). In addition, clear definitions of the concept hedging are not provided, and taxonomies (for example, Salager-Meyer & Salas, 1991) are sometimes confusing, with overlapping sub-categories, in the sense that one is not sure why items have been placed within a particular category, or where it would seem an item could fit into another category as well. These limitations are referred to in Chapter 2 with reference to the particular studies under discussion.

The model that appeared to be the most useful for the current study is that of Hyland (1998b), who bases the classification of hedges on the rhetorical or pragmatic functions they perform. Linguistic expressions were therefore identified as hedges in terms of performing specific rhetorical functions. The advantage of this approach is that hedges are not identified according to predetermined linguistic categories. Another advantage is that the importance of context in understanding hedges is recognised. This has crucial implications for the teaching of hedging in scientific writing among learners whose first language is not English. The analytical framework is introduced in Chapter 2, and is explained in depth by means of text samples in Chapter 3.

1.2 AIMS OF THE STUDY

In light of the above, the underlying aim of the present study is to establish the nature of the relation between the quality of article and report writing in occupational therapy and the density of hedges in such writing. The texts in question are undergraduate occupational therapy research reports, which are divided into achievement groups, namely, those by high achievers and low achievers, and journal articles by health professionals, mainly occupational therapists. Journal articles are included because it

is assumed that they exemplify good writing, and accordingly, would provide an appropriate basis for comparing the two student groups.

The main research question which this study attempts to address can thus be stated as follows:

In the writing of articles and reports in the field of occupational therapy, what is the nature of the relation between the quality of the writing and the density of hedges in such writing?

The main research question can be reformulated as four general research questions, namely:

- (a) Are there differences in the overall use of hedges between the research articles and the student writing as a whole?
- (b) Are there differences in the overall use of hedges between the research articles and the good student writing?
- (c) Are there differences in the overall use of hedges between the research articles and the poor student writing?
- (d) Are there differences in the overall use of hedges between the good and poor student writing?

In addition to examining the overall use of hedges in the student writing, the study is interested in investigating how the writers used hedging devices for specific rhetorical purposes (cf. Chapter 3). The following four questions follow from the aforementioned four:

- (a) Are there differences in the use of the hedging categories between the research articles and the student writing as a whole?

- (b) Are there differences in the use of the hedging categories between the research articles and the good student writing?
- (c) Are there differences in the use of the hedging categories between the research articles and the poor student writing?
- (d) Are there differences in the use of the hedging categories between the good and poor student writing?

These eight research questions will be reformulated as 20 research hypotheses pertaining specifically to the difference between the research articles and the student writing, and the good and poor student writing regarding the overall use of hedges, and the use of hedges for specific rhetorical purposes, in terms of particular hedging categories (cf. Chapter 4).

The current study could be regarded as a theoretical-descriptive study, with applied linguistic implications. First of all, it attempts to make a contribution towards the explication of hedging in scientific writing in that it sets out to establish whether hedging is a feature of scientific writing quality, by investigating the extent of its use among the three writing groups, namely the professionals, the good students and the poor students.

The findings of the study could also be applied in the teaching of hedging in scientific writing because not only the extent to which the different writing groups employed hedges is known, but also the linguistic realisations of hedging. This information may be particularly helpful to teachers who could use the various linguistic expressions taken from the text samples as a starting-point for demonstrating hedges at work and relating form and function, which is imperative. (cf. Chapter 5).

1.3 METHOD OF RESEARCH

This study is a quantitative empirical study in that it attempts to quantify certain textual features and establish their role in scientific writing quality, by statistical comparison of the occurrence of such features in student texts. However, the study

also involves a certain amount of qualitative research in that the results of the statistical tests are interpreted from a text-linguistic perspective, focusing on the final product to some extent, but also giving attention to the context (aims of science and scientific discourse community) that helped shape the text.

1.3.1 Collection of data

The texts examined in the present study consisted of ten research articles written by health professionals, mainly occupational therapists, which were taken from various editions of the *South African Journal of Occupational Therapy* (SAJOT). In addition, 28 research reports written by final fourth year occupational therapy students were analysed.

The student texts were divided into achievement groups, namely high achievers and low achievers. The high achievers obtained 60% and above for the research component (which comprised both a written research report and an oral examination), and the low achievers obtained 59% and below. The division was in order to establish whether the two achievement groups differed in the use of hedges, and whether the high achievers reflected similar patterns of use to the professionals.

Statistical procedures were used for establishing whether significant differences existed. First, densities had to be calculated for each hedging category per text. The densities were then used to calculate means for the overall use of hedges and hedging types. The statistical procedures comprised *t*-tests (cf. § 3.4.3).

1.3.2 Hypotheses

The four main hypotheses set out in the present study are as follows:

Achievement Hypothesis

H1: There will be a significant difference in the overall density of hedges between the two student groups, the Highs and Lows.

Writer-status Hypothesis A (Models versus student writing)

H2: There will be a significant difference in the overall density of hedges between the Models and the student writing as a whole.

Writer-status Hypothesis B (Models versus Highs)

H3: There will be a significant difference in the overall density of hedges between the Models and Highs.

Writer-status Hypothesis C (Models versus Lows)

H4: There will be a significant difference in the overall density of hedges between the Models and Lows.

The hypotheses pertaining to the difference in the use of specific hedging categories are set out in Chapter 4. Because I am not aware of hedging studies that have considered writing quality, and there are no findings on this issue, it was decided to leave the hypotheses open, that is, non-directional, despite the temptation to use directional hypotheses, such as hypothesising that the Models would use more hedges than the students, and the good students would use more hedging than the poor students. This was a decision in favour of statistical conservatism given that it is easier to generate statistical significance in respect of directional hypotheses (one-tailed as opposed to two-tailed tests). In this study, the “use” of hedges means two things, namely, the density of hedges, and the patterns as identified in the qualitative interpretation.

1.4 STRUCTURE OF THE DISSERTATION

The remainder of this dissertation is structured as follows:

Chapter 2 provides a background to perspectives on science and science writing, and gives a survey of the research on scientific writing by professionals and students. Particular attention is given to the notions of science, science as interpretation,

tentativeness in science, and hedging as an expression of tentativeness. This provides background to the discussion in Chapter 3 of the analytical framework used in the study. Chapter 3 also outlines the research procedures. Chapter 4 sets out the research hypotheses, and the results of the statistical tests are given and interpreted. Chapter 5 contains a review of the study, comments briefly on some applied linguistic implications, and points out limitations and areas for further research.

CHAPTER 2

HEDGING IN SCIENTIFIC WRITING

2.0 INTRODUCTION

This chapter provides an overview of some of the research into scientific writing, and more specifically on hedging as an important feature of scientific writing. Hopefully this review will not only highlight the nature of scientific writing, and the significant role of hedging in this genre, but will also underline the importance of continued research into this area in the interest of developing scientific writing skills among students at tertiary institutions.

In Chapter 1 it is pointed out that an understanding of hedging “requires some understanding of the cultural practices of scientists and their epistemological assumptions and values, together with the specific genre within which the feature is situated and has significance” (Hyland, 1998b:13). Basically, there are two perspectives, namely the empirical model and the rhetorical model. The empirical model upholds the notion of science as an empirical undertaking in which the facts are believed to “speak for themselves”. Scientific discourse should, therefore, be objective, impersonal and informational. The scientist’s job is simply to recount the “truth”. The empirical model is also referred to as the traditional positivist view. In contrast, the rhetorical model claims that knowledge is negotiated: “The accreditation of knowledge is a social process and research is perceived as a quest for collective agreement rather than a search for truth” (Hyland, 1998b:7). The rhetorical model is also referred to as the social constructionist view. Here, both the scientist’s interpretation of evidence and the language that she uses are viewed as being important in the construction of knowledge, or the continuity or furtherance of a discipline.

The rhetorical model places language at the centre of scientific knowledge. The writer of science must know how to express ideas. Ideas for which there is collective agreement are commonly presented as “fact” (referred to as factive statements), whereas ideas which rest on the writer’s interpretation are presented as interpretive or

non-factive statements. How the latter are communicated is important in getting ideas accepted as part of the truth of the discipline. One such communicative resource is the use of hedges which enable the writer to express:

...possibility rather than certainty and collegiality rather than presumption. Scientific claims are rarely made without interpretive statements and these involve both assessments of probability and judgements concerning the impact of linguistic choices on readers (Hyland, 1998b: Preface).

In science, the principal vehicle for disseminating new knowledge is the research article (RA), whose readership is a specialist audience who constitute a scientific discourse community, which in turn has codified the language of scientific presentation. It is therefore incumbent on the writer to adhere to specific language and discourse forms for the sake of facilitating agreement and thereby acceptance of claims.

In light of the above, two important reasons for using hedges in scientific writing can be distinguished, although the one necessarily implies the other. The first is to present information as truthfully as possible in terms of what is known or understood. This requires acknowledging uncertainties and exercising caution in making propositions. The second is to conform to the scientific community's discourse norms, where reader consideration is important. Besides these reasons, hedging in scientific writing is also thought to be a face-saving strategy (Myers, 1985a).

According to Schröder and Zimmer (in Markkanen & Schröder, 1997:253), the concept of hedging has shifted from its origins in logic and semantics to pragmatics and discourse analysis. They point out that hedging research originally had a semantic focus (1965 – 1979), but from the 1980s onwards, the concept of hedging was broadened because of the growing influence of pragmatic research. In pragmatics, hedges “are seen as realizations of interactional/communicative strategies in contexts of mitigation, politeness, indirectness, etc.” For the purposes of the present study, a pragmatic perspective has been adopted, and because the study entails an analysis of hedging in research writing, this aspect will be the main focus of the literature review.

Furthermore, particular attention will be given to Hyland's (1998b) work, since it is his categorisations that inform the analytical framework.

Research and ideas in the following areas will be discussed in turn: discourse and genre analysis; academic discourse and academic writing; scientific discourse and scientific writing; writer comment; epistemic comment; affective comment; science and science writing; hedging in medical discourse; and finally Hyland's (1998b) investigation into hedging in science research articles.

2.1 DISCOURSE AND GENRE ANALYSIS

In the introduction above, it is mentioned that the more recent focus of hedging research tends to be on pragmatics, which can be defined as "the study of the use of language in communication, particularly the relationships between sentences and the contexts and situations in which they are used" (Richards, Platt & Weber, 1985:225). This has resulted in a discourse analytical approach towards understanding hedging. The value of this approach is evident from the following statements. Regarding the various approaches to hedging, Clemen (in Markkanen & Schröder, 1997:235) contends that "The various approaches to the analysis of hedging have not always made it clear that hedging is achieved primarily by setting utterance in context rather than by straightforward statement, or that discourse analysis must precede semantic grasp". This is reiterated by Crismore and Vande Kopple (1990:50) who maintain that "we cannot understand the effects of hedges without considering the setting, the speaker or writer, the audience, the nature of the subject matter, and the text". Likewise, Markkanen and Schröder (1997:6) state that "no linguistic items are inherently hedgy but can acquire this quality depending on the communicative context or the co-text".

Because the study described in this dissertation involves both a discourse and genre analysis in the sense that the analysis of the use of hedging within the texts depended to some extent on an understanding of occupational therapy topics and concerns and the communicative goals of the type of writing, namely research writing, some discussion of the literature on discourse and genre analysis is necessary.

The literature on discourse and genre analysis (Brett, 1994; Dudley-Evans, 1994; Fairclough, 1992; Hopkins & Dudley-Evans, 1988; Paltridge, 1993; Swales, 1985) indicates that the definition of genre incorporates the notion of discourse. This is noticeable in the definition of a genre by Swales (in Hopkins & Dudley-Evans, 1988:115), "A genre is a recognised communicative event with a shared public purpose and with aims mutually understood by the participants within that event." The words "communicative event" refer to discourse which is a term for "language which has been produced as the result of an act of communication" (Richards, Platt & Weber, 1985:225). The genre in focus in this study is research writing, and at a finer level, a distinction can be made between student research writing and professional research writing.

There is also considerable agreement on the type of framework that is necessary for genre analysis. Many (Halliday, 1990; Hasan, 1989; Martin, 1986; Matthiessen, 1990; Morley, 1985; Paltridge, 1993) support the idea of a pragmatic perspective on genre, and argue that a systemic-functional theory of language is an appropriate theoretical framework for genre analysis because of its "semantic-oriented approach to grammar and discourse analysis as well as its focus on language in use" (Paltridge, 1993:176). According to this theory, language is primarily understood as a resource for making meaning; the user is constantly making choices from the linguistic system for the purposes of meaning-making. Furthermore, these choices are understood as being selected from the semantics of the grammar, and not from the syntax. With its emphasis on the relationship between language, context and text, this theory aims to provide a model of language in which the relationship between meaning and wording is treated in a systematic manner (Paltridge, 1993). Fairclough (1992:213) supports the usefulness of this approach in the analysis of texts. He asserts: "How texts are produced and interpreted, and therefore how genres and discourses are drawn upon and combined, depends on the nature of the social context". Besides analysing what is in texts, this approach is also concerned with what is absent or omitted from texts. This is particularly relevant in the study of hedges in scientific writing, and although a systematic study of omissions did not form part of my analysis, this may be worth pursuing in further research. In relation to omissions, Hyland (1998b:61) points out that "removing hedges changes the nature of information, and while science is not

unique in this respect, the constraints on presenting claims may be more rigorous than in other disciplines”.

Hopkins and Dudley-Evans (1988) likewise argue for a functional analytical approach that considers what they refer to as the transactional (the content of the writer's message), interactional (the way in which the writer takes his audience into account), and logical (the structural patterning that gives overall coherence to a complete text) functions of language. Dudley-Evans (1994) also points out that when there is not enough linguistic evidence in a text to, for instance, classify a move (for an explanation of “move”, cf. Hopkins & Dudley-Evans, 1988, and Brett, 1994, in § 2.1.2) in the Discussion section of a dissertation, then knowledge of the genre conventions helps the analyst to decide. This relates to the notion of intertextuality which de Beaugrande and Dressler (1981, in Paltridge, 1995:395) describe as “the factors which make the utilization of one text dependent upon knowledge of one or more previously encountered texts”.

Regarding the analysis of language behaviour, Paltridge (1993) makes two points which are important for text analyses as well. The first is that the analysis should be data- and not intuition-driven, and secondly, that qualitative analyses of special purposes texts (such as research writing) are necessary for the sake of trying to link textual meaning with the wording of the texts. This is implied by a systemic-functional theory of language. This sentiment is reiterated by Holmes (1988), who analysed English Second Language textbooks to ascertain their adequacy in terms of being representative of naturally occurring expressions of doubt and certainty in spoken and written language. In this regard, she stresses the importance of corpus-based data for providing textbook writers with an authentic data-base of the range of expressions that are available for signalling degrees of certainty (cf. Brett, 1994, in § 2.1.2).

Another important point made by Paltridge (1993) is that, in addition to deciding on the focus of the analysis, it is also necessary at a very early stage to decide on the level of delicacy to aim for in the analysis. The principle of selective and detailed analysis is expressed by Halliday (1985, in Paltridge, 1993:170) as follows:

The guiding principle is to select and develop what is needed for the particular purpose in hand. There are many different purposes for analysing a text, and the scope and direction of the analysis will vary accordingly. Often we may want to scrutinise only one or two features, but to follow them through to a considerable length.

In my analysis of hedging, it was especially important to relate form to function, hence the importance of a systemic-functional theoretical framework for the sake of linking textual meaning with the wording of the texts. The relationship between form and function is explained in the introduction to Hyland's analytical framework in § 2.7.1, and is further elaborated on in Chapter 3, which describes my analytical framework.

In Chapter 1, the issue of student scientific writing within an academic context is discussed, and in this section, the notion of discourse has been introduced. In § 2.1.1 and § 2.1.2, the notions of academic discourse and scientific discourse will be described.

2.1.1 Academic discourse and academic writing

Although academic discourse tends to be more commonly associated with universities, it also embraces school language. However, for the purposes of the present study, my concern is with the university as a particular discourse community, referred to as the academic discourse community. Academic discourse refers to the type of language used and required at university. The area that is problematic for many students is academic writing since literacy in this genre "involves the student's capacity to use written language to perform those functions required by the culture in ways and at a level judged acceptable by the reader" (Olivier-Shaw, 1996:19). In other words, what are regarded as appropriate ways of learning and writing about knowledge are established by the academic discourse community.

The literature (Horowitz, 1986; Orr, 1995; Pennycook, 1996; Rice, 1998; Zamel, 1993) on academic writing mainly concerns the problems associated with this type of writing. In a recent inquiry into a teacher development workshop that focused on creating language and composition awareness in the teaching of the Human and Social Sciences in the Outcomes-Based Education curriculum of Gauteng Department

of Education schools (cf. § 1.1), it was generally found that the workshop had been the participating teachers' first experience in learning about the format, the tools and the approach to academic writing, specifically the research essay (Henning, et al., 2001:111).

Besides teachers being inexperienced in academic writing, another factor that may play a role in students' having difficulty in acquiring academic literacy may be the manner in which information is transmitted at school level. The main sources of information are the teacher and the textbook – both present information as fact – with inevitable consequences, which are aptly expressed by Crismore and Vande Kopple (1990:52): “Presented with one flat assertion after another in their schooling, students learn to value certainty rather than contingency. And, in relation to both their textbook and their teachers, they assume [a] docile, acquiescent, non-authoritative status”.

Hopefully, this, albeit short, introduction to academic discourse highlights the importance of students' acquiring academic literacy, which Warren (undated; seminar handout) elaborates on as follows:

Reading and writing tasks should be regarded, ... as occasions for exploring and practising knowledge construction, discovering the relationship between thought and form, and learning how to use academic discourse and the language of logical reasoning when presenting arguments and research findings. Since academic communicative tasks are typically cognitively demanding but 'context-reduced', i.e. reliant primarily on linguistic cues and devices for conveying meaning, language development assumes particular importance in a context of diverse levels of student preparedness.

2.1.2 Scientific discourse and scientific writing

Numerous studies on scientific writing (for example, Butler, 1990; Darian, 1995; Grabe & Kaplan, 1997; Hopkins & Dudley-Evans, 1988; Hyland, 1998a; Meyer, 1997; Myers, 1985a) have demonstrated how knowledge is negotiated by writers of science, and that “new” knowledge is seldom presented as fact. However, the idea of negotiated knowledge is not new; this was introduced by the scientists, Robert Boyle and Isaac Newton in the 17th century (Atkinson, 1992:337).

Besides students being unfamiliar with scientific writing conventions, and how knowledge is constructed by the scientific community, is the fact that for many students the language of scientific writing is English, which for the majority of students, is not their first language. Scientific writing is a challenge for most first language speakers of English, and is probably much more so for second language speakers (Angelil-Carter, 1995; Olivier-Shaw, 1996; Thesen, 1994). In the present study, scientific English is understood to encompass research English.

From the literature (Bazerman, 1981, 1983; Brett, 1994; Crookes, 1984; Hill, Soppelsa & West, 1982; Kress & Threadgold, 1988; Michael, 1991; Swales, 1985, 1986, 1987; van Dijk, 1990), it is evident that there are many genre studies of scientific writing that involve examining the overall genre or text-type in terms of move categories, and while the occurrence of writer comment or interpretation is recognised as a distinguishing feature of Results and/or Discussion sections, there are not many studies that focus exclusively on comment within these sections. Two such studies that were undertaken were by Hopkins and Dudley-Evans (1988) and Brett (1994). Brett (1994:50) explains the importance of detailed analysis of Results sections in a social science, such as sociology, as follows: “new knowledge within sociology is not as easily or objectively substantiated as the “hard” sciences, scholars being concerned with covariance of patterns rather than physical outcomes.”

In a genre-based investigation of the Discussion sections in articles and dissertations by Hopkins and Dudley-Evans (1988:118; 120), it was found that the cycles were predominantly characterised by the writer’s interpretation of results, and that the dissertations appeared to be judged less on the actual results than on the way the writer relates them to the previous work in the field. Brett (1994) had similar findings. In the literature, cycles are described as comprising a range of patterns of organisation, or move patterns, for example: statement of result; reference to previous research (comparison); explanation; exemplification; deduction; reference to previous research (support); hypothesis; and recommendation.

According to Brett (1994:52), communicative categories refer to “moves”, which make up a cycle. He describes the categories in terms of function, lexis, and grammatical form. Three categories are identified, that is: Metatextual categories;

Presentation categories; and Comment categories. Metatextual “defines parts of the text which refer to the data or to other written sections; it is text about the text, not furthering the writer’s argument, but guiding the reader to other parts of the writing”. The second is Presentation categories, which objectively and impersonally report, present, or highlight results. The third is Comment categories, in which the authors provide their own interpretation of the results; these categories enable the author to explain, compare, and raise further questions concerning the results. Brett found that the major differences in terms of communicative categories between social science and “hard” science research articles did not lie so much in Introductions and Discussions (which is commonly believed), but rather in the Methods and Results sections. Brett’s (1994:55) analysis of 20 research articles showed that about 30% of the communicative categories comprised commentary, which according to him reflect “sociologists’ need to urge and persuade the reader, which extends beyond the mere presentation of numbers, in attempting to establish meaningful statements about humans and their patterns of behaviour”. Although Brett does not specify which “hard” sciences he is comparing his data with, from his reference list, it appears that the comparison is based on studies by others in the fields of neuroscience and chemical engineering.

Brett’s (1994:57) findings provide some evidence for disciplinary variation, for which he strongly suggests that “the materials and tasks used to increase learners’ comprehension and production of such texts should be authentic and disciplinarily appropriate, the pedagogic genre analyst should not readily accept models based on analyses of disparate disciplines.”

The studies described in this section reveal that writers’ interpretation of the results in articles, and how these are related to existing literature, plays an important role in how writers or scientists are judged by a specialist audience. In several studies, the writer’s explicit interpretation is referred to as writer comment.

2.2 WRITER COMMENT

For the purposes of the current study, it is important to note that writer comment is considered to be a wider concept than hedging, which embraces aspects such as

emphasis and feelings. Writer comment is seen as referring to author-marked observations of hypothesis, opinion or recommendation (Adams Smith, 1984), and as the “expression of attitudes, feelings, judgments, or commitment concerning the propositional content of a message” (Biber & Finegan, 1988; 1989). Hedging is one aspect of comment, more specifically epistemic comment. (cf. § 2.3.1).

In Adams Smith (1984), comment is explained as referring to writer-marked observations of hypothesis, opinion or recommendation. It is also noted that author’s comment is more commonly known as speaker’s comment. Adams Smith examined written medical discourse, namely three text types from the *British Medical Journal*: clinical case notes, research papers, and editorials. She examined the discourse at paragraph level to ascertain the overall intention in functional terms, namely, process description, evaluation and recommendation.

Seven types of comment expressions were identified: probability; ability; recommendation; emphasis; evaluation; argumentation; and (un)expected outcomes. She then classified these into three classes, namely, expressions of verbal modality, nonverbal modality, and attitudinal markers. Nonverbal modality was expressed by adverbs, and related adjectives and nouns. Attitudinal markers were expressed by what she terms nonmodal forms. The analysis revealed that modal auxiliaries (verbal modality) were the chief means of expressing comment in the research papers; they comprised 54% of all comment expressions. *May* and *should* occurred most frequently, with *may* comprising 42%, and *should* comprising 18%. *Can* made up only 4%. Verbal modality expressions were followed by nonverbal expressions, especially adverbs, such as *probably* and *possibly*, and the related adjectives. These forms accounted for 13% to 15% of all comment in the research papers. Attitudinal markers made up 35% of comment expressions. In this category, Adams Smith (1984) includes sub-classes that would not be regarded as hedges, but rather as expressions of affect and emphasis. For example, she includes adverbs such as *surprisingly*, *fortunately*, and *dramatically*; emotive nouns such as *culprit* and *disparity*; and the use of metaphor, analogy, and antithesis. She gives the following example of a metaphor: *one more skeleton in an area littered with the bones of too many insufficiently tested hypotheses*. She furthermore includes *must* as an expression of obligation or necessity, and includes *can* and *could* as expressions of ability.

In comparison with the clinical case notes and research papers, the editorials were more author-marked throughout. In the research papers, the Introduction and Discussion sections contained the most markers. Author's comment was virtually non-existent in the Methods and Results sections of the research papers.

Because Adams Smith (1984) was concerned with investigating comment rather than hedging as a specific type of comment, her taxonomy was not entirely appropriate for my analysis of hedging. For example, I was not interested in *can* and *could* as expressions of ability, and emphasis expressions (such as *dramatically*); nor was I interested in expressions of feelings (such as *surprisingly*). Her classification of nonmodal attitudinal markers is also not entirely clear. For example, it is not clear why reporting verbs or verbal phrases cannot be included in the verbal modality category. Neither is there clarity concerning the distinction between adverbs, related adjectives and nouns as nonverbal modality markers, and qualification of reporting verb and reporting noun as nonmodal attitudinal markers. Overall, there appears to be substantial overlapping of items, and too little clarity on the distinctions between categories.

The term "stance" is also used to refer to speaker or writer comment. Biber and Finegan (1988; 1989) also did studies on comment or stance, but unlike Adams Smith (1984), they examined both spoken and written corpora that represented a range of discourse. They conducted investigations into how stance is expressed in English. They (1989:93-94) define stance as the "expression of attitudes, feelings, judgments, or commitment concerning the propositional content of a message". Stance, therefore, is understood as encompassing both evidentiality, that is, "the speaker's expressed attitudes towards knowledge", and affect, which is "the expression of a broad range of personal attitudes, including feelings, emotions, moods and general dispositions".

The 1989 study's corpora consisted of 500 texts drawn mainly from the Lancaster-Oslo/Bergen (LOB) and London-Lund (LL) corpora. The analysis included adjectival, adverbial, and modal markers of evidentiality and affect. The study was restricted to overt markers of stance. The stance markers were divided into twelve categories based on semantic and grammatical criteria. These comprised affect adverbs (*luckily*), verbs

(*it pleases me*), and adjectives (*I am shocked*); certainty adverbs (*indeed*), verbs (*this demonstrates that*) and adjectives (*impossible*); doubt adverbs (*perhaps*), verbs (*this indicates that*) and adjectives (*uncertain*); hedges (*at about; maybe; sort of*); emphatics (*really*); possibility (*might*), necessity (*should*) and predictive modals (*will; shall*). It is important to note that Biber and Finegan (1989) do not provide a definition for hedges, which they classify under evidentiality, and which is shown to be a feature of one of the stance styles they identified, which they term “expository expression of doubt”. They identified six stance styles (texts exhibiting similar stance markers). The various stance styles, and all the findings will not be considered here; only that which is relevant to the present study will be mentioned. What is interesting is that 326 out of 500 texts (65% of the corpora), were what Biber and Finegan refer to as “faceless”, by which they say that they hardly mark stance, or do not mark it with the features they had examined. Therefore, this study seems to indicate that for a large number of English texts, a faceless style is the norm. In addition, 75% of the academic prose texts were faceless. Biber and Finegan (1989:109) thus conclude that “The norm for written expository genres in English is thus a text which characterises a relative absence of both affective and evidential stance markers”. When certainty and doubt were, however, expressed in academic prose, the use of adjectival constructions was preferred.

Biber and Finegan (1988) were concerned with adverbial marking of stance, which involved the use of attitudinal and style disjuncts. (cf. Chapter 3 for explanations of these terms). Four hundred and ten texts of written and spoken British English taken from the LOB and LL corpora were analysed to see how adverbials marked stance. The adverbials were grouped into six semantic categories, which were labelled as follows:

Honestly adverbials;

Generally adverbials;

Surely adverbials;

Actually adverbials;

Maybe adverbials;

Amazingly adverbials.

Sixty-seven texts out of the total of 410 texts that were studied comprised academic prose. 30 (40%) belonged to the stance type termed “faceless”, 12 (16%) were “cautious”, 18 (24%) fell into the “generalised content” basket, and six (8%) belonged to the class where the emphasis was on individual position. Only one academic text fell into the stance type referred to as “secluded from dispute”. Concerning the overall findings of this study, in several cases, the discourse functions of stance adverbials differed considerably from the functions suggested by their literal meanings.

As with Adams Smith (1984), Biber and Finegan’s (1988; 1989) taxonomies could not be adopted for my analysis, since these were based on a much wider concept than hedging, and as I have indicated, my analysis does not involve aspects such as feelings, emotions, moods and general dispositions. Although the study on adverbial stance was informative and relevant in that attitudinal and style disjuncts are important markers of hedging, the classification of adverbials contained types that were unrelated to my focus, such as “honestly” and “amazingly” adverbials. Nevertheless, the studies described here have provided useful insights into the broader notion of comment, and have suggested possible ways of interpreting and classifying markers of author’s comment.

The next section discusses a narrower range of comment, namely epistemic comment. Epistemic comment is an important notion in the present study, as hedging is understood as constituting one part of epistemic comment that indicates an unwillingness to make an explicit and complete commitment to the truth of propositions (cf. § 2.7).

2.3 EPISTEMIC COMMENT

Epistemic comment is related to epistemic modality. Epistemic modality is the technical term used for expressing degrees of certainty. Epistemic modality is concerned with “the speaker’s assumptions, or assessment of possibilities, and in most cases, it indicates the speaker’s confidence, or lack of confidence in the truth of the proposition expressed” (Coates, 1987:112).

Lyons (1977:797) describes epistemic modality as:

any utterance in which the speaker explicitly qualifies his commitment to the truth of the proposition expressed by the sentence he utters, whether this qualification is made explicit in the verbal component or in the prosodic or paralinguistic component, is an epistemically modal or modalized utterance.

Two studies by Holmes (1982; 1988) on how epistemic modality is expressed in English, are discussed. Holmes (1982) believes it is important to know how doubt and certainty are expressed in English, for the purposes of teaching English second language learners who have difficulty in expressing and interpreting epistemic modality.

The difficulty that English second language learners have in interpreting and expressing epistemic modality is often exacerbated by what are typical classroom interactions, namely, unmodified declaratives and informatives. In the school context, pupils are seldom required to modify the information they convey. Crismore and Vande Kopple (1990:52) attribute this to most students regarding “what they read and hear in the classroom as true; [and] because of their schooling, they view textbooks (and their teachers as extensions of textbooks) as truth givers”. Pupils do therefore not expect to, and are not expected to modify information. In addition to this, Holmes (1982) suggests three further reasons for learners having difficulty with epistemic modality, namely, establishing the precise degree of certainty expressed by particular linguistic forms; the range of linguistic devices available for signalling this aspect of meaning (degrees of certainty); and the fact that linguistic forms may simultaneously convey various meanings. Besides signalling modal meaning, these devices may also be used to modify illocutionary force.

Holmes (1988) conducted a detailed examination of specific epistemic items in four English Second Language (ESL) textbooks for the purposes of establishing their adequacy in terms of being representative of naturally occurring expressions of doubt and certainty in spoken and written language. The range of lexical devices used to express epistemic modality were grouped into five classes, namely: modal verbs; lexical verbs; adverbial constructions; nouns; and adjectives.

Overall, Holmes' (1988) investigation indicates that the treatment of expressions of doubt and certainty is unsystematic, and that there appears to be an emphasis on modal auxiliaries to the neglect of the wide range of alternative expressions that are available for signalling degrees of certainty. In this regard, Holmes (1988:40) makes the important point:

As corpus-based data on the range, frequency, and contextual distribution of lexical items expressing different communicative functions becomes more widely available, textbook writers will increasingly be provided with the information they need to select for presentation to their learners items matched to their needs and levels of linguistic skill.

2.4 AFFECTIVE COMMENT

In this section, the work by Myers (1985a; 1985b; 1989; 1992; 1994) and Vassileva (1997) who view hedging as reflecting the relation between the writer and the reader, and not as being "modality", will be reviewed.

Besides using language to qualify one's commitment to assertions, referred to as epistemic comment discussed in the previous section, language is also used as a mitigation strategy which is defined by Fraser (1980, in Holmes, 1984:345) as "softening or reducing the strength of a speech act whose effects are unwelcome to the hearer." Holmes (1984) mentions two reasons for wanting to modify a speech act. The first is to convey modal meaning, or the speaker's attitude to the content of the proposition, and the second is to express the speaker's attitude to the addressee in the context of the utterance; this is referred to as conveying affective meaning.

Myers (1985a; 1985b; 1989; 1992; 1994) studied mitigation in molecular genetics articles. He argues that the features that are usually explained in terms of the norms of scientific writing (such as passives; nominalisations; hedges; acknowledgements) "can be better understood as rational strategies for dealing with the social interactions involved in publishing an article" (Myers, 1989:3). These strategies are seen as encompassing both positive and negative politeness devices. Positive politeness involves showing deference to the addressee, whereas negative politeness involves the

speaker or writer's attempts at protecting herself from "potential anger, contempt or other humiliation on the part of the addressee" (Markkanen & Schröder, 1997:8). Positive politeness devices are used to mitigate both claims and denials of claims. Myers' (1989) findings concerning positive politeness devices will not be discussed here as these are irrelevant to the present study. However, what is of interest is Myers' (1989) view of hedging as a negative politeness device.

Myers identifies three main forms of negative politeness in his article analysis, namely, hedging, personal constructions, and impersonal constructions. What is interesting is Myers' view of hedging as a negative politeness strategy, which reflects a relation between the writer and the reader, not the degree of probability of the statement. According to Myers (1989:12-13), "hedging reflects not the probability of the claim, and not the [writer's] personal doubt, but the appropriate attitude for offering a claim to the community". In other words, hedging is reader-oriented. Furthermore, neither personal, nor impersonal constructions are regarded as being hedging resources; rather, these are understood as being separate forms of negative politeness. In this sense, Myers' analysis of hedges was difficult to follow, because several of the items classified as either personal or impersonal constructions could be interpreted as hedges. Regarding the teaching of writing, Myers emphasises that the teaching of writing, and by implication, discourse analysis, must show that writing is a form of interaction – since this is often lost in the lack of face to face contact. Vassileva (1997), like Myers, is of the view that hedging reflects the relation between the writer and the reader, not between the writer and the proposition; therefore hedging is not understood to be "modality" which reflects the relation between the writer and the proposition.

Vassileva's (1997) and Luukka and Markkanen's (1997) investigations, which are described next, have a similar focus. They were interested in finding out whether different cultural norms influenced whether and how personal opinion was expressed in scientific discourse.

Vassileva (1997) attempted to establish the degree to which hedging is used in English, Bulgarian, and Bulgarian English academic discourse. She was also interested in what kinds of linguistic expressions were used as hedges. However,

because her main concern was to investigate whether culture-specific perceptions of what constitutes appropriate linguistic behaviour would negatively influence the writing, the emphasis was on socio-pragmatic failures rather than on a strictly linguistic analysis. The data comprised research articles written in English, Bulgarian, and “Bulgarian English”. Some of the Bulgarian English writers were outstanding specialists in English, and therefore a good command of English was assumed. Vassileva (1997:209) describes her taxonomy as “somewhat loose”, it does, nevertheless, consider both formal and functional criteria. She also regards her taxonomy as being similar to that of Salager-Meyer (1994) (cf. § 2.6). For example, modal verbs and the semi-auxiliaries, like *to seem*; *to appear*, are treated as shields; adjectives and adverbs are treated as approximators; phrases containing *suggest*; *assume*, etc. as compound hedges, and expressions, such as *I believe*; *to our knowledge*, as expressions of author’s personal doubt and direct involvement.

The analysis showed that the English writers were more tentative in expressing personal opinion, and in rejecting or confirming others’ claims, than the Bulgarian and Bulgarian English writers. In comparison with the English writers, the Bulgarian English writers used notably fewer hedges. The Bulgarian writers fell somewhere in between. Vassileva (1997) offers three explanations for the Bulgarian English use of hedges. The writers were either not sufficiently familiar with the means of expressing hedging in English, which she questions, given their command of English. Or the writers were unaware of the need to use them, which indicates socio-pragmatic ineptitude. Another reason, she suggests, may be their desire to preserve their cultural identity, which was observed in the overall organisation of the discourse, and more particularly, in the expression of hedging. Vassileva (1997) also compared the use of hedging in the article sections. In all three writing groups, the Introduction and Discussion sections contained the most hedges, whereas the Conclusion had the lowest occurrences of hedges in the English writing.

Luukka and Markkanen (1997) investigated the use of impersonalisation (viewed as a sub-strategy of hedging) in academic writing in three languages, English, Finnish and “Finnish English”, for the purposes of establishing how important it is to be inconspicuous in this genre, and in the language culture. The purpose of the study was to establish whether the avoidance of explicit personal reference, called

impersonalisation, is used as a face-saving strategy. They conducted a study of spoken and written academic texts by two authors, one of whom was a native speaker of English, and who wrote one paper in English. The other was a native speaker of Finnish, who wrote two papers, one in English, and one in Finnish. Each of them delivered the spoken text version at conferences, after which the texts were prepared for publication. Luukka and Markkanen (1997) also wanted to test their assumption that impersonalisation was more frequent in writing than in speech, and were interested in seeing whether there were differences in how the strategy was realised in the three languages. It was found that the spoken texts were more explicitly personal than the written ones. However, the English texts were more explicit than the Finnish texts. What is interesting is that the Finnish writer's spoken and written texts in English resemble those of the English writer, and not her Finnish spoken and written texts.

The above-mentioned findings suggest that there may be differences regarding the degree to which tentativeness is expressed in different languages, and that perceptions of what is normative in a particular language culture, may influence the writer's use of a feature. This has implications for the teaching of scientific writing. First of all, students should be made aware that writing is a form of interaction between the writer and a specialist audience. Secondly, students for whom English is a second language, should be taught how to express degrees of tentativeness appropriately, since there may be differences in the degree to which it is expressed in their first languages, which may influence their use of hedging in English. This is of particular relevance in South Africa, where English is a second language for the majority of students. In the following section, three studies (Rowland, 1995; Butler, 1990; Grabe & Kaplan, 1997) are reviewed in an attempt to shed more light on the nature of science and what Grabe and Kaplan (1997) refer to as the "writing of science".

2.5 SCIENCE AND THE WRITING OF SCIENCE

Butler (1990:138) states that "one of the most important aspects of doing science is the weighing of evidence and the careful drawing of conclusions from data". This means that the scientist interprets information. The interpretive aspect of doing and writing science has already been discussed at some length.

Rowland's (1995) main aim is to demonstrate that tentativeness is integral to learning mathematics, and that this quality is to be expected, acknowledged and made explicit. This idea is strongly supported by Darian (1995) who investigated the linguistic and rhetorical features of hypotheses in introductory science texts. He claims that the whole enterprise of mastering the forms and functions of hypotheses turns on the concept of tentativeness. "It is really mastering the idea of tentativeness – in reading, in writing, and in one's own thought process – that helps us develop hypothesizing as a fine tool for solving problems of scientific enquiry and of life in general" (Darian, 1995:107). In a study on the effects of hedged texts on pupil readers, the value of tentativeness in learning is echoed by Berlyne (in Crismore & Vande Kopple, 1990:54):

... conceptual conflict leads to epistemic curiosity, which in turn leads to an active search for additional information, a more thorough cognitive analysis, and a more precise understanding of the differing perspectives of the other. Reading and responding in this active, analytical manner, therefore would probably lead to significant learning.

Rowland (1995:328) analysed transcripts of interviews with children aged ten to 12 years to see how they expressed uncertainty regarding a mathematical task. The main aim of his study was "to draw attention to the presence [of hedges] and to analyse the meaning of such hedges in pupils' mathematical discourse". Rowland is resolute about uncertainty being a necessary precondition in mathematics learning, which he expresses as follows: "in the making and learning of mathematics, uncertainty is to be expected, acknowledged and explicit".

Rowland uses Prince et al.'s (1982) taxonomy to analyse the data. This taxonomy will be described in some detail since several of the studies that are described in the next section employ this taxonomy. According to Prince et al. (1982), hedges comprise shields and approximators. Shields lie outside the proposition, and comment on the proposition, whereas approximators are located inside the proposition itself, and function to modify the proposition.

Shields are further sub-divided into plausibility and attribution shields. The former implies a position held; a belief to be considered and indicates some doubt that it will

be fulfilled. Attribution shields attribute knowledge to another or elsewhere. Approximators are further sub-divided into rounders and adaptors. Rounders are common in the domain of measurements, of quantitative data, whereas adaptors are words or phrases that attach vagueness to nouns, verbs, or adjectives.

Rowland's (1995:350) study showed that he, himself, used attribution shields and adaptors for teacher-like purposes, and that the children typically used rounders and plausibility shields, and for the purposes of signalling uncertainty: "they nearly always inserted some space between conviction and proposition". He proposes that this space be called "zone of conjectural neutrality (ZCN)". Because most children believe that maths is about right and wrong answers, many use shields as a self-protective strategy against being wrong. This has two implications for teaching: the first is to encourage pupils to believe that being unsure is a genuine and creative option available to them, and the second is that the shields should alert the teacher to the existence of a ZCN. The teacher could then provide some cognitive bridging to assist the pupil.

In his study, Butler (1990:138) explains the importance of modal verbs in science as follows:

One of the most important aspects of doing science is the weighing of evidence and the careful drawing of conclusions from data. The modal verbs are among the most powerful devices available in English for the presentation of conclusions with a range of subtle gradations in strength and confidence.

Butler (1990) analysed modal verb use in scientific texts taken from physics, botany and animal physiology. This included texts from academic journals and extracts from textbooks for university students. The topics within each sub-group were matched as closely as possible. In addition to examining the difference in modal usage across the three scientific disciplines, he investigated the use of modals with particular types of main verbs, and the distribution of modals across sections of the scientific article format. The physics writing displayed a higher use of modals than the biology writing. Furthermore, the physics writing made greater use of the modals: *can*; *could*; *would*; and *should*, whereas biology made greater use of *may* and *might*. Regarding the use of

modals in text sections, modals were used much more frequently in Introduction and Discussion sections than in Methods and Results sections. The findings regarding the uses of the individual modals will not be provided here; however, in many cases, the modals were employed to convey epistemic meaning.

Grabe and Kaplan (1997) analysed a range of science and non-science texts to establish whether there was any difference in the linguistic expression of hedges across text types. The text types were taken from professional and popular natural science, newspaper editorials, annual business reports, and fiction narratives. According to Grabe and Kaplan, any discussion of hedging cannot be completely separated from issues of emphasis, strong assertion, and epistemic commentary. Their analysis thus includes linguistic signals of emphasis and assertion. This study, therefore, is more an analysis of comment rather than of hedging as a separate entity. For this reason, the more detailed findings concerning the various components of comment will not be considered. What is significant, though, is the finding that the professional science writing and popular science writing were not very different in terms of their use of modals, hedges, emphatics, and attitudinal markers.

Whereas Rowland (1995) examined pupil-talk in mathematics learning, Butler (1990) investigated “hard” science written texts to establish the extent and use of modal auxiliaries as expressions of tentativeness. In contrast, Grabe and Kaplan (1997) examined both science and non-science texts to establish whether there was any difference in the linguistic expression of hedges. No differences were found, and they, therefore, suggest that students reading from popular science sources will not be misled. However, one has to be circumspect regarding this finding, since the study was more an analysis of comment rather than hedging exclusively.

The studies discussed here reveal that science writing is primarily interpretive, and that interpretation depends, to a large extent, on mastering expressions of tentativeness. Clearly, this feature should not only be acknowledged as playing a crucial role in one’s learning, but the language of tentativeness should also be taught for writing in science.

Although medical discourse is dealt with separately in the next section, clearly medical discourse forms an important and large body of scientific writing. Furthermore, it has been particularly important for me to understand written medical discourse as my text analysis involves a health science, namely occupational therapy.

2.6 HEDGING IN WRITTEN MEDICAL DISCOURSE

In comparison with scientific discourse studies, there are relatively few studies on hedging in medical texts. Skelton's (1997) study shows that early medical writings were characteristically narrative, whereas later and current writings are predominantly epistemic. This finding is corroborated by Atkinson (1992), whose analysis of medical research writing from 1735 to 1985 indicates that the changing language and rhetoric of medical research report writing can be attributed to the changing epistemological norms of medical knowledge, the growth of a medical community, and the ongoing redefinition of medicine in relation to the non-medical sciences.

Although the focus of this section is on medical writing, it is interesting to compare the findings of Grabe and Kaplan (1997) (cf. § 2.5) with those of Vartalla (1999). Grabe and Kaplan (1997) attempted to establish whether there was any difference in the linguistic expression of hedges between science and non-science texts. The results indicated that there was no difference. Similarly, Vartalla (1999) wanted to see if there was a difference in the use of hedging in popular scientific and specialist research articles on medicine. The overall results indicated that hedging devices were used in the same way in both text types. However, the specialist-to-specialist authors seemed to have resorted to a more limited set of words than the authors of the popularisations.

Vartalla (1999) attempted a study to establish whether there were any differences in the communicative functions of hedging in popular scientific and specialist research articles on medicine. He analysed 15 specialist, and 15 popular medical texts. The writers had to be medical professionals. Furthermore, similar topics were chosen. The analysis was limited to the five central word classes, namely modals; verbs; adverbs; adjectives; and nouns. The items were analysed contextually. The overall results indicate that hedging devices were used in both text types. Hedging was used as a

textual tool for both imprecision and precision (by this Vartalla means epistemic meaning), and for indicating (interpersonal) positive politeness between specialist writers and non-specialist readers. As mentioned earlier, Vartalla concentrated on a number of selected hedging devices (the five word classes) and then focused on the most central expressions of epistemic possibility rather than all potential expressions of epistemic modality. The modals *may*, *might*, and *could* were used in both text types to express tentative possibility. The two core groups of epistemic main verbs, namely reporting verbs (for example, *claim*; *suggest*; *hypothesise*; *propose*) and intransitive verbs (for example, *appear*; *seem*; *tend*), were also used in both text types. Those adverbs that can most clearly be linked to epistemic possibility, namely *presumably* and *probably*, also appeared in both genres. Nine probability adjectives were identified, and although there were fewer of these devices than that of modals, verbs, and adverbs in the specialist articles, there were, nevertheless, occurrences in both the specialist and popular articles. Nouns also occurred in both text types.

Riley (1991) analysed 12 articles reporting on experimental studies in speech-language pathology to see how writers used the passive and active voice in the expository sections, namely, Methods and Results, and the argumentative sections, namely the Introduction and Discussion. Passive structures were used more frequently in the expository sections, whereas active structures occurred more often in the argumentative sections. She claims that passive structures are more appropriate for expository purposes, as in the Methods and Results sections, where the writer's role is to present data and describe procedures, whereas active structures are more appropriate for argumentation, as in the Introduction and Discussion sections, where the writer's role is to interpret data and advocate a new thesis. She, therefore, concludes that it is the rhetorical and social contexts, or communicative functions, that determine the linguistic choices that writers make.

Riley's (1991) rationale for choosing articles from one journal, rather than from journals in different fields, is worth noting. Choosing one journal was to allow for generalisations about the discourse in one field and to enable a comparison of writers within one sub-discipline. She also believed that being familiar with its subject matter (through graduate coursework) would aid her understanding of each writer's discourse strategy. Regarding the analysis of passive structures, Riley not only acknowledges

the difficulty of identifying and classifying passive structures, but also mentions the difficulty in teaching the use of voice in scientific writing. The reason is that the appropriate use of voice in scientific writing depends on the writer's rhetorical goals, which may change within sections.

Lachowicz (1981) also conducted a study on the use of passive constructions of citations in scientific and technological writings. He supports Riley's (1991) finding that passive structures are commonly associated with expository sections, and function to reflect objectivity, and to reduce the author's commitment to the truth value of the statements.

Webber's (1994) study on the use of questions in medical texts has been included because questions may function as hedges (cf. Hyland, 1998b, in § 2.7). As hedges, questions are used by the writer to indicate a lack of knowledge, and a genuine search for truth; questions are also used to engage the reader in the scientific debate.

Webber (1994) was interested in investigating the use of questions in medical texts. The study involved analysing six medical journals to establish the incidence of questions, to see which kind of publications they are prevalently used in, and to see how they relate to the communicative function of medical texts. Questions have several purposes, namely: to arouse interest; as discourse organisers; as attitudinal markers; as distancing and hedging techniques to express doubt or caution; as reader guidance devices; to point to the future; and to criticise or attack opponents. They therefore serve both the writer and the reader. Sometimes, they are followed by an answer. Webber (1994) included all the questions in the texts, excluding indirect questions and reported speech. The following text types were examined, namely: editorials/review articles; research papers; case studies; letters; book reviews; news sections; and meeting reports. It was found that the most important reason for using questions was that of reader involvement: "Questions create anticipation, arouse interest, challenge the reader into thinking about the topic of the text, and have a direct appeal in bringing the second person into a kind of dialogue with the writer" (Webber, 1994:266). By creating anticipation and arousing interest, questions therefore facilitate epistemic curiosity to which Crismore and Vande Kopple (1990) refer, and the necessary uncertainty that Rowland (1995) believes to be crucial in

mathematics learning, and understanding the value of tentativeness in developing hypothesising for solving problems and scientific enquiry (Darian, 1995) (cf. § 2.5).

As a distancing or hedging technique, questions are also an effective device for raising doubts on a controversial or obscure issue without mentioning names or taking up a strong position, and thus leaving open the possibility for alternatives. Regarding the use of questions in the different genres, they were more frequent in the overtly personal genres such as editorials and letters, and less so in research articles. They did, however, occur more often in the Discussion section of research articles.

Although studies by Salager-Meyer and Salas (1991) and Salager-Meyer (1994) are reviewed now, it is Salager-Meyer's (1994) study that is more relevant to the current study, in that there hedging is acknowledged as embracing a three dimensional concept that incorporates negative politeness (cf. Myers, 1989; Vassileva, 1997, in § 2.4), avoidance of personal involvement, and the writer's not being able to reach absolute accuracy regarding the phenomena being investigated. This view of hedging is similar to that of Hyland's (1998b), which is reviewed in the following section. Hyland, for example, would view negative politeness as being reader-oriented, and would regard avoidance of personal involvement as being writer-oriented. Not being able to describe a phenomenon with complete accuracy would constitute accuracy-oriented hedges.

Salager-Meyer and Salas (1991) undertook a genre-based and text type analysis of hedging in written medical English discourse to find out how the lack of assertiveness in current (1980–1990) medical literature is realised through the use of hedges, and to what extent hedging usage differs according to textual communicative purpose (cf. Vassileva, 1997; Luukka & Markkanen, 1997, in § 2.4). Four text types were examined, namely, research papers (RP), case reports (CR), reviews (RV), and editorials (ED). The taxonomy that was used included Prince et al.'s (1982) classification of hedges into shields and approximators (cf. Rowland, 1995 in § 2.5), plus three additional categories, namely passive voice (cf. Riley, 1991; Lachowicz, 1981), expressions of the author's personal doubt and direct involvement, and emotionally charged intensifiers. While the classification system will not be critiqued here, it is not clear why the category, emotionally charged intensifiers, has been

included as a hedging category, since these would generally be understood as constituting a separate aspect of author's comment. Furthermore, the question arises whether passive voice items could not have been included under shields.

Overall, Salager-Meyer and Salas' (1991) findings indicate that the use of hedges is determined by the overall discourse structure and communicative purpose of the text type. Editorials and reviews are more heavily hedged than research papers and case reports, with case reports being the least hedged. Shields characterised editorials and reviews, whereas the passive voice featured in research papers and case reports. The remaining categories were much less frequently used as a whole. However, approximators were more frequent in case reports than the other text types, and emotionally charged expressions, and expressions of the author's doubt were more frequent in editorials and reviews than in research papers and case reports. Salager-Meyer and Salas (1991:33) thus conclude that "the more pretension to universality and generalisation (RV and ED), the more hedged the discourse".

In Salager-Meyer (1994), the use of hedges in five Research reports (RP) and ten Case reports (CR), which appeared in leading medical journals, also between the period 1980 to 1990, was compared. In this study, Salager-Meyer describes hedging as embracing a three-dimensional concept that incorporates negative politeness, avoidance of personal involvement, and as a means of conveying the writer's inability in, or the impossibility of reaching absolute accuracy regarding the phenomena under investigation. Generally, the taxonomy resembled the one described in the 1991 study (above), except that passive voice no longer constituted a separate category, and a new category was added, namely compound hedges, which Salager-Meyer describes as "strings of hedges" or the "juxtaposition of several hedges". However, why compound hedges constituted a separate hedging category is not clear. The results show that the most frequently used hedges in both genres were shields, approximators, and compound hedges. The Discussion RP/comment (CR) sections were the most heavily hedged (shields and compound hedges), while the Methods (RP) and the Case Report (CR) sections were the least hedged (approximators). The Introduction section of both RP and CR contained mainly shields, followed by approximators in RP Introductions, and adaptors of frequency in CR Introductions. Based on her findings, Salager-Meyer concludes that the different rhetorical functions

that the sections of the research paper perform, are realised by various linguistic resources.

This review of the literature on written medical discourse has been insightful in several respects. One of these is Salager-Meyer's (1994) understanding of hedging as embracing a three-dimensional concept; this view brings together the various perspectives on hedging. It is also interesting to note that there was no difference in hedging between popular scientific and specialist research articles, and that both text types used the same modal auxiliary and adverbial expressions, and that in contrast, the specialist articles contained fewer adjectives than the popularisations (Grabe & Kaplan, 1997; Vartalla, 1999).

The second insight concerns the use of passive structures in scientific writing to signal objectivity. The data analysis showed that the passive voice is associated with expository sections, and the active voice is associated with argumentative sections (Riley, 1991; Lachowicz, 1981).

Thirdly, the explanations for the use of questions in medical writing, namely, to engage the reader in dialogue, and as a distancing technique, are relevant to the analytical framework of the present study, in which questions are classified as hedging devices. It is also interesting to note that there were fewer instances of questions in the research articles than in personal genres, and that when questions did occur in the former, these were in the discussion sections.

In the following section, Hyland's (1998b) work will be described in some detail since this forms the basis of my hedging analysis.

2.7 HYLAND: HEDGING IN SCIENCE RESEARCH ARTICLES

This section provides an overview of Hyland's (1994; 1995; 1996a; 1996b; 1998a; 1998b) investigation into hedging in research articles (RAs), and an introduction to his analytical framework. A detailed explanation of this framework is provided in Chapter 3, since the current study is based on it.

Hyland specifically chose to investigate hedging in the RA because of the important role that hedging plays in this genre. Hyland (1998b:1) refers to hedging as “any linguistic means used to indicate either a) lack of complete commitment to the truth value of an accompanying proposition, or b) a desire not to express that commitment categorically”. Hedging is regarded as one part of epistemic modality. However, whereas epistemic modality is concerned with “the speaker’s assumptions, or assessment of possibilities, and, in most cases, it indicates the speaker’s confidence, or lack of confidence in the truth of the proposition expressed” (Coates, 1987:112), hedging indicates an unwillingness to make an explicit and complete commitment to the truth of propositions.

Because the RA is the major vehicle for reporting new experiments and for generating knowledge in the scientific community, RAs are central to the existence and growth of a discipline, and its practitioners. Furthermore, since research reporting often involves presenting new claims for ratification by readers, writers have to meet certain expectations to have their work accepted. Hedging helps writers to do this:

Hedging enables writers to express a perspective on their statements, to present unproven claims with caution, and to enter into a dialogue with their audiences. It is therefore an important means by which professional scientists confirm their membership in research communities” (Hyland, 1996a: 251-2).

The purpose of Hyland’s (1998b) study was to provide an explanatory framework (emerging from the analysis of actual language behaviour) of the role of hedging in cell and molecular biology RAs, by clarifying the incidence and function of particular hedging expressions. The study was based on a corpus of 75,000 words taken from 26 RAs in cell and molecular biology. The results of the analysis were compared with general academic data taken from three large computer corpora. The overall findings will be provided at the end of this section.

2.7.1 Hyland’s analytical framework

Hyland (1998b) describes his pragmatic analytical framework as providing a functional account for the use of hedges in scientific RAs. This framework combines

sociological, linguistic and discourse perspectives; this means that standards of knowledge (beliefs concerning the nature of reality), plus textual representations (that is how knowledge or information is expressed linguistically – in writing), and discourse community norms (norms or expectations of the scientific community), are considered in combination to clarify the use of hedges in the RA writing. In other words, reality, language, and audience are all necessary considerations in the analysis of hedges.

According to Hyland (1998b), his data revealed two major functions of hedging in RA writing, which he has called content-motivated and reader-motivated. Both are regarded as acknowledging the role readers play in ratifying knowledge, since the hedges signal the writer's awareness of the possibility of reader opposition to claims. Opposition will most likely occur if adequacy and acceptability conditions are not met. The former refers to claims corresponding to what is thought to be true according to belief about the nature of external reality, while the latter refers to their having to incorporate an awareness of interpersonal factors. Writers are, therefore, obligated to make assumptions about the nature of reality (content-orientation) and the acceptability of a statement to an audience (reader-orientation). Claims that ignore these conditions are unlikely to be ratified. Content-oriented hedges comprise accuracy type hedges and writer-oriented hedges. Accuracy type hedges enable the writer to present claims that reflect precision regarding the phenomena being described, while writer-oriented hedges serve to protect the writer against professional damage that may result from bald propositions. Reader-oriented hedges express the writer's acknowledgement of the reader's role in ratifying claims.

2.7.1.1 Content-oriented hedges

It should be pointed out that Hyland (1998b) uses the terms “motivation” and “orientation” interchangeably, but for the purposes of the current study, orientation is preferred.

“Content-motivated hedges mitigate the relationship between what a writer says about the world and what the world is thought to be like. They involve the writer's need to present claims as accurately as possible and to anticipate claims to the contrary”

(Hyland, 1996a: 256). Reasons for using content-oriented hedges fall into two categories, depending on the writer's focus which may be either *propositional accuracy*, in which case the writer seeks to present statements with appropriate accuracy, or *self-protection*, in which case writer presence, and therefore writer responsibility, is diminished.

“*Accuracy-based hedges* allow writers to express propositions with greater precision and caution in areas characterised by shifting interpretations. [They] distinguish the actual from the inferential and imply that a proposition is based on the writer's plausible reasoning rather than reliable facts. They therefore specify the state of knowledge on a subject either by defining how statements are to be understood or by accurately asserting the writer's assessment of the certainty of the proposition. Readers are expected to understand that the proposition is true as far as can be determined” (Hyland, 1996a:256).

Accuracy-based hedges are understood as encompassing *attribute-type* and *reliability type* hedges. *Attribute hedges* allow deviations between idealised conceptions of particular relationships and actual, observed behaviour to be accurately expressed, and enable the writer to specify attributes of phenomena being described, more precisely. “*Reliability hedges* suggest the writer's reservations concerning whether the situation actually obtains, keeping interpretations close to findings, where claims may be less tenuous” (Hyland, 1996b:441).

In the examples below (taken from Hyland, 1996b:437), [1] is an example of an attribute type hedge, and [2] is an instance of a reliability type hedge.

The adverbial *generally* in the excerpt below serves as an attribute hedge by indicating the degree of precision intended, and the sense in which the claim may be held to be true.

[1] Staining was *generally* confined to the vascular tissues

In the following excerpt, *somehow* functions as a reliability hedge in that an attempt is made to present the content as truthfully as possible, while acknowledging factual

uncertainties. The writer admits that a precise understanding of the relationship that is thought to exist is not known.

- [2] The photoreceptor involved is *somehow* related to the photosynthetic apparatus itself.

While accuracy hedges are proposition-focused, *writer-oriented hedges* are writer-focused. They aim to shield the writer from consequences of opposition by limiting personal commitment. They indicate an unwillingness to make a commitment to conclusions and are therefore often associated with higher level claims, or a greater generalisation of interpretation of findings. They are, however, also content-oriented in that they function to hedge the writer's commitment to propositional content. The most distinctive feature of writer-oriented hedges is diminished writer presence. Excerpt [3] (taken from Hyland, 1996b:444) is an example of a writer-oriented hedge, which is realised by constructing an abstract rhetor which nominalises a personal projection. Hyland explains this as follows: "By foregrounding 'These data', the writer presents a view where data, vested with agentivity, are attributed with primary responsibility for an interpretation; they become the source of the claim."

- [3] *These data indicate* that phytochrome A possesses the intrinsic

2.7.1.2 Reader-oriented hedges

Reader-oriented hedges function to express collegial deference, as a response to discourse norms (that is, the writer conforms to the social expectations of the scientific community). This practice acknowledges the reader's role in ratification of claims; because hedged statements mark claims as provisional, the reader is invited to participate in a dialogue or debate, which is a characteristic feature of scientific investigation (Hyland, 1996b). An example of a reader-oriented hedge which is accomplished by using a hypothetical conditional to suggest an alternative (Hyland, 1996b:448) is:

- [4] *If we assume that* the apparent molecular weight obtained by SDS PAGE is correct, *this suggests* that only *a few* amino acids are missing from the N-terminal end and that a leader sequence may be encoded.

2.7.2 Hyland's overall findings

The analysis of the data showed that hedging is a significant aspect of RA writing, and is realised both lexically and by three main discourse-based strategies. The hedging devices were mainly lexical; 79% of cases were realised by verbs, adjectives, adverbs, and modal auxiliaries. The discourse-based strategies made up 15% of all hedges in the corpus. Discourse-based strategies involve using more than one linguistic form (cf. § 3.4.1.1 (b)). These strategies are: reference to limiting experimental conditions; reference to model, theory, or methodology; and admission to a lack of knowledge. The most common one for hedging was reference to experimental conditions. Hyland (1996a:273) points out that since a variety of forms are used to express these hedging strategies, and because they are not neatly quantifiable, their significance as hedging devices available to scientific writers has tended to be overlooked in the literature. The expression of hedging, and the distribution of devices will not be referred to here, since this will be dealt with in depth in Chapter 3. The bulk of hedges (84%) occurred in the Results and Discussion sections. This finding relates to the rhetorical function of these sections which is to interpret and substantiate information, rather than to present information as "fact". Because the information is not yet fact, it has to be presented cautiously, which is why the exposition is hedged.

2.8 CONCLUSION

The overall aim of this literature review was to examine the nature of scientific writing, and more specifically, the role of hedging in research writing. This review has shown that scientific statements are both factive and interpretive, and that for the writer's interpretations to be accepted by an expert audience, interpretive statements frequently need to be assessed and stated with appropriate degrees of certainty. It is furthermore indicated that this assessment can be communicated by hedging. In this regard, many studies show that, in general, second language English students have

difficulty with interpreting and expressing hedging. The review has also revealed that an appropriate theoretical framework for hedging analysis is one which emphasises the relationship between language, context and text, such as the systemic-functional approach. This review has also attempted to show that the most suitable existing framework for analysing hedges in research writing is that of Hyland (1998b). This framework embraces the systemic-functional approach.

A related aim of the review was to find out what motivations are given for using hedging in scientific writing. It can be concluded that there are two main reasons, which do not necessarily exclude each other. The first encompasses the scientific quest for truth, and is, therefore, concerned with expressing this truth as accurately and reliably as possible. The second reason is to save face. Meyer (1997:39-40) offers a succinct explanation of how these motivations are, in fact, inseparable. He says:

There is more than just face-saving that is involved in trying to make statements impregnable. There is an underlying, mostly implicit cognitive model of the scholarly process that is older and still stronger than the ideal of falsifiability.

Officially it is not the personal face of a scholar that is at stake, but truth. We may thus see that the different explanations for hedging in academic discourse do not exclude each other, but are true on different levels: What looks like a face-saving strategy on an interpersonal level, is nothing but the strict application of a rational maxim on the level of the logic of conversation, which on the level of genre has been codified as a set of discourse conventions, and on the epistemological level serves to further the goals of science.

CHAPTER 3

ANALYTICAL FRAMEWORK AND RESEARCH PROCEDURES

3.0 INTRODUCTION

The aim of this chapter is to describe the analytical framework that is used in the present study, and to illustrate the framework with examples from the sample texts (cf. § 3.4.1 and 3.4.2). The research procedures that were followed, are also described.

3.1 HEDGING IN SCIENTIFIC WRITING

The term hedging is explained in Chapter 1 (cf. § 1.1), and its role in scientific writing is further elaborated on in Chapter 2 (cf. § 2.1.1; 2.3; 2.5; 2.6 and 2.7). In Chapter 1, it is also pointed out that the current study has adopted the rhetorical view of science, or scientific writing, in that it is argued that knowledge is negotiated, that the scientist interprets data, and that language is at the centre of interpretation and knowledge negotiation. The rhetorical view is contrasted with the empirical view. According to the empirical view, the work of science is the discovery of truth about the natural world, which exists independently of the scientist; truth is established through formulation of theories tested by experimental method. Claims are, therefore, either true or false. Against this background, scientific statements can, therefore, be understood as being either “descriptive” (impersonal, factual) or “interpretive” (constructed by an individual) (Hyland, 1998b: 81-82).

In scientific writing, and more specifically, the research article (RA), which is the major vehicle for disseminating new knowledge to other scientists, “new knowledge” seldom comprises descriptive statements. Two types of statements characterise scientific writing: those statements that form part of the shared belief with readers, (“agreed understandings confirmed by the research community” or “facts”), and those that are newly suggested by the author. The first type is said to comprise *factive statements*, and the second is said to comprise *non-factive, or hedged statements*. Because work in science mainly involves what is “possibly true”, or “not necessarily true”, or what is “unknown” (non-factive), rather than what is known, or accepted to

be true, or known, or accepted to be untrue (factive), it is difficult to express knowledge claims in unmitigated form. This is also because induction and inference rather than deduction and direct causality constitute most arguments in scientific discourse (Hyland, 1998b:89). Furthermore, even though scientists may have strong grounds for trusting the relations between accepted premises and new results, uncertainty, caution, and interpersonal factors will prevent the categorical assertion of such claims. Based on the above, scientific statements are thus understood to comprise both factive and non-factive statements. This is shown in Figure 1 below.

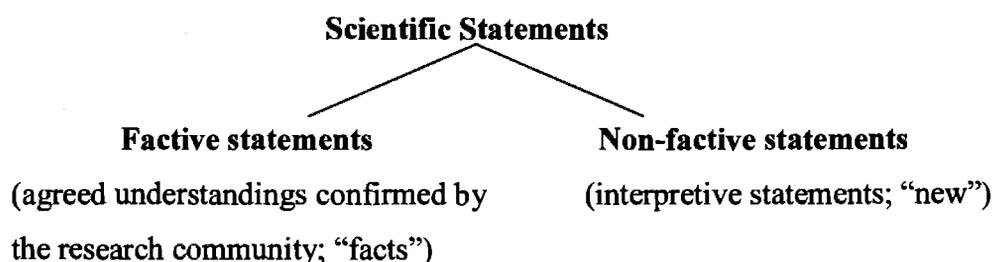


Figure 1: Factive and non-factive statements in science

3.2 AN EXPLANATION FOR THE USE OF HEDGING IN RESEARCH ARTICLES

An introduction to Hyland's (1998b) analytical framework is provided in § 2.7. It will be recalled that he identified two major functions of hedging in RAs, which he called *content-oriented* and *reader-oriented*. Both are regarded as acknowledging the role readers play in ratifying knowledge, since the use of hedges signal the writer's awareness of the possibility of reader opposition to claims. Claims which are especially subject to criticism and negation, are those which characterise the RA. The RA, whose primary function is to disseminate new knowledge in science, is essentially characterised by interpretive (non-factive) statements involving weighing evidence, drawing conclusions from data, and stating circumstances which allow these conclusions to be accepted. These statements are assessed by the writer. This assessment can be communicated by hedging which enables writers to express a perspective on their statements, to present unproven claims with caution and to enter into dialogue with their audiences. Hedged statements indicate that the writer is aware of the reader's role in ratifying claims, and that claims may be rejected. Claim

rejection can be divided into two types. The first encompasses claims not corresponding with what is known, or believed to be true, referred to as *adequacy conditions*, and the second involves a lack of consideration for the reader in claim ratification, referred to as *acceptability conditions*. In Hyland's terms, the use of content-oriented hedges provide protection against being opposed on the basis of not meeting adequacy conditions, and the use of reader-oriented hedges provides protection against being rejected on the basis of not meeting acceptability conditions.

Content-orientation (meeting adequacy conditions) may be expressed at two further levels of delicacy. The first originates in the obligation to meet academic requirements of presenting claims as accurately as possible; the second concerns the need to anticipate what may be harmful or advantageous to the writer. Each of these is referred to as *accuracy-oriented* and *writer-oriented* respectively. Accuracy-oriented hedges can be further distinguished. The one sub-type reflects the difficulties of using a limited language to describe natural phenomena, while the second sub-type implicates the writer's confidence in the certainty of her knowledge. The first sub-type is termed *attribute hedges*, while the second sub-type is called *reliability hedges*. The diagram below (Figure 2) shows Hyland's (1998b:93) model for types of statement in science.

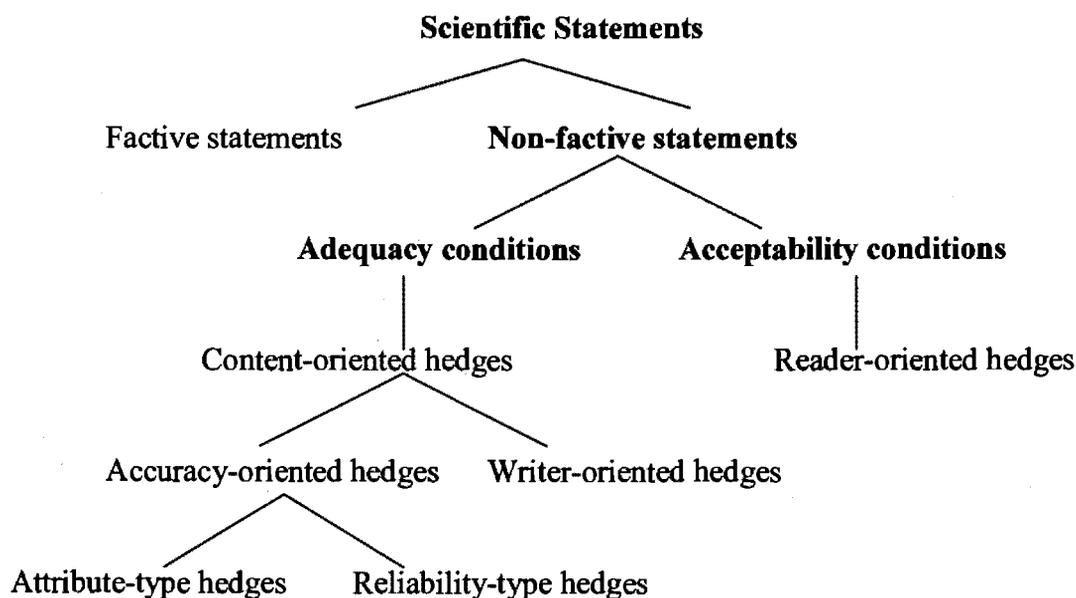


Figure 2: Types of statement in science

The analytical framework in terms of the functions that hedges perform in RAs is now described and illustrated with reference to the texts analysed in this study. Representative examples from each category are provided.

3.3 ANALYTICAL FRAMEWORK

The analytical framework is now described in terms of content-oriented and reader-oriented hedging categories. The content-oriented category comprises accuracy-oriented and writer-oriented hedges. Accuracy-oriented hedges are further sub-divided into attribute type hedges and reliability type hedges. Each of these is elaborated on in terms of the specific functions they perform, and their linguistic realisations.

3.3.1 Content-oriented hedges

To recapitulate, content-oriented hedges serve to mitigate the relationship between what the writer says about the world, and what the world is thought to be like. The motivation for content-oriented hedges falls into two categories, depending on the writer's primary aim, which may be to present statements with appropriate accuracy, or to make the strongest claim possible while limiting the damage of being wrong. These two forms of motivation are referred to as *accuracy-oriented* and *writer-oriented hedges* (Hyland, 1998b:162;176). Each of these is discussed in turn.

3.3.1.1 Accuracy-oriented hedges

The principal function of accuracy-oriented hedges is to achieve precision which may be by marking a departure from an ideal, or by indicating that a proposition is based on plausible reasoning or logical deduction in the absence of complete knowledge. They specifically address the writer's concern with the relationship between propositions, or propositional elements, and reality. In trying to present information as fully, accurately, and objectively as possible, accuracy-oriented hedges seek to meet adequacy conditions (cf. § 3.2). Two types of accuracy-oriented hedges are distinguished, namely *attribute hedges* and *reliability hedges*. Each has its own motivation and function. These are discussed separately.

3.3.1.1 (a) Attribute hedges

The main motivation for using attribute hedges is to indicate how a phenomenon varies from an idealised conception of it.

The use of attribute hedges allows deviations between idealised models of nature and instances of actual behaviour to be accurately expressed. They enable writers to restructure categories, define entities and processes exactly, and to distinguish how far results approximate to an idealised state. They specify more precisely the attributes of the phenomena being described" (Hyland, 1998b:164).

Attribute hedges can be realised by the following forms: modal auxiliaries, adverbials, adjectives, and nouns. These uses will be discussed in turn.

Modal auxiliaries

The modal auxiliary *can*, plus the combinations *can be* and *can be attributed to* can be used. In the following three examples [1] to [3], *can* functions as a hedge against complete certainty in respect of propositional content, and enables the writers to precisely express what is believed to be true of the phenomena under discussion. In all three cases, the writers are basing their claims on professional and experiential knowledge.

- [1] Analysis of a person's participation *can* assist the occupational therapist in many ways, e.g. assessing a person's level of creative participation, establishing the balance within a person's lifestyle and guiding the occupational therapist into selecting appropriate activities for treatment programmes, in conjunction with knowledge of the client's interests. (Model K, p17)
- [2] The effects of stroke and head injury *can be* extremely diverse. (B/99, p8, H)

- [3] The large number of broken wheelchairs in Winterveldt *can be attributed to* lack of resources that are available to assist in the repairs of wheelchairs. (B/98, p5, H)

Adverbials

An adverbial is “any word, phrase, or clause that functions like an adverb. Adverbials may be classified as adjuncts, conjuncts, or disjuncts” (Richards, Platt & Weber, 1985:5-6). Style disjuncts, adverbial adjuncts and content disjuncts can be employed as attribute hedges.

Style disjuncts

Style disjuncts “indicate that manner or respect in which someone is speaking (for example, *truthfully, approximately, briefly*)” (Quirk et al., 1985:612). Two style disjuncts were used in my corpus as attribute type hedges, namely, *generally* and *commonly*. Both forms indicate the degree of precision intended, and the sense in which the claim may be held to be true. Excerpts [4] and [5] are examples.

- [4] The research has revealed that the attitudes of Medunsa third year medical students, *generally*, is neutral towards people with mental illness. (A/99, p21, H)
- [5] Splints are *commonly* used to avoid contractures, which may result from persistent hypertonia, of joints like wrist, hand or elbow. (F/98, p1, L)

Adverbial adjuncts

An adjunct “is part of the basic structure of the clause or sentence in which it occurs, and modifies the verb. Adverbs of time, place, frequency, degree, and manner, are examples of adjuncts” (Richards, Platt & Weber, 1985:5). In the corpus, four adverbial adjuncts were employed as attribute hedges, namely, *usually, normally, often*, and *frequently*.

In the two extracts below [6] and [7], *usually* and *normally* enable the writers to accurately express instances of actual behaviour (based on research evidence), with regard to reasons for attempted suicide [6], and the influence of culture on expectations and concomitant roles [7]. Extract [7] was taken from a report on an investigation into the similarities and differences between the weekly activity profiles of married and single women, and it was found that both social (cultural) and personal expectations shaped the roles and daily activities of women.

[6] Among the reasons for attempted suicide, family problems, *usually* combined with poor communication, appear to be common. (Model R, p38)

[7] Members of society *normally* take their cultures for granted. (A/98, p6, H)

In extracts [8] and [9], *often* and *frequently*, are frequency adverbials. It is important to point out, though, that not all instances of these forms are regarded as hedges. Only when they are used to hedge against complete certainty, and to convey attributes as accurately as possible, are they considered hedges. Here, the co-text and context are especially important in interpretation.

Excerpt [8] is taken from an article reporting on an investigation into the effectiveness, and the continual use of appropriate devices for persons with disability. The “privilege” refers to personal independence.

[8] People with physical disability are *often* deprived of this “privilege” and as a result lose position and status in the family as well as losing their self esteem. (Model O, p36)

The proposition in extract [9] is based on common medical knowledge.

[9] Stroke is *frequently* caused by thrombosis and embolism. (J/99, p1, L)

Content disjuncts

Content disjuncts are concerned with expressing certainty about the truth-value of what is said (Hyland, 1998b:138). Content disjuncts are also referred to as attitudinal disjuncts (Quirk et al., 1985:511), or probability adjuncts (Halliday, 1994, in Hyland, 1998b:136). In Hyland's data, they included a wide range of hedges relating to contingency and degrees of certainty. Three further groups are distinguished in this category. The largest group expresses doubt without carrying implications about the truth of the proposition, or the sense in which it is seen to be true or false. Examples are *presumably; possibly; probably*. The second group conveys how the truth of the proposition can be mentally perceived; examples of these disjuncts are: *apparently; evidently; intuitively*. However, most adverbs in this class communicate conviction, and items expressing doubt are rare. In the third group, items are judgemental and express the sense in which the writer believes what is said to be true or false. These adverbial disjuncts typically carry a reference to the reality of what is said, so items either express a contrast with reality, or signify that what is said is true only in principle (Hyland, 1998b:136-137).

The two content disjuncts that were used as attribute hedges were *essentially* and *necessarily*. In examples [10] and [11], the content disjuncts refer to the reality of what is said, and signify that what is said is true only in principle.

- [10] Various authors have given their views on the treatment process followed in occupational therapy, and their ideas are *essentially* the same in most areas of practice of occupational therapy. (G/98, pp7-8, H)
- [11] A possible reason for the result obtained in figure 1.1, where the median is 40, could be that 77% of the students have been in contact with a mentally ill person. This is interesting to note, since the literature seems to indicate that students who have had contact with mentally ill people do not *necessarily* have positive or neutral attitudes, rather their attitude tends to be significantly negative. (A/99, p20, H)

Adjectives

Adjectives that are commonly used as attribute hedges are *general* and *common*. In excerpts [12] and [13], *general* and *common* are functioning as attribute hedges by specifying the precision of the terms “observation” and “diagnoses”. The writers are not restricting the validity of the claims, but are hedging their descriptions of the phenomena under discussion.

[12] It is a *general* observation that mothers with disabled children are not cared for, meaning no one considers their needs. (H/97, p4, H)

[13] The *common* diagnoses found in Ga-Rankuwa Psychiatric Unit are: schizophrenia, mood disorders, psychosis, psychoactive substance disorder and anxiety based disorders. (G/98, p1, H)

Nouns

The two noun forms that are employed in the corpus to signal attribute hedges are *in general* and *on the whole* (excerpts [14] and [15]). These nouns are functioning in the same way as the above-mentioned adjectives are. They are hedging the expressions used to describe what actually obtains rather than to restrict the validity of the claims.

[14] From the above, one can conclude that *in general*, activities for psychiatric patients differ from one patient to another because of the different purposes they serve among different psychiatric patients and also because of the patient’s situation, needs, the likely progression of his dysfunction and the setting of the therapeutic intervention for that patient. (G/98, p9, H)

[15] The patients (both male and female) have a positive attitude *on the whole* towards the occupational therapy staff. (D/97, p21, L)

Summary of Attribute hedges

The main motivation for using attribute hedges is to indicate how a phenomenon varies from an idealised conception of it. Attribute hedges specify more precisely the attributes of the phenomenon being described. Attribute hedges are realised by various forms, such as modal auxiliaries, adverbials, adjectives, and nouns.

3.3.1.1(b) Reliability hedges

In §2.7, it is stated that the principle motivation of reliability hedges is the writer's desire to clarify the state of knowledge, and to acknowledge factual uncertainties. Although both attribute and reliability hedges convey a concern with propositional precision, attribute hedges serve to express deviations between idealised conceptions and actual behaviour, whereas reliability hedges serve to convey more precisely the writer's assessment of the certainty of a statement in terms of the actual state of knowledge, or in terms of what is actually observed rather than what is assumed. The writer's assessment rests on available facts, based on inference, deduction or repeated experience.

Writers frequently used reliability type hedges in relation to the findings pertaining to their investigations. In this regard, claims are restricted to specific contexts. The following forms can be used to express reliability hedges, namely, modal auxiliaries; verbs; adjectives; nouns; the discourse-based strategy termed limited or inadequate knowledge; and adverbials.

Modal auxiliaries

The following modal auxiliaries can be used as reliability hedges, namely, *may*, *might*, *could*, and *would*.

Hyland (1998b) mentions that both *may* and *might* can be used interchangeably to indicate a 50-50 assessment of possibilities. It has also been noted that *may* appears to be replacing *might* as an exponent of epistemic possibility in formal contexts and scientific writing (Hyland, 1998b:116). In excerpts [16] and [17], *may* and *might* are

used in the same sense which is to convey reliable interpretations which are based actual, current findings.

[16] The results shown by the Mann-Whitney U-test indicated no significant difference ($p > 0.92$) between the suicidal and non-suicidal group, however this *may* have been due to small sample size. (Model R, p39)

[17] Subject[s] 02 and 09 showed more improvement in all the three conditions. The reason *might* be that the subject[s] were attending the hemiplegia support group. (F/98, 24, L)

In the following case [18], *could* is functioning as a reliability hedge; the writer is concerned with expressing the propositional content as reliably as possible against the background of clinical knowledge.

[18] Both were head injured patients which *could* be the reason why they recovered quickly, since head injury patients recover more quickly and easily as compared to CVA patients (Pedretti, 1997). (B/99, p36, H)

In extract [19], *would* is used to convey hypotheticality. The writer's intention is to convey a situation that might obtain, as reliably as possible, by basing the hypothesis on prior theoretical or experimental premises, and by stating the conditions required to fulfil the hypothesis. According to Coates (1983), *would* is the main hypothetical modal with epistemic meaning. Hyland (1998b:111) also states that "a common use of epistemic *would* in scientific writing is as the hypothetical variant of will (= marker of prediction)".

[19] In situations where both tests are used it might be better to use one test diagnostically and the other as a test to determine progress achieved by treatment. This *would* eliminate the practice effect reported by McFall and her colleagues (1993). (Model S, p12)

Verbs

Reliability hedges can also be expressed by means of verbs, for example: *seem*; *suggest*; *tend*; *appear*; and *estimate*.

In extract [20], *seemed* is used to express the writer's personal uncertainty regarding the activity. This lack of confidence is based on her observation of how the children responded to the activity. The writer's intention is to express the propositional content (that is, what she considers to be the inappropriateness of the activity in a given context) as reliably as possible, by basing it on actual, observed evidence.

[20] The activity *seemed* culturally not appropriate, children were not following the instructions and only explored the different cards. (H/98, p29, H)

In extracts [21] and [22], the writers have made deductive conclusions based on either observing actual behaviour [21], or by referring to literature [22]. Since the use of *suggests* conveys that the deductions are to be understood as personal conclusions which may require further enquiry, these are interpreted as reliability hedges.

[21] Children thus appear normally endowed, yet their behaviour *suggests* that the desire for growth and maturity has been diverted in some way. (J/98, p8, L)

[22] Markvitz (1977) and Krige (1950) argue that destruction of a social system automatically destroys every part of the society, especially its economy. This therefore *suggests* that sound family and social structure and hierarchy are important for the establishment of a support system for any business initiative. (A/97, p8, L)

In extract [23], *tended* is also used as a reliability hedge. The researchers are basing their observation on actual experience with a particular group of children. They want to convey the test outcome as reliably as possible, but acknowledge that they do not have complete certainty to make a categorical statement.

[23] In our experience children in a lower socio-economic environment (not part of this study) *tended* to score much lower than the USA norms. Visual perceptual stimulation received at home does seem to have a definite enriching effect on the child's visual perceptual abilities. (Model S, p13)

Appear is employed as a reliability hedge in extract [24]. The writer's observation concerning the children is based on both theoretical knowledge and clinical experience, and is, therefore, an attempt at conveying reliable information. The use of *appear*, though, signals a tentative, rather than a categorical claim.

[24] Children thus *appear* normally endowed, yet their behaviour suggests that the desire for growth and maturity has been diverted in some way. (J/98, p8, L)

In the following example [25], *estimates* is used to express the situation that obtains as reliably as possible, given that exact figures are not available, or would be extremely difficult to establish.

[25] The World Health Organisation *estimates* that 10% of the population is likely to be disabled. (B/97, p4, L)

Adjectives

The following adjectives can be used as reliability type hedges, namely: *possible*, *slight*, *probable*, and *apparent*.

In the following example [26], *possible* acts as a reliability hedge in that the writer is not completely certain why the musical component, in comparison with the other components, had an excellent patient response. In order to account for the outstanding response as reliably as possible, the writer is careful to link the reasons to patient-given explanations, and uses *possible* to hedge the claim (the explanation).

[26] The musical component is the one that had a very great response from the patients. The musical component had a response of ninety-five percent from the patients. The other component which is crafts, also gained a high response which is also ninety-five percent (95%) of all the twenty patients. The *possible* reasons included that patients explained that they learned new skills by attending these groups and they felt that they were being kept busy by these groups. (I/98, pp 29-30, L)

In the next excerpt [27], *probable* is used similarly to *possible* above. (Both extracts have been taken from the same report.) Here, too, the writer is careful to base the judgement on observed behaviour. In other words, the claim is made in relation to a specific context that the researcher is familiar with.

[27] Another *probable* reason that so many of the clients performed this activity in an acceptable manner was because their level of motivation was high enough to enable them to do [so]. (I/98, p37, H)

Slight in extract [28] is used to convey what actually obtained in a particular situation. The writer uses *slight* to qualify the extent of delay for the sake of content precision.

[28] Figure 4 shows that there is a *slight* delay in the receptive language modality, two subjects are delayed (S4 and S5). (J/98, p20, L)

Apparent in [29] below functions as a reliability hedge to convey the writer's uncertainty regarding sufficient evidence for this type of marriage working. She acknowledges that there is no tangible counter-evidence indicating that such marriages fail, but is careful to provide, by way of a reference to literature, the conditions for the success of such partnerships.

[29] In conclusion, although there is no *apparent* reason to prevent mildly retarded people from taking on the responsibility of marriage and parenthood, Rosen et al. (1977) emphasize the importance of adequate support to the retarded couple, proper training and sufficient resources. (F/97, p13, H)

Nouns

Nouns are also employed as reliability hedges, for example: *tendency*, *possibility*, and *evidence*. In the sample texts, both *tendency* [30] and *evidence* [31] have been used by the writers to convey information as reliably as possible. Since the observations are personal, and are based on specific research contexts, the claims are expressed tentatively.

[30] It has also been observed that students have the *tendency* to discuss their mentally ill patients with their friends and laugh at problems which are very real to the patient. (A/99, p1, H)

[31] There is *evidence* that supports the fact that doctors have negative feelings and avoidance tendencies towards patients who have chronic disabling illnesses and the hostile or severely disturbed (Duckworth, 1988). (A/99, p9, H)

Possibility is also used as a reliability hedge in extract [32]. While the writers cannot account for the entire South African population, their study into the dynamics of the particular community does provide reasonable evidence for drawing such a conclusion. Therefore, the hedged claim is for the purposes of making a tentative proposition, rather than one that is rigidly categorical.

[32] While it is probably unreasonable to expect previous friends to provide support where they have withdrawn it, creating opportunities for peer support amongst clients themselves is a clear *possibility*. (Model M, p16)

Limited or inadequate knowledge

In research writing, writers often refer to limited or inadequate knowledge. Hyland (1998b:141) refers to this as a discourse-based strategy since this frequently involves using more than one linguistic form. Writers employ this strategy for the purposes of either locating and justifying their own research, or to indicate problems or concerns associated with limited, or a lack of information within a particular discipline. In

addition, this strategy helps writers to express the reliability or unreliability of claims against a background of the current state of knowledge within a specific field.

In the sample texts, limited knowledge was indicated by referring to *no research evidence; few studies; limited evidence; a lack of literature; limited literature; and insufficient information*. How limited or inadequate knowledge can be expressed is exemplified in extracts [33] to [38].

[33] Furthermore, *it is not known whether* devices are appropriate for the circumstances in the home or whether persons are able to use them effectively. (Model O, p36)

[34] *Very few studies have been published on* the evaluation of longterm use of assistive devices (Finlayson and Havixbeck, 1992). (Model O, p36)

[35] Evaluation of hand function is an important part of the assessment process, but *there is no consensus in the literature* that any one test adequately measures hand function or has an acceptable definition of hand function. (Model L, p40)

[36] *Thus far, no norm has been reached about the activity profiles of married and single women between the ages of 35 and 50.* (A/98, p1, H)

[37] *Literature* related directly to the problem investigated by this study *was limited*. It is evident that the field of job analysis in Occupational Therapy is underdeveloped. (E/98, p15, H)

[38] *No literature* was found which examines marriage amongst moderately retarded people. (F/97, p13, H)

Adverbials

Adverbials can be employed as reliability hedges, namely, content disjuncts, style disjuncts, adverbial adjuncts and adverbial conjuncts (cf. §3.3.1.1 (a) for explanations of terms). Each of these is illustrated in turn.

Content disjuncts

Hyland (1998b:167) points out that content disjuncts are commonly used to express reliability. Content disjuncts “comment on the probability of the content of a proposition being true and include both adverbs of certainty, which simply convey doubt on the information, or of mental perception, which show how results are understood”.

Several content disjuncts can be used as reliability hedges. In the sample texts, the writers used five content disjuncts (cf. § 3.3.1.1 (a)) for the purposes of expressing information as reliably as possible. These were *likely*, *probably*, *presumably*, *possibly*, and *perhaps*. In the following three excerpts [39] to [41], *likely*, *probably*, and *presumably* are used to express what the writers believe to be true of the situations, based on either experiential knowledge, or subject knowledge. These are attempts at conveying reliable information according to what is known.

[39] Movement of children from one school to another, is a serious problem at most special schools, and so it is at Bethesda too. It is difficult to determine the real reason for this. On the one hand, it is understandable that parents are *likely* to explore all avenues in their attempt to find help or cure. (F/97, p3, H)

[40] There is no specific trend to the percentage of society activity participation, and it varies with age. Games activity participation does show a trend. It can be seen that on the whole throughout life there is very little participation in this type of leisure time activity (ranges from 0% to 12,5%), but that in the

final age band participation increases (42,86%). This is *probably* due to the increase in leisure time available to the last age band, and the decrease in active sport participation. (Model K, p25)

[41] In the normal hand with pre-articular structures unaffected by disease the ulnar deviation forces produced by (especially) the long flexors of the second and third fingers is *presumably* counter-balanced by the radial interossei and lumbricals. (Model N, p32)

In the following two extracts, [42] and [43], *possibly* and *perhaps* are used by the writers to convey that they have drawn inferences based on the preceding information (the mothers' needs). Because these are inferences, they are hedged. Nevertheless, the information can be regarded as reliable because it is based on actual research evidence (that is, the needs analyses).

[42] Of the research population, 91,6% (N = 11) of the mothers have a need for money. This is *possibly* for maintenance of their families as most of them are single and unemployed, they have no income to meet their needs. (H/97, p25, H)

[43] Lastly, for Group B [there] is a need for transport as most of them live far from their meeting place and their children are a bit older and immobile, *perhaps* carrying them is very cumbersome. (H/97, p27, H)

Style disjuncts

Two style disjuncts (cf. § 3.3.1.1 (a)), namely, *approximately* and *more or less*, were employed as reliability hedges by the writers. It is important to emphasise that the interpretation of these particular forms as reliability hedges depends on the context and co-text. Hyland (1998b:164-165), for example, would most likely interpret these as attribute hedges. The use of *approximately* [44] is probably more important as a reliability hedge than that of *more or less* in [45], where this information may not be that significant. In [44] some idea of the time span, with respect to using the air splint in treating the condition (spasticity in the elbow joint), may be important in terms of

its observed efficacy in certain conditions. It is in this sense that *approximately* is used, for the purposes of validating an investigation into the use of the air splint as a treatment method in spasticity in the elbow joint.

[44] Clinical therapists of the Occupational Therapy Department, Garankuwa Hospital, began to use the air splint *approximately* one and a half years ago. (G/97, p1, H)

[45] Ga-Rankuwa Hospital has an acute psychiatric unit which admits *more or less* 65 acutely ill psychiatric patients. (G/98, p1, H)

Adverbial adjuncts

A range of adverbial adjuncts can be employed as reliability type hedges. Eleven adverbial adjuncts (cf. § 3.3.1.1 (a)) were used as reliability hedges in the corpus. These were *partly; partially; slightly; some; to some extent* (downtoners); *sometimes; not always*, and *seldom* (low frequency indicators); *almost; about; and somewhat*. In the following three extracts [46] to [48], the writers strive to present the content as accurately as possible by using adverbial adjuncts, and by referring to literature. In [46], the writer refers to literature to provide corroboration for her own findings. However, by using *partly*, she acknowledges that complete knowledge is lacking.

[46] This is *partly* confirmed by the study of Finlayson & Havixbeck (1992) who found that those subjects who were visited at home were twice as likely to use all their prescribed equipment than those who were not visited at home. (Model O, p44)

In the following two extracts [47] and [48], the writers indicate what they believe to be true of certain phenomena, and try to express their understanding as accurately as possible by using adverbial adjuncts. References to literature are also used to enhance reliability.

[47] These attitudes are more in relation to some type of impairment as *some* types of impairment are viewed with fear. Children with [these] impairments were or are rejected by people in the community (Kisanji, 1995). (I/99, p6, H)

[48] To understand the *somewhat* confused attitudes of contemporary society towards mentally ill persons, it is helpful to examine current situations and thinking in the light of their historical background (Nancy, 1995). (F/99, p9, L)

In the following two excerpts [49] and [50], the writers use adverbial adjuncts to present reliable information based on their knowledge of the condition, or hospital practice.

[49] Adult head injured or stroke patients are *sometimes* found with spasticity of the elbow, which influences active movement of the joints. (F/98, p2, L)

[50] Assistive devices are usually issued by occupational therapists in the hospital, but follow up to determine whether the devices serve a useful purpose is *seldom* done. (Model O, p36)

In the two excerpts that follow [51] and [52], information is presented as reliably as possible in terms of what is understood to be true.

[51] Cognitive tests can provide a baseline against which to measure the effectiveness of treatment. They can *to some extent*, indicate areas of deficit, however it should be [remembered] that it is notoriously difficult to allocate a quantitative measure of qualitative functions such as executive and adaptive functions. (B/99, p15, H)

[52] Attitudes on their own are *not always* reliable predictors of behaviour. (D/97, p4, L)

Slightly in the following extract [53] is used to hedge against inaccuracy, or against making a statement that is not perceived to be a true or accurate reflection of the actual results.

[53] The correlations of the perceptual quotients are *slightly* higher ($r = 0.6156$) ($p < 0.01$). (Model S, p13)

Partially in the excerpt below [54] is used to accurately convey what the scoring encompassed.

[54] The scoring is *partially* based on an analysis of which type of stimulus provokes the necessary neuronal processing to elicit the effects of neurobehavioural dysfunction, be it verbal, tactile, proprioceptive, or visual. (B/99, p22, H)

Adverbial conjuncts

Adverbial conjuncts can also be used as reliability type hedges, although it would appear that they rarely occur. Adverbial conjuncts “are not part of the basic structure of a clause or sentence. They show how what is said in the sentence containing the conjunct connects with what is said in another sentence or sentences” (Richards, Platt & Weber, 1985:5-6). Only one adverbial conjunct was used as a reliability hedge, namely, *somehow* in extract [55]. The writer uses *somehow* to indicate that a precise understanding of the relationship that is thought to exist between psychosocial distress and mental health on the one hand, and stresses/strain and support on the other hand, is lacking. *Somehow* functions as a reliability hedge in that an attempt is made to present the content as truthfully (reliably) as possible, while acknowledging factual uncertainties.

[55] The dominant thinking around psychosocial distress and mental health is that they are *somehow* related to stresses/strain and support. (Model M, p11)

Summary of reliability hedges

The principal motivation of reliability hedges is the writer's desire to clarify the state of knowledge, and to acknowledge factual uncertainties. Reliability hedges serve to convey more precisely the writer's assessment of the certainty of a statement in terms of the actual state of knowledge, or in terms of what is actually observed, rather than what is assumed. The writer's assessment rests on available facts, based on inference, deduction, or repeated experience. Various forms may be used to express reliability hedges, namely: modal auxiliaries; verbs; adjectives; nouns; adverbials; and the discourse-based strategy, referred to as limited or inadequate knowledge.

3.3.1.1 (c) Writer-oriented hedges

Like accuracy-oriented hedges, writer-oriented hedges are content-oriented in the sense that they, too, involve expressing views concerning propositional content. However, whereas accuracy-oriented hedges are proposition-focused and seek to increase precision by referring to the exact state of knowledge, or to how the proposition is to be understood, writer-oriented hedges are writer-focused and serve to protect the writer from the possible consequences of negatability by limiting personal commitment. "Writer-oriented hedges therefore diminish the author's presence in the text rather than increase the precision of claims, toning down the language they use to express their commitment to their research claims" (Hyland, 1998b:170). The main motivation for using writer-oriented hedges is the writer's desire to gain some distance from propositions because the writer is not prepared to personally guarantee the proposition. The tentativeness expressed by writer-oriented hedges "relates principally to the commitment the author wishes to bestow on a statement rather than a strict concern with the truth of propositional relationships" (Hyland, 1998b:173).

Writer-oriented hedges are usually associated with higher level, or more significant claims than accuracy-oriented ones. Because the writer seeks to place significant results in a wider context and demonstrate a contribution to scientific knowledge rather than simply interpret findings, this puts the writer at risk of being wrong, and therefore self-protection may be necessary.

Writer-oriented hedges can be realised by impersonal expressions; attribution to literature; verbs; adverbials; adjectives; and modal auxiliaries.

Impersonal expressions

A distinctive characteristic of writer-oriented hedges is the absence of writer agentivity (Hyland, 1998b:172). The use of impersonal expressions serves to create an objective stance in that the writer is removed, as it were, from the proposition. In the corpus, the impersonal expressions comprised impersonal subjects and passive constructions, for example:

[56] *The results* imply that the focus of leisure time therapy for males should not be on craft activities, as is often the case. (Model K, p30)

[57] If a client conforms to these criteria *it may be assumed that* the client is functioning on a high level of creative ability within the leisure time sphere of activities of daily living. (Model K, p30)

Attribution to literature

In this category, ideas or claims are attributed to others (usually literature sources) directly. Quotations may also occur. The expression, *according to*, is often employed. In addition, attributions to literature are made in combination with verbs, modal auxiliaries, nouns, passive constructions, and impersonal expressions. The following extracts [59] to [63] from the sample texts show how attributions to literature are expressed.

The following three extracts [58], [59], and [60] have been taken from the same text which reports on an investigation into the beliefs, feelings, and knowledge of housewives towards childhood disability. In [58], the claim that attitudes serve four functions is attributed to a literature source. The writer, herself, does not provide a personalised explanation of attitudes, but, by means of a source reference, alludes to the importance of understanding the nature of attitudes, for the purposes of addressing the harmful impact that negative attitudes towards disabled children have.

[58] There are four functions of attitudes *according to Rajecki (1982)*. (I/99, 10, H)

In the next excerpt, the use of a particular technique for measuring the affective component of attitudes is attributed to other researchers. The writer herself is careful not to recommend measurement procedures, since these may be questioned.

[59] *Bernstein et. Al (1994) suggested* that this component *might* be monitored by physiological recording. (I/99, p8, H)

In the following extract [60], the writer very clearly distantiates herself from the proposition. The idea, though, was very relevant to her study, which was situated in an under-developed area, which is characterised by poverty, illiteracy, and limited resources, particularly health care facilities. By attributing the idea to a literature source, the writer is able to make a crucial point without fearing claim rejection based on what may be perceived as a personal opinion, rather than reliable evidence.

[60] *There is also the belief that* disability rates are higher in developing countries than in technologically more advanced countries in all grades and types of disability (*Khan & Durkin, 1995*). (I/99, pp5-6, H)

Excerpt [61] is taken from an article describing a study of the low rates of unemployment of people with disabilities (PWD). The researchers were investigating reasons for these low rates, and, based on field-research within a particular community, were interested in finding out what the barriers were with regard to the disabled individual, and within the community, to employing PWD. The idea of self-employment being a possible solution is attributed to an external body, which most likely functions to indicate that the researchers themselves do not fully agree with this idea, based on not only a lack of funds, but also on the internal and external barriers that their experience, and subsequent findings, have revealed.

[61] *The International Labour Organization*¹³ suggests self-employment as a possibility – however, this outlet is limited because of inaccessibility to the necessary financial means. (Model P, p11)

The following excerpt [62] was taken from a study into the psycho-social stressors experienced by the mentally ill people of Zola (a clinic in Soweto, and one of Baragwanath hospital's satellite community clinics). One of the main findings of the study was that the majority of patients lived in overcrowded circumstances, and the conclusion was that overcrowding may well be an associated factor in the mental illness of these patients. The following statement is writer-oriented in the sense that the writer, himself, does not provide any personal commitment to the proposition, although it (the proposition) provides important corroborative evidence for his own findings and conclusions. Rather, the findings are attributed elsewhere.

[62] Overcrowding in a home *was found to be* significantly related to psychological stress in women (*Gable & William: 1987*). (Model Q, p33)

The next extract [63] comes from an article reporting on an investigation into the appropriateness of assistive devices for people with disability. The underlying assumption was that devices are either abandoned, or used incorrectly due to lack of training in use and follow-up in the home-environment. In order to provide support for this assumption, and in order not to appear subjective, the writers resort to source attribution in support of their assumption and grounds for research. This, therefore, constitutes a writer-oriented hedge.

[63] *It is said that* training reduces fear and increases confidence in the safety of using the device. The fear of falling is particularly relevant when doing transfers, such as in and out of the bath (*Shipham, 1985*). (Model O, p41)

Verbs

Several verbs can be used as writer-oriented hedges, such as: *appear; seem; suggest; assume; speculate; suspect; believe*, etc. In the sample texts, three verbs were used as writer-oriented hedges, namely, *appear, seem* and *suggest*.

The following statement [64] is writer-oriented in the sense that the writers are careful not to be overly critical of play and leisure time being used to mean the same thing, in spite of the fact that they, themselves, believe that a distinction between play and leisure time is necessary. Later in the text, they actually state that the term “play” is more often applied when discussing the activity of children, but is not consistently applied to children only.

[64] The term “play” *appears* to be used in the literature as being synonymous with leisure time activity. (Model K, p18)

Excerpt [65] is taken from an article reporting on a study into community perceptions regarding the employment of people with disabilities. The findings indicate that two types of barriers exist, namely personal and social barriers, but that the main obstacle was social barriers, which lay with society’s uncertainty about the nature of disabilities and their impact on the individual’s performance in employment. Although the researchers are aware of the myths and stereotypes that have influenced people’s perception of the disabled, they are careful not to emphatically state that changing attitudes must start in society itself; rather, this idea is hedged, and therefore offers some writer-protection against possible opposition to their view.

[65] The answer to changing the attitudes towards people with disabilities *seems* to lie in society itself: it is of the utmost importance for interaction to take place between the society and people with disabilities for a positive change to occur. (Model P, p11)

In the following extract [66], a writer-oriented hedge (*suggests*) is used probably for the sake of not sounding too certain about a condition which may be open to several interpretations, and consequently, likely opposition.

[66] The child appears normal, yet his/her behaviour *suggests* that the desire for growth and maturity have been diverted in some way, for example, the autistic child. (H/98, p9, H)

Adverbials

Although Hyland's (1998b:186) framework does not contain adverbials within the writer-oriented category, four content disjuncts (cf. § 3.3.1.1 (a)), namely: *perhaps*; *possibly*; *seemingly*; and *apparently* were used as writer-oriented hedges in the sample texts. Once again, the interpretation relied largely on context and co-text.

The following extract [67] was taken from a report on a study of parents' expectations of mentally retarded children regarding their performance potential. The questionnaire that was used to obtain data consisted of various information categories. One such category comprised questions on marriage and parenthood. However, upon analysis, the researcher realised that these aspects should have been separated, since the latter posed a different set of concerns. To make this important point for further research, she makes a tentative statement (signalled by *perhaps*), which is aimed at counteracting reader opposition.

[67] Regarding marriage and parenthood, it would *perhaps* be wiser to separate these two issues, as mothers regarded parenthood a far more problematic issue than marriage. (F/97, p40, H)

Extract [68] is also taken from the study referred to in extract [67] above. *This* refers to the parents' wanting to be informed about their child's handicap, and what the child's future prospects are on the one hand, while on the other hand, they tend to hear what they want to believe. The writer gives a possible explanation for this behaviour. However, the explanation is tentative, since there may be others, in which case, hers would be questioned. This constitutes a writer-oriented hedge in that the writer is careful not to commit herself to the claim in case of reader dismissal.

[68] This may *possibly* be so because the full extent and implications of the handicap are too painful for a parent to bear. (F/97, 16, H)

The following statement [69], also taken from the report referred to in [67] and [68] above, constitutes a writer-oriented hedge in the sense that the writer withholds any commitment to the claim, which, instead, is attributed to a literature source.

[69] It is reported that mentally disabled people *apparently* can do skilled or unskilled work at adult level (Smith, 1975). (F/97, pp11-12, H)

Extract [70] is taken from an article reporting on a study into causes of joint deformity of the fingers in rheumatoid arthritis. The writer deliberately hedges “innocent tasks” by means of *seemingly*, since she does not regard such tasks as unarmful. She conducts the study to show that such tasks are, in fact, exceedingly harmful. The hedge, though, does protect her from what could be outright opposition to what could be viewed as an unorthodox approach in traditional medical practice.

[70] Although much has been written advocating joint protection¹⁵, little research has been done on the forces that contribute to the deformity during everyday, brief, and *seemingly* innocent tasks^{14,6}. (Model N, p33)

Adjectives

Like adverbials, Hyland’s (1998b) writer-oriented hedging category does not contain adjectives. However, in my corpus, adjectives were employed as writer-oriented hedges namely: *possible*; *tentative*; *apparent*; and *suggested*.

The following extract [71] is taken from an article reporting on a study on assertiveness among black suicidal adolescents. Since one of the roles of the occupational therapist in a psychiatric unit is to assess and treat communication problems and improve assertive behaviour, the therapists would also treat suicidal patients, and would be aware of the enormous complexity of the phenomenon. This is most likely why “*reasons*” is hedged by *possible*, because there could be any number of reasons for suicide and attempted suicide in adolescents. Most probably too, many of these reasons relate to poor communication – which forms a major part of occupational therapy work in psychiatric units.

[71] These authors, among others, have postulated *possible* reasons for suicide and attempted suicide in adolescents. (Model R, p38)

In extract [72], also taken from an article, the writer uses a writer-oriented hedge (*tentative*) to provide protection against rebuttal. The hedge is necessary since the writer acknowledges the many limitations of the study (for example, lack of random sample, preliminary study, and restriction to certain age group).

[72] However, the following *tentative* conclusion may be made. (Model S, p13)

In the following extracts [73] and [74], *apparent* and *suggested* function as writer-oriented hedges. The writers aims at creating an objective stance which is accomplished by a lack of writer agentivity, and the adjectival use.

[73] In the study in Soshanguve, it was *apparent* that disabled persons were sometimes hesitant to accept assistive devices which emphasised their disability. (Model O, p14)

[74] The *suggested* method to be used is the random sampling method. (I/98, p33, L)

Modal auxiliaries (not used in conjunction with references to literature)

It is important to note that modal auxiliaries in this sub-category are not used in conjunction with attributions to literature. Common modal auxiliaries that are used as writer-oriented hedges are: *may*; *might*; *could*; and *would*. These forms were also used in the sample texts, for example, extracts [75] to [78].

In extract [75], the writer hedges the claim because she, herself, may not be certain of its truth-value. Because she cannot personally guarantee it, she avoids commitment, which also provides some protection against reader rejection.

[75] Their [parents'] feeling towards schools and teachers *may* be ambivalent which makes it difficult to approach them when problems arise. (F/97, p16, H)

In excerpt [76], the writer hedges the proposal of running several groups rather than one. The hedge is indicated by *might*, and a lack of writer agentivity, which assists the writer in distancing herself from the proposition. This proposal strategy would be important in a hospital or clinical setting where there could be intense opposition from colleagues.

[76] Instead of running one group for a very long time it *might* be more effective to run several groups that will be more beneficiary to the rehabilitation of the patient. (D/98, p20, H)

The use of *could* and the lack of writer agentivity (as in [76] above) also constitutes a writer-oriented hedge in the following statement [77]. The writer similarly avoids commitment to the proposition, and thereby avoids possible refutation.

[77] It seem[s] that cognitive and perceptual problems *could* be detected using formal tests and observation of performance in an activity, such as primary ADL [activities of daily living]. (J/99, p6, L)

In extract [78], the use of *would* and lack of writer agentivity, or writer presence, constitutes a writer-oriented hedge. The writer is, in fact, reporting on a study that has shown the usefulness of a modified treatment procedure in the management of the rheumatoid hand, and is keen to promote this. She is careful, though, to distance herself from the proposition, for the purposes of not provoking opposition, and to have her ideas accepted.

[78] It *would* appear that joint protection, based on the principle of balance around the joints with the vector of the resultant forces lying along the long axis to protect the ligaments against excessive amounts of tension, has an important role to play in the management of the rheumatoid hand. (Model N, p33)

Summary of writer-oriented hedges

The main motivation for using writer-oriented hedges is the writer's desire to gain some distance from propositions because the writer is not prepared to personally guarantee the proposition. The tentativeness expressed by writer-oriented hedges "relates principally to the commitment the author wishes to bestow on a statement rather than a strict concern with the truth of propositional relationships" (Hyland, 1998b:173). Writer-oriented hedges are usually associated with higher level, or more significant claims than accuracy ones. Because the writer seeks to place significant results in a wider context and demonstrate a contribution to scientific knowledge rather than simply interpret findings, this puts the writer at risk of being wrong, and therefore self-protection may be necessary.

3.3.2 Reader-oriented hedges

A writer not only wants a message (proposition) to be understood (the function of content-oriented hedges), but also to be accepted. This acceptance rests on the audience (reader). Reader-acceptance of claims relates to acceptable levels of self assertion, deference and willingness to debate. How the writer presents claims is important in getting claims accepted. In presenting a claim, the writer also projects a certain persona, which informs the reader of the writer's attitude towards the reader's role in the ratification of claims. Categorical statements ignore the reader, whereas hedged statements "mark claims as provisional, they invite readers to orientate themselves to the discourse and engage in a dialogue" (Hyland, 1998b:178). In addition to the interpersonal function of reader-oriented hedges, there is also a normative aspect. Acting as a scientist involves implicit rules concerning deference due to colleagues in presenting information. Conforming to these rules is necessary for knowledge accreditation. Besides carrying conviction, a paper "must also appeal to the reader as a thinking, knowledgeable scientist" (Hyland, 1998b:179).

Several rhetorical goals are accomplished through reader-oriented hedges, and it is in terms of these goals that the hedging devices were identified. In my corpus, seven reader-oriented goals were identified, namely:

making recommendations or suggestions;
 asking questions;
 appealing or referring to shared assumptions;
 taking personal responsibility (referred to as personal attribution);
 addressing readers directly;
 personal reference to experimental limitations; and
 suggesting alternative interpretations.

Making recommendations or suggestions

Writers make recommendations or suggestions in relation to their findings, as a response to insights they may have gained from their research, or in recognition of the limitations of their research. In making recommendations and suggestions, writers also “allude to the community of scientists engaged in a joint quest for knowledge” (Hyland, 1998b:184).

The forms that are used in this category comprise those that are conventionally associated with expressing recommendations and suggestions in English, such as modal auxiliaries, verbs, nouns, and the content disjunct, *perhaps*. In the sample texts, the following four modal auxiliaries were used, namely, *would*; *could*; *should*; and *might*. Excerpts [79] to [82] are examples of how modal auxiliaries can be used to make recommendations or suggestions.

[79] It *would* be most valuable to duplicate the research [to include] more housewives of Wintervedt. (I/99, p33, H)

[80] Since many of the existing gardening services do not provide certain services such as removal of weeds and cutting out of dry leaves, these tasks *could* be included to make the service unique. (Model P, p13)

[81] If the results were negative, exposure to mental illness *should* start in order to try and improve the students [sic] attitudes towards mental illness. (F/99, p3, L)

[82] In situations where both tests are used it *might* be better to use one test diagnostically and the other as a test to determine progress achieved by treatment. (Model S, p12)

Two verbs that are commonly used are *suggest* and *recommend*. These also occurred in the sample texts. Extracts [83] and [84] are illustrations.

[83] Community members, armed with sufficient knowledge, empathy and information can provide not only material support as *suggested* above, but also informational and affirmative support for families. (Model M, p16)

[84] The researcher *recommends* that a different method of selecting sample be used for example, involving at least 10 patients in the study. (G/99, p30, L)

Another explicit marker that can be used is the noun, *recommendation*. An example is [85] below:

[85] Based on the results of the study including the process of data collection the following *recommendations* should be considered: (A/97, p23, L)

The content disjunct, *perhaps*, can also be employed to suggest an alternative, as in [86] below:

[86] *Perhaps* different types of sporting activities could be used to meet the aims of therapy, thus maintaining the volitional aspect that sport has for male clients. (Model K, p30)

Asking questions

In research writing, questions highlight unresolved issues or the tentativeness of a solution, and aim at seeking a response by explicitly drawing the reader into the process of problem solving. Questions can be stated either directly or in statement form. Extracts [87] and [88] are examples.

Excerpt [87] was taken from a report on an investigation into parents' expectations of mentally retarded children regarding their performance potential in all of the major spheres of life, and adulthood, namely: self-management, education and employment, marriage and parenthood, social skills, and life skills. The writer is concerned whether the responses to the questionnaire were, in fact, a reflection of the truth in terms of mothers' actual expectations, and acknowledges that a misconception of the term "independence" may have influenced responses. By asking a direct question, the writer not only expresses her concern with the accuracy of the data, but also genuinely seeks a response from the reader concerning what remains an unresolved issue.

[87] Did they really understand the questions – especially the term independence? (F/97, p40, H)

The next extract [88] was taken from a report on a study into the effectiveness of the airsplint in reducing spasticity of the elbow joint. On the whole, the findings indicated that the patients had responded well to the treatment, but the writer was not entirely certain whether this could be attributed entirely to the specific treatment, since other factors, such as attending the hemiplegia support group, might have influenced the outcome. By questioning the validity and reliability of the testing procedure, the writer marks the findings as provisional. In addition, the question signals an awareness of the reader's role in assessing the findings.

[88] *The question arise[s] whether* the testing procedure was valid and reliable. (F/98, p23, L)

Appeal or reference to shared assumptions

Another feature of research writing is the writer's appealing or referring to shared assumptions held by scientists within a particular discipline. By appealing to a common knowledge or belief base, it may be easier to get claims that relate to this, accepted. This is, therefore, a reader-oriented strategy, since the writer's aim is to get claims accepted on the basis of shared assumptions. While a variety of expressions

may be used in appealing or referring to shared assumptions, two common expressions are: *it is understood that*, and the verb, *assume*. Both were used in the sample texts, for example, excerpts [89] and [90].

Extract [89] is taken from an article reporting on an investigation into the leisure time activities of a typical urban South African population. The researchers acknowledge that because there is no research evidence in South Africa for the selection of appropriate leisure time activities for clients, occupational therapists may select inappropriate activities. The statement expresses a common understanding by the occupational therapy fraternity on the usefulness of craft activities in meeting the work related aims of therapy. The researchers, however, refer to this common knowledge as a springboard for introducing a new claim: that in terms of their findings, other types of activities be considered with regard to male clients. The traditional assumption is not rejected, but neither is the indiscriminate use of craft activities advocated.

[89] *It is understood that* craft activities often meet the work related aims of therapy, and are thus regularly used in therapy. (Model K, p30)

The following excerpt [90] is taken from an article reporting on approaches to joint protection of the rheumatoid hand. The approach that is being referred to is the cognitive approach which emphasises the importance of the patient's learning about the disease, joint protection, and exercises, for the management of pain, whatever the condition. This approach towards pain management would be common knowledge among occupational therapists, and therefore, the writer uses this as a foundation to suggest that the same approach be adopted in accomplishing behaviour change among rheumatoid hand patients for the purposes of joint protection.

[90] Although they discussed this approach to pain management, it would not be unreasonable to *assume* that it could also be used in behaviour change to prevent or limit hand deformities. (Model N, p36)

Personal attribution

According to Hyland's (1998b:182) data, generally, explicit personal alignment with findings, models and analyses conveys a reader-based hedge. "By specifying a personal source, ... the writer shifts the interpretive frame, drawing attention to the relation of the work of the investigator, and signalling that the claim is left open to the reader's judgment". Usually, the personal pronouns *we*, *our*, *I* and *my* are used to acknowledge personal views, or conclusions, or are used to comment on the experimental conditions of the study. How personal attribution is expressed is illustrated in extracts [91] and [92].

The following extract [91] is taken from a report on an investigation into wheelchair accessibility at schools in Winterveldt (a highly populated, under-developed area, characterised by a lack of facilities, unemployment, and illiteracy). The writer is careful to indicate that the claim is a personal one, which would be less offensive to a reader, and therefore, more easily tolerated. It should also be noted that the writer is referring to physically, not mentally, handicapped children.

[91] It is *my* belief that in the fairly near future we will find it quite natural that a very gravely handicapped person will attend ordinary schools, without a companion. (E/97, p17, L)

In extract [92], also taken from a research report, the writer indicates that she has modified the definition for her own purposes. This is indicated by *personal view*. This is a reader-oriented hedge in that the writer indicates to the reader that she acknowledges that this definition may not be suited to other contexts, and that the reader may have different views concerning definitions of the specific phenomenon.

[92] [Effectiveness] is the increase of motion in a joint (operational definition; *personal view*). (C/99, p3, H)

Addressing readers directly

A relationship with the reader may also be invoked by addressing readers directly. Here, the claim is hedged by explicitly drawing the reader into the scientific enquiry process. The audience is treated as if it were capable of making the same logical inferences (Hyland, 1998b:183). The impersonal pronoun, *one*, is used to address the reader directly. Extract [93] is an example.

Extract [93] is taken from a report on an investigation into the attitudes of MEDUNSA students towards people with mental illness. The literature survey that the writer conducted indicated that as students progressed with their medical/allied health studies, their attitudes became increasingly negative. This is the concern that is expressed in the statement. The use of *one* indicates that the writer regards the reader as an important participant in acknowledging this dilemma that negatively impacts on both the public at large, and on health training institutions.

[93] This is an area of concern since *one* would expect senior students to hold more positive views of the disabled than that of first year students (Lyons, 1991). (A/99, p8, H)

Personal reference to experimental limitations

Personal reference to experimental limitations also constitutes reader-oriented hedging, in the sense that “this strategy functions to represent both the source and the status of the claim as individual rather than collective, making the claim dependent on activities which might be regarded as essentially fallible or limited in their applicability” (Hyland, 1998b:181). In my corpus, experimental limitations were referred to by means of a range of expressions that Hyland (1998b:147-148) refers to as discourse-based strategies. A variety of expressions could be used to convey experimental limitations, such as: “*We have not been able to determine precisely whether*”; “*Under these conditions; This makes it difficult to compare*”; “*Results under these conditions cannot be considered conclusive; So it is difficult to conclude*”, etc. (Hyland, 1998b: 147-148).

In the following text samples, the indecisiveness of the results in extract [94] is referred to, and in extract [95], the validity of the results is not guaranteed.

[94] Measurement of the range elbow extension prior to intervention (the Baseline) showed averages from 17 to 18. The interventions in Condition A, B and C resulted in gains in range for all subjects, with the exception of subjects four and eleven, where ranges decreased by 1 and 3 respectively in Condition B. *The reason for the lack of improvement is not known.* (G/97, p26, H)

[95] **The size of the population was small relative to the entire population of Oukasie, thus it would not be a fair representation of the whole population.** (C/97, p25, L)

Regarding the analyses and interpretation of strategies, Hyland (1998a:148) makes the following important point:

... the recognition of this means of hedging [that is, discourse-based strategies] depends principally on its content rather than its form. It is not therefore possible to offer a more precise formal characterisation, as there is no established and widely accepted knowledge about their realisations in the literature, and the corpus yields insufficient examples to draw broad conclusions. Nevertheless, they are important means of expressing caution in RAs and should be considered among the hedging devices available to scientific writers.

Suggesting alternative interpretations or possibilities

Hyland (1998b:182-183) states that in comparison with explicit personal alignment with findings, models and analyses, a more subtle way of deferring to the reader is to offer a claim as one possibility among many. In Hyland's (1998b:182-183) corpus, writers used hypothetical conditionals, which were expressed as *if*-clauses in combination with either *would* or *could*, to suggest alternative interpretations. Two such examples taken from the sample texts are excerpts [96] and [97].

[96] Many unknowns still remain however: On a research level one would like to know (i) *if* reducing the strain *would* contribute significantly to the prevention of *or* at least to the retardation of the development of ulnar deviation (Model N, p35)

[97] It was postulated that *if* the need for assistive devices for use in the home *could* be determined and appropriately selected, and if the person *could* be trained in the use of these in their own environment, the chances were that the person *could* continue using the devices as long as they fulfilled their purpose. (Model O, p36)

Summary of Reader-oriented hedges

To summarise, reader-oriented hedges serve both interpersonal and normative functions. A writer wants a message (proposition) to be understood, and accepted. This acceptance rests on the reader. Reader-acceptance of claims relates to acceptable levels of self assertion, deference and willingness to debate. How the writer presents claims is important in getting claims accepted. In addition to the interpersonal function of reader-oriented hedges, there is also the normative aspect. Acting as a scientist involves implicit rules concerning deference due to colleagues in presenting information. Conforming to these rules is necessary for knowledge accreditation.

Overall summary of hedging in research articles

Because science or research article writing is essentially concerned with interpretive statements, these must be assessed by the writer. This assessment can be communicated by hedging, which enables writers to express a perspective on their statements, to present unproven claims with caution and to enter into dialogue with their audiences. Hedged statements indicate that the writer is aware of the reader's role in ratifying claims, and that claims may be rejected. Claim rejection can be divided into two types. The first encompasses claims not corresponding with what is known, or believed to be true, referred to as adequacy conditions, and the second involves a lack of consideration for the reader in claim ratification, referred to as acceptability conditions. In Hyland's (1998b) terms, two types of hedging are useful.

The one is content-oriented hedges, which assist in dealing with possible rejection on the grounds of not meeting adequacy conditions, and the second is reader-oriented hedges, which assist in dealing with possible rejection on the grounds of not meeting acceptability conditions.

Content-orientation may be expressed at two further levels of delicacy. The first stems from the obligation to meet scientific requirements of presenting claims as accurately as possible, and the second concerns the need to anticipate what may harm or benefit the writer. The former comprises accuracy-oriented hedges, and the latter comprises writer-oriented hedges. Accuracy-oriented hedges can be further distinguished. The one sub-type reflects the difficulties of using a limited language to describe natural phenomena, referred to as attribute hedges, while the other implicates the writer's confidence in the certainty of her knowledge, referred to as reliability hedges.

3.4 RESEARCH PROCEDURES

3.4.1 Subjects

The subjects were 28 final fourth year Occupational Therapy students at the Medical University of Southern Africa (MEDUNSA). The 28 students were made up of three lots of final year students over three years, namely 1997 (referred to as A/97 – I/97), 1998 (A/98 – J/98), and 1999 (A/99 – J/99; H/99 had to be excluded from the study, because this student failed to comply with the research component requirements). For the majority of these students, English is a second language.

The ten journal articles written by health professionals, mainly occupational therapists, were taken from various editions of the *South African Journal of Occupational Therapy* (SAJOT). The advantage of choosing same-subject articles from one journal, rather than from several journals, or articles from different fields, is mentioned in § 2.6 (cf. Riley, 1991). Familiarity with the subject matter helps the analyst to better understand the writer's discourse strategy, and allows for generalisations about the discourse in one field. The professional texts are referred to as **model texts** or **Models K to T**. The letters K through to T represent the ten articles.

3.4.2 Materials

The materials consisted of the ten journal articles (referred to as **model texts** or **Models K to T**) and the 28 research reports written by the students.

The choice of the texts that made up the sample was based on the assumption that good scientific writing would be hedged where necessary, and that there would probably be a difference in the occurrence of hedges between good and poor research writing.

An analysis of model texts was necessary to see whether and how professional occupational therapists were using hedges in their writing. This information was not only important in testing and refining the analytical framework, but was also used as the basis for the subsequent analysis of the student texts. In addition, the model texts were compared with the student writing to establish whether there were differences between the professional and student writing. The articles that were analysed are indicated below.

Articles analysed

Barnard, P.M. & Alers, V.M. 1996 An investigation into the leisure time activities of a typical urban South African population. *S.A. Journal of Occupational Therapy* May, 1996:17-31.

Bonn, M. 1995 The temperament of young children and their behaviour in hospital. *S.A. Journal of Occupational Therapy* May:18-29.

Boshoff, K., Alant, E. & Wolmarans, Z. 1998 Employing young adults with disabilities. *S.A. Journal of Occupational Therapy* November:11-14.

Casteleijn, D. 1994 Assertiveness among black suicidal adolescents. *S.A. Journal of Occupational Therapy* November:38-41.

Matlala, M. 1995 Psycho-social stressors experienced by the mentally ill people of Zola. *S.A. Journal of Occupational Therapy* May:30-35.

Masilela, T.C. & Macleod, C. 1998 Social support. Its implications in the development of a community-based mental health programme. *S.A. Journal of Occupational Therapy* First Quarter 1998:11-16.

Meyer, C. & Shipham, E. 1995 The appropriateness of assistive devices for people with physical disability. *S.A. Journal of Occupational Therapy* March:36-42.

Röhrs, C. & Graham, M. 1996 The functional use of the affected hand in hemiplegic patients at Brunnstrom Stage 6. *S.A. Journal of Occupational Therapy* November:39-45.

Rousseau, A. 1996 A pilot study to determine the correlation between the motorfree visual and perception test and the test of visual perceptual skills when used with 7 year old children. *S.A. Journal of Occupational Therapy* May:11-14.

Shipham, I. 1996 Ulnar drift of the fingers – biomechanics and measurement of increase during resisted pinch. *S.A. Journal of Occupational Therapy* May:32-37.

3.4.3 Procedures

The student writing was divided into two groups, referred to as high achievers (**Highs or H**) and low achievers (**Lows or L**). The Highs obtained 60% and above for the research component (which comprised both a written research report and an oral examination), and the Lows obtained 59% and below. There were 16 high and 12 low achievers. The division was in order to compare whether the two achievement groups differed in the use of hedges, and whether the Highs reflected similar uses to the model texts.

In order to calculate means for the overall use of hedges and hedging types, densities had to be calculated. Densities were obtained by dividing the number of occurrences by the number of words in the relevant text and then multiplying by 1000. This

yielded the density for each hedging category per text. Likewise, densities were obtained for the overall use of hedges per text. The means were used in the statistical procedures for establishing whether significant differences existed or not.

The statistical procedure that was used was the *t*-test because two sample means were being compared. The assumptions underlying the use of the *t*-distributions are “the sampling distribution of the difference between means is normally distributed”, and “both samples are drawn from populations whose variances are equal. This assumption is referred to as *homogeneity of variance*” (Runyon & Haber, 1980:242).

In order to check whether these assumptions were met, the Bartlett test was done to check for homogeneity (Bowerman, 1990; Brown, 1988:166), and the Shapiro-Wilk test was conducted to check for normal distribution (*SAS Procedures Guide, Version 8*, 1999:1397). In one instance (H2:RO), when the variances within the groups were very large, a non-parametric test (Kruskal-Wallis) was done (Brown, 1988:174-175). Non-parametric procedures are not as powerful as parametric tests in that they do not assume a distribution.

If the assumptions of *t*-distributions are violated, transformations must be done; this is important for creating a more valid measure of the relationship between variables, since it is possible that findings may otherwise appear to be significant, even when they are not (Runyon & Haber, 1980:242). In six cases there were indeed large variances between the groups (H2; H3; H3:RO; H3:WO; H3:At; H4) and the scores had to be transformed. The G.E.P. Box and D. R. Cox procedure was followed to transform data to get a dispersion of scores closer to one another (Box & Tidwell, 1962:531-550). The transformations were done by taking the logarithm or square root of the variable. This provides a more accurate measurement of the correlation between variables. When the results are given in Chapter 4, it will be indicated when the significant differences are on the transformed scores.

3.5 CONCLUSION

In this chapter the analytical framework was described and illustrated with reference to the texts analysed in this study. Throughout, the relationship between form and function was focused on. The research procedures were outlined, and some statistical background was given. In the following chapter, the results of all the tests will be discussed in detail.

CHAPTER 4

DISCUSSION OF RESULTS

4.0 INTRODUCTION

In this chapter, the findings in respect of each of the hypotheses are presented. This is followed by a discussion of the extent to which the three groups of writers (Models, Highs and Lows) were employing hedges in terms of the four hedging categories, that is: reader-oriented hedges, writer-oriented hedges, reliability type hedges and attribute type hedges. In addition, each of the hedging categories is discussed in terms of each of the sub-categories that were identified. Throughout, the emphasis will be on the major density differences among the Models, Highs and Lows. In most cases of major differences, excerpts from the sample texts have been included to illustrate how particular linguistic devices or discourse-based strategies were being used as hedges. Some student errors in respect of using inappropriate linguistic expressions in relation to the hedging categories are also pointed out. Finally, summaries of the overall findings for each of the hedging categories (cf. Table 5 on p. 137), and a conclusion in relation to the major findings, are provided.

In Chapter 1 (cf. § 1.2), it is stated that the underlying aim of the present study is to establish the nature of the relation between the quality of writing articles and reports in the field of occupational therapy and the density of hedges in such writing. It has, therefore, been necessary to compare student writing with professional writing, because it is assumed that professional writing, here research articles, would exemplify good, and therefore appropriately hedged writing, and that, in contrast, the student writing, particularly as it is also English L2 writing, would exhibit fewer hedges. It is also assumed that there would probably be a difference in the use of hedges between “good” student writers and “poor” student writers, mainly in the sense that the latter group would use fewer hedges.

The main research question which this study attempts to address was thus stated as follows:

In the writing of articles and reports in the field of occupational therapy, what is the nature of the relation between the quality of the writing and the density of hedges in such writing?

This main research question was reformulated as four general research questions, namely:

- (a) Are there differences in the overall use of hedges between the research articles and the student writing as a whole?
- (b) Are there differences in the overall use of hedges between the research articles and the good student writing?
- (c) Are there differences in the overall use of hedges between the research articles and the poor student writing?
- (d) Are there differences in the overall use of hedges between the good and poor student writing?

The above research questions were subsequently formulated as four main hypotheses (cf. § 3.4. for an explanation of terms and calculation of density). All the hypotheses are non-directional and therefore results are conservative. The reasons for deciding to leave the hypotheses open, that is, non-directional, are provided in Chapter 1. What is meant by the “use” of hedges is also explained there as meaning two things, namely, the density of hedges, and the patterns as identified in the qualitative interpretation (cf. § 1.3.2).

Achievement Hypothesis

H1: There will be a significant difference in the overall density of hedges between the two student groups, the Highs and Lows.

Writer-status Hypothesis A (Models versus student writing)

H2: There will be a significant difference in the overall density of hedges between the Models and the student writing as a whole.

Writer-status Hypothesis B (Models versus Highs)

H3: There will be a significant difference in the overall density of hedges between the Models and Highs.

Writer-status Hypothesis C (Models versus Lows)

H4: There will be a significant difference in the overall density of hedges between the Models and Lows.

It is important to note that the present study not only attempts to test the general main hypotheses, but also the hypotheses relating to the hedging categories. First of all, the results pertaining to the general hypotheses (Hypotheses 1 to 4) are presented. Thereafter, the hypotheses and results pertaining to the four specific rhetorical categories, namely: reader-oriented hedges, writer-oriented hedges, reliability hedges, and attribute hedges will be discussed.

4.1 HYPOTHESES AND RESULTS: GENERAL HYPOTHESES

The hypothesis and results pertaining to the Achievement Hypothesis (H1) are:

H1: Achievement Hypothesis

H1: There will be a significant difference in the overall density of hedges between the two student groups, the Highs and Lows.

df = (1,26) *F* Value = 0.13 *p* = 0.7255 (*p* > 0.05)

There is no significant difference.

The hypothesis and results pertaining to the Writer-status Hypothesis (H2) are:

H2: Writer-status Hypothesis A (Models versus student writing)

H2: There will be a significant difference in the overall density of hedges between the Models and the student writing as a whole.

df = (1,36) *F* Value = 18.09 *p* = 0.0001 (*p* < 0.01)

There is a highly significant difference at 1%. The significance is on transformed* scores.

*In § 3.4.3, it is pointed out that transformation of scores is necessary when *t*-test assumptions are violated (Runyon & Haber, 1980:242-243).

The hypothesis and results pertaining to the Writer-status Hypothesis (H3) are:

H3: Writer-status Hypothesis B (Models versus Highs)

H3: There will be a significant difference in the overall density of hedges between the Models and Highs.

df = (1,24) *F* Value = 16.52 *p* = 0.0004 (*p* < 0.01)

There is a highly significant difference at 1%. The significance is on transformed* scores.

(* cf. § 3.4.3)

The hypothesis and results pertaining to the Writer-status Hypothesis (H4) are:

H4: Writer-status Hypothesis C (Models versus Lows)

H4: There will be a significant difference in the overall density of hedges between the Models and Lows.

df = (1,20) *F* Value = 14.75 *p* = 0.0010 (*p* < 0.01)

There is a highly significant difference at 1%. The significance is on transformed* scores.

(* cf. § 3.4.3)

The results are now discussed in relation to each of the hedging categories, that is: reader-oriented hedges, writer-oriented hedges, reliability type hedges and attribute type hedges.

4.2 HYPOTHESES AND RESULTS: READER-ORIENTED HEDGES

The hypotheses and results pertaining to the use of reader-oriented hedges are:

H1:RO There will be a significant difference in the overall density of reader-oriented hedges between the Highs and Lows.

df = (1,26) *F* Value = 0.13 *p* = 0.2840 (*p* > 0.05)

There is no significant difference.

H2:RO There will be a significant difference in the overall density of reader-oriented hedges between the Models and the student writing as a whole.

A non-parametric test, namely the Kruskal-Wallis (cf. § 3.4.3), was done since the scores could not be transformed because of the very large variance within the groups.

$df = (1,36)$ $F \text{ Value} = 22.25$ $p = 0.0001 (p < 0.01)$

There is a highly significant difference at 1%.

H3:RO There will be a significant difference in the overall density of reader-oriented hedges between the Models and the Highs.

$df = (1,24)$ $F \text{ Value} = 25.72$ $p = 0.0001 (p < 0.01)$

There is a highly significant difference at 1%. The significance is on transformed* scores.

(* cf. § 3.4.3)

H4:RO There will be a significant difference in the overall density of reader-oriented hedges between the Models and the Lows.

$df = (1,20)$ $F \text{ Value} = 8.59$ $p = 0.0083 (p < 0.01)$

There is a highly significant difference at 1%.

There is no significant difference in the overall density of reader-oriented hedges between the student groups, namely the Highs and Lows, but there are highly significant differences in the overall density of reader-oriented hedges between the Models and student writing as a whole, and between the Models and each of the student groups, that is the Models and Highs, and the Models and Lows. What follows is a discussion of these differences. Table 1 below provides the raw scores and

densities for the linguistic expressions that each of the groups used to accomplish specific reader-oriented rhetorical functions. In order to establish which features were more distinct than others, what Ellegard (1962:104) refers to as a “distinctiveness ratio”, has been applied. This refers to the frequency of occurrence of one particular item in one set of texts. In the current study, it was decided that the minimum frequency would be between one and a half to two times as many occurrences of a feature between the Model texts and the student texts. In cases where this applies, this is indicated in the Tables (1 to 4), where the densities pertaining to the Model texts are highlighted in bold italics.

Table 1: Reader-oriented expressions in Models, Highs and Lows: raw scores and densities per 1000 words

Linguistic expressions	Models raw scores	densities	Highs raw scores	densities	Lows raw scores	densities
Recommendations & suggestions:						
* Modals in past forms						
* Verbs						
* Nouns						
* Adverbial : content disjunct						
Modals in past forms:						
<i>would</i>	1	0.03	1	0.01		
<i>could</i>	4	0.14	3	0.02	1	0.01
<i>should</i>	3	0.1	1	0.01	2	0.03
<i>might</i>	1	0.03				
Sub-totals	9	0.32	5	0.05	3	0.06
Verbs:						
<i>suggest</i>	2	0.07				
<i>recommend</i>					4	0.07
Sub-totals	2	0.07			4	0.07
Nouns:						
<i>recommendation</i>					1	0.01
Adverbial : content disjunct						
<i>perhaps</i>	1	0.03				
Sub-totals					1	0.01
Questions:						
direct questions	6	0.21	3	0.02		
questions in statement form	1	0.03	4	0.03	2	0.03
Sub-totals	7	0.25	7	0.07	2	0.03
Shared assumptions:						
<i>it is understood that</i>	1	0.03				
<i>assume</i>	1	0.03				
Sub-totals	2	0.07				
Personal attribution:						
personal pronouns	2	0.07			4	0.07
<i>personal view</i>			1	0.01		
Sub-totals	2	0.07	1	0.01	4	0.07
Involving reader:						
impersonal pronoun: <i>one</i>	3	0.1	11	0.1	7	0.13
Personal reference to experimental limitations:						
specific mention of study's limitations			6	0.05	4	0.07
Sub-totals			6	0.05	4	0.07
Indicating conditionals:						
<i>if- clauses + could</i>	3	0.1				
<i>if- clauses + would</i>	1	0.03				
Sub-totals	4	0.14				

4.2.1 Reader-oriented hedges and principal realisation devices

Reader-oriented hedges help the writer to present claims that are acceptable to readers in terms of levels of self assertion, deference, and willingness to debate (cf. § 3.3.2). In this corpus, seven rhetorical functions were identified, namely:

Making recommendations or suggestions;
 Asking questions;
 Appealing or referring to shared assumptions;
 Taking personal responsibility (referred to as personal attribution);
 Addressing readers directly;
 Personal reference to experimental limitations; and
 Suggesting alternative interpretations or possibilities.

It is according to these reader-oriented functions that the hedging devices were analysed. Each of these is discussed in turn.

4.2.1.1 Making recommendations or suggestions

Writers make recommendations or suggestions in relation to their findings, based on insights they may have gained from their research, or in recognition of the limitations of their research. In making recommendations and suggestions, writers also involve fellow scientists in a joint quest for knowledge (cf. § 3.3.2).

In the sample texts, modal auxiliaries, verbs, nouns and the content disjunct, *perhaps*, were used when making recommendations or suggestions (cf. Table 1).

4.2.1.1 (a) Modal auxiliaries

The Models used modal auxiliaries to make recommendations and suggestions to a much greater extent than the two groups of students, who used modal auxiliaries to a similar extent. The Models had a density of 0.32, whereas the Lows and Highs had densities of 0.06 and 0.05 respectively. The following past form modals were used, namely: *could*; *should*; *would*; and *might*. The Models used *could* much more

frequently than the students (a density of 0.14 for the Models and 0.03 for the students). Overall, the groups hardly used *would* and *might*. There was only one occurrence of *might* as a reader-oriented hedge to make recommendations in a Model text. At this point, it is important to note that there are two aspects of the group range difference, namely, range in terms of expressions (for example, modal auxiliaries), and range in terms of functions (for example, making recommendations).

Excerpts [1] and [2] are examples of how the modal auxiliaries, *should* and *might*, were used to make recommendations.

[1] If the results were negative, exposure to mental illness *should* start in order to try and improve the students [sic] attitudes towards mental illness. (F/99, p3, L).

[2] In situations where both tests are used it *might* be better to use one test diagnostically and the other as a test to determine progress achieved by treatment. (Model S, p12)

4.2.1.1 (b) Content disjuncts

In the corpus, there was only one instance in which a content disjunct was used to make suggestions. This occurred in a Model, in which the content disjunct *perhaps* was used. In the Model text [3], the use of *perhaps* further contributes towards the cautious style already signalled by *could*.

[3] *Perhaps* different types of sporting activities could be used to meet the aims of therapy, thus maintaining the volitional aspect that sport has for male clients. (Model K, p30)

In Biber and Finegan's (1988) study of adverbial stance types in English, in which they examined sets of texts to see whether they are uniformly characterised by frequent occurrence of several linguistic features, they found that a cautious style was characterised by frequent *maybe* adverbials, of which *perhaps* is one. Although

cautious style applies to a number of texts, it is particularly pertinent to scientific writing, more specifically research report writing (cf. § 2.3).

4.2.1.1(c) Verbs

Two verbs, namely, *suggest* and *recommend*, were used to make suggestions and recommendations. While the Highs did not use verbs, the Models used *suggest* twice, and the Lows used *recommend* four times, for which the densities are the same (a density of 0.07 for the Models and the Lows). In the corpus, these verbs were used in passive constructions.

4.2.1.1(d) Nouns

Only one noun, namely, *recommendation*, was used once by a Low to make recommendations. Perhaps a reason for a Low's using this particular noun form, and its associated verb form (*recommend*) (cf. § 4.2.1.1 (b) above), is that they are familiar forms in the sense that they are explicit markers of making recommendations and suggestions. The students may, therefore, find them easier to use than less obvious or familiar forms.

4.2.2 Asking questions

In research writing, questions signal important unresolved issues or the tentativeness of a solution, but also aim at seeking a response by explicitly drawing the reader into the process of problem solving (cf. § 3.3.2).

Overall, more questions were asked by the professionals (Models) than the students either in relation to unresolved aspects more broadly, or more specifically in relation to the findings or limitations of their studies. The fact that the Model texts contained more questions may be attributed to the professionals being more closely acquainted with the discipline and concomitant problems. How scientists use questions in scientific texts is examined by both Webber (1994) and Hyland (1998b). Webber (1994:265) states that questions are used when addressing a highly complex subject about which little as yet is known. The issue is considered open to debate. In addition

to indicating gaps in present knowledge, questions also “represent an appeal to continue research in the field. They are a way of appealing directly to the reader”. This function of questions is reiterated by Hyland (1998b:143): “While [questions] generally seek to engage and elicit a response from the reader, questions typically draw attention to the existing state of knowledge in order to signal an important unresolved issue”.

Questions were either stated directly in question form, or indirectly, as statements. Only the Models and the Highs used direct questions. However, the Models used direct questions much more than the Highs. The densities are 0.21 for the Models and 0.02 for the Highs. In comparison, the three writing groups used slightly fewer indirect questions. One would have expected the Lows to use direct question forms rather than the indirect statement form, which is a more difficult construction. Their avoidance of direct questions may be because they are insecure. An example of a direct question from a High is:

- [4] Eight of the twelve participants’ expectations seem to be unrealistically high. *But are they really too high?* According to [the] literature (Kaplan, 1994), it is actually possible for the mildly retarded child to be independent in self-management. (F/97, p39, H)

4.2.3 Appeal or reference to shared assumptions

Sometimes writers appeal or refer to common assumptions held by scientists within a particular discipline. By appealing to a common knowledge or belief base, it may be easier to get claims that relate to this accepted. This is, therefore, a reader-oriented strategy, since the writer’s aim is to get claims accepted on the basis of shared assumptions (cf. § 3.3.2).

There were no instances of shared assumptions in the student writing, which may be because undergraduate students would probably not know what the shared or common assumptions in the particular discipline are. References to shared assumptions were also scarce in the Models; there were only two instances.

4.2.4 Personal attribution

Personal attribution refers to the writer's acknowledging personal views, conclusions, or experimental limitations. "By specifying a personal source, ... the writer shifts the interpretive frame, drawing attention to the relation of the work of the investigator, and signalling that the claim is left open to the reader's judgment" (Hyland, 1988b:182) (cf. § 3.3.2). Adams Smith (1984:33) notes that personal attribution, or what she refers to as the subjective element in writing, is accomplished by use of the first person in preference to the impersonal passive (cf. § 2.3).

Overall, there were not many instances of personal attribution among the three groups. In the corpus, personal attribution was conveyed by the personal pronouns, *my* and *we*. The phrase, *personal view*, was also used (cf. § 3.3.2).

4.2.5 Addressing readers directly

A relationship with the reader may also be invoked by addressing readers directly. Here, the claim is hedged by explicitly drawing the reader into the process of scientific enquiry (cf. § 3.3.2).

In the corpora, the impersonal pronoun, *one*, was used to involve the reader in the reasoning process. The densities were essentially the same for the three groups. A reason for the students' use may be their having been taught how to use *one* in scientific writing, and their exposure to its frequent use in occupational therapy textbooks. The example below [5] is taken from a Low. Although this student clearly has difficulty in using English, he, nevertheless, has managed to use epistemic language quite effectively. Regarding the use of *one*, Luukka and Markkanen (1997:182) found that this was characteristic of English first language (L1) scientific discourse, more specifically, written papers for publication. In their corpus, for example, the English L1 writer "does not use one single explicit reference to himself" whereas in contrast, "the Finn refers explicitly to herself by using the first person pronoun equally frequently in both her spoken and written English texts" (cf. § 2.4).

- [5] *One* may conclud[e] that an airsplint is having more effect in reducing spasticity, although *one* expected that the airsplint used with weightbearing might have more effect as more treatment principles applies on it. (F/98, p23, L)

However, in a few cases, students used awkward expressions as a way of engaging the reader, or acknowledging the reader's active role in evaluating information. One such awkward use appears in extract [6]. The student is actually providing the reader with an interim conclusion on how perceptions are formed, based on prior information in the text. The writer assumes that the reader has been following the argument and has drawn the same conclusion, hence the expression *we have seen*. However, a more appropriate use, for example, would be, *one can conclude that*.

- [6] *We have seen* again that there are also factors affecting or influencing the individual's perception. (I/98, p15, L)

4.2.6 Personal reference to experimental limitations

Personal reference to experimental limitations also constitutes reader-oriented hedging, in the sense that "this strategy functions to represent both the source and status of the claim as individual rather than collective, making the claim dependent on activities which might be regarded as essentially fallible or limited in their applicability" (Hyland, 1998b:181) (cf. § 3.3.2).

In the corpus, experimental limitations were signalled by a unit of discourse that could be distinguished from the rest of the co-text as that of referring to experimental limitations. Hyland (1998b) refers to this as a discourse-based strategy. It will be recalled that the identification of discourse-based strategies as a means of hedging depends principally on content rather than form (cf. § 3.3.2). Although there were essentially no differences regarding the use of this strategy among the groups, the following example [7] is interesting in that in spite of some awkward language use, the student manages to communicate the limitations of the study, namely subjectivity (in terms of the researcher's having to make decisions regarding assistance), the small sample size, and the sample bias (only females).

- [7] The data for questionnaire II (see appendix C) were collected by means of observation. This shows that the results are not a hundred percent correct since *the researcher was the one who concluded [that] the patients needed assistance or did not need assistance*. On addition *the sample was very small, and only female patients were observed*. (G/99, p29, L)

4.2.7 Suggesting alternative interpretations or possibilities

Only the Models suggested alternative interpretations or possibilities. Hypothetical conditionals were used, which were expressed by means of three *if*-clauses, in combination with *could*, and one *if*-clause, in combination with *would*. A reason for the students' not employing conditionals may be two-fold; perhaps they find the construction difficult, or they do not have sufficient background for considering conditional relationships that could obtain between aspects relating to the research topic. The following excerpt [8] is an example of *would* being used as a hypothetical marker where the conditions for the realisation of the hypothesis are stated.

- [8] On a research level one would like to know (i) *if* reducing the strain *would* contribute significantly to the prevention of *or* at least to the retardation of the development of ulnar deviation; (ii) is it more important to avoid moderately high loads which are constant, *or* very high intermittent loads? (Model N, p35)

4.2.8 Summary of results: reader-oriented hedges

The results for the hypotheses pertaining to reader-oriented hedges are the same as those for the four general hypotheses (cf. § 4.1). There is no significant difference in the overall density of reader-oriented hedges between the student groups, namely, the Highs and Lows, but there are highly significant differences in the overall density of reader-oriented hedges between the Models and student writing as a whole, and between the Models and each of the student groups (cf. Table 1).

In the reader-oriented hedging category, the Models consistently used not only more hedges in expressing more hedging functions than the students, but also employed a wider range of linguistic expressions than the students. The major differences pertaining to the extent of use were in respect of modal auxiliaries, questions, reference to shared assumptions, and using hypothetical conditionals to suggest alternative interpretations or possibilities. The lower incidence of modal auxiliaries in the student writing could, perhaps, be attributed to students' not fully comprehending how the modals and concomitant tense forms can function as reader-oriented hedges.

In § 4.2.2, it is mentioned that, overall, the professionals (Models) asked more questions than the students, the likely reason being that as professionals, they would be better acquainted with the discipline and associated problems. They, therefore, would have far more insight than an undergraduate student. The students are also most probably too insecure to ask questions.

In § 4.2.3, it is indicated that there were no instances of shared assumptions in the student writing. The reasons may be similar to those suggested above for the students' general avoidance of questions. Similarly, suggesting alternative interpretations or possibilities occurred in the Models only. Here too, it is assumed that the students are not in a position to consider alternatives, based on this being their first "research" experience. Considering alternatives requires a broad base to work from, plus insight into the study and findings. In addition to this, the students have difficulty in using *if*-clauses, in combination with modal auxiliaries in the past tense form, to convey hypothetical conditionals.

4.3 HYPOTHESES AND RESULTS: WRITER-ORIENTED HEDGES

The hypotheses and results pertaining to the use of writer-oriented hedges are:

H1:WO There will be a significant difference in the overall density of writer-oriented hedges between the Highs and Lows.

df = (1,26) F Value = 1.38 p = 0.2510 (p > 0.05)

There is no significant difference.

H2:WO There will be a significant difference in the overall density of writer-oriented hedges between the Models and the students' writing.

df = (1,36) *F* Value = 10.02 *p* = 0.0032 (*p* < 0.01)

There is a highly significant difference at 1%.

H3: WO There will be a significant difference in the overall density of writer-oriented hedges between the Models and the Highs.

df = (1,24) *F* Value = 5.42 *p* = 0.0287 (*p* < 0.05)

There is a significant difference at 5%. The significance is on transformed* scores.

(* cf. § 3.4.3)

H4:WO There will be a significant difference in the overall density of writer-oriented hedges between the Models and Lows.

df = (1,20) *F* Value = 10.07 *p* = 0.0048 (*p* < 0.01)

There is a highly significant difference at 1%.

There is no significant difference in the overall density of writer-oriented hedges between the two student groups, the Highs and Lows, but there is a highly significant difference in the overall density of writer-oriented hedges between the Models and student writing as a whole.

While there is a significant difference in the overall density of writer-oriented hedges between the Models and the Highs, there is a highly significant difference between the Models and the Lows. How the three groups compare with one another regarding the extent of writer-oriented hedges is now discussed. Refer to Table 2, which provides

the raw scores and densities for the linguistic expressions that each of the groups used to accomplish particular rhetorical functions.

Table 2: Writer-oriented expressions in Models, Highs and Lows: raw scores and densities per 1000 words

Linguistic expressions	Models		Highs		Lows	
	raw scores	densities	raw scores	densities	raw scores	densities
Impersonal expressions:						
impersonal subjects	8	0.28	28	0.26	17	0.31
passive constructions	9	0.32	51	0.47	21	0.39
Sub-totals	17	0.61	79	0.74	39	0.73
Attribution to literature:						
<i>"according to"</i>	13	0.46	58	0.54	35	0.65
AL & reporting verbs/modals	15	0.53	31	0.28	21	0.39
AL & nouns	2	0.07	8	0.07		
AL & passive constructions	2	0.07			1	0.01
AL & impersonal expressions	2	0.07	1	0.01		
Sub-totals	34	1.22	98	0.91	57	1.07
Verbs:						
<i>appear</i>	8	0.28	11	0.01	1	0.01
<i>seem</i>	18	0.64	10	0.09	8	0.15
<i>suggest</i>			1	0.01	1	0.01
Sub-totals	26	0.93	22	0.21	10	0.19
Adverbials: content disjuncts:						
<i>perhaps</i>	5	0.17	10	0.09	1	0.01
<i>possibly</i>	2	0.07	1	0.01	2	0.03
<i>seemingly</i>	1	0.03	1	0.01		
<i>apparently</i>			2	0.01		
Sub-totals	8	0.29	14	0.13	3	0.06
Adjectives:						
<i>possible</i>	2	0.07			1	0.01
<i>tentative</i>	1	0.03				
<i>apparent</i>	1	0.03				
<i>suggested</i>					2	0.03
Sub-totals	4	0.14			3	0.06
Modal auxiliaries:						
<i>may</i>	13	0.46	21	0.19	1	0.01
<i>might</i>			4	0.03	4	0.07
<i>could</i>	8	0.28	14	0.13	5	0.09
<i>would</i>	6	0.21	12	0.11	6	0.11
Sub-totals	27	0.97	51	0.48	16	0.30

4.3.1 Writer-oriented hedges and principal realisation devices

The main aim of writer-oriented hedges is to protect the writer from the possible consequences of negatability by limiting personal commitment. The main motivation for using writer-oriented hedges is the writer's desire to gain some distance from propositions because the writer is not prepared to personally guarantee the proposition. The tentativeness expressed by writer-oriented hedges "relates principally to the commitment the author wishes to bestow on a statement rather than a strict concern with the truth of propositional relationships" (Hyland, 1998b:173) (cf. § 3.3.1.1 (c)).

The three groups of writers employed the following devices to hedge writer commitment, namely: impersonal expressions; attribution to literature; verbs; adverbials; adjectives; and modal auxiliaries. Each of these is discussed in turn.

4.3.1.1 Impersonal expressions

Overall, there was very little difference regarding the extent of using impersonal expressions as writer-oriented hedges among the three groups. There were 79 instances (a density of 0.74) of impersonal expressions in the Highs, closely followed by 39 cases (0.73) in the Lows, and 17 (0.61) in the Models. The impersonal expressions comprised impersonal subjects and passive constructions. One explanation for the use of impersonal expressions by the students may be the explicit instruction they received in using impersonal expressions in their report writing.

Excerpt [9] is an example of how a student writer employed a passive construction as a writer-oriented hedge.

[9] The idea of developmental delay, with its causing factors has become an important issue in education as *it is said to be* a major cause of the various learning disabilities evident in the school-going child. (J/98, p4, L)

In order to achieve an objective stance, and to remain impersonal, two students resorted to the following impersonal expressions, which are awkward. The students,

therefore, need to be made aware of the range of expressions that are available for signalling distance, and maintaining an objective stance. Examples of the student texts are [10] and [11].

[10] "it is the researcher's interpretation that" (A/98, p26, H), and

[11] This biographical information will also help if, for example, the researcher might want to conduct further research ... (I/97, p19, H)

4.3.1.2 Attribution to literature

In this category, ideas or claims are attributed to others (usually literature sources) directly. Quotations usually also occur. Attributions to literature occurred more frequently in the Models than the students (cf. Table 2). In attributions to literature, several expressions or constructions were employed, such as the phrase *according to*; reporting verbs on their own, or in combination with modal auxiliaries; nouns; passive constructions; and impersonal expressions. Although all three groups made frequent use of the expression *according to*, particularly in association with reporting verbs or modal auxiliaries, *according to* was resorted to the most often by the Lows, for whom the density (0.65) was much higher than the Models (0.46). A reason for the more frequent use of this form by the Lows may be that this is not only a familiar expression, but is also probably perceived as being the least problematic means of integrating sources in terms of overall sentence construction.

In the following extract [12], the writers use both *according to* and a quotation to attribute the definition of leisure time to a source. This is a writer-oriented hedge in that the writers avoid providing their own definition, which may be debatable given the breadth of the concept.

[12] According to Parker cited by Rojek, leisure time is the "time free from work and other obligations, it also encompasses activities which are characterized by a feeling of comparative freedom"². (Model K, p18)

The following excerpt is a good example of how source attribution can modify a statement. Without the phrase, *according to*, in [13] below, the claim would be interpreted as being “factive”, which refers to “agreed understandings confirmed by the research community” or “facts” (Hyland, 1998b:89; 93) (cf. § 3.1).

[13] The Likert scale, *according to* Kalat (1996), is one of the most commonly employed methods for measuring attitudes. (A/99, p5, H)

The Models also used reporting verbs, which sometimes included modal auxiliaries, to a much greater extent than both student groups (cf. Table 2). A reason for the substantially lower occurrence in the student writing in terms of reporting verbs may be that they are unacquainted with the range of available verbs and their concomitant meanings. According to Hyland (1998b:124), there is no consensus regarding the number of reporting verbs in the literature. In this regard, the range in Hyland’s (1998b) corpus is extremely limited, with *suggest* and *propose* being the most common. Hyland (1998b:137) points out that in comparison with other linguistic forms, the range of reporting verbs does provide “more resources for greater delicacy in commenting on the work of others”, and should therefore be taught, especially to L2 writers.

Although the students used substantially fewer reporting verbs than the Models, in general, they employed appropriate reporting verbs. Occasionally, however, colloquial register verbs were used. Extracts [14] and [15] are examples of students using colloquial register verbs.

[14] Hepburn (1987) *said* that forceful stretching of short duration applied to muscles and connective tissue can traumatize these structures and exaggerate pathological shortening. ((F/98, p6, L)

[15] Therefore, Creek (1990) *feels* that certain activities such as cooking can be considered as personal management or work activities, depending with what intent the activity is carried out. (I/97, p9, H)

Nouns were also used in combination with attributions to literature. The Models and Highs used nouns to the same extent. There were no instances in the Lows, which may be because they find nominal constructions difficult. Excerpt [16] is an example of a noun as a writer-oriented hedge (cf. § 3.3.1.1 (c) [59]).

- [16] *There is also the belief that* disability rates are higher in developing countries than in technologically more advanced countries in all grades and types of disability (Khan & Durkin, 1995). (I/99, pp5-6, H)

Occasionally, the writers used the passive construction when attributing claims to others who were referred to in parentheses. Impersonal expressions were also used alongside attribution to literature. These occurred in the Models and Highs only. A reason for the avoidance of impersonal expressions in the Lows may be they find the overall construction, which often involves using the passive voice, difficult. Extract [17] is an example of employing an impersonal expression to convey an attribution to a source (cf. § 3.3.1.1 (c) [62]):

- [17] *It is said that* training reduces fear and increases confidence in the safety of using the device. The fear of falling is particularly relevant when doing transfers, such as in and out of the bath (*Shipham, 1985*). (Model O, p41)

4.3.1.3 Verbs

The Models used verbs as writer-oriented hedges to a far greater extent than the students. There was a substantial difference in densities, with 0.93 for the Models compared with just 0.21 for the Highs, and 0.19 for the Lows. The following verbs were used as writer-oriented hedges, namely *appear*, *seem*, and *suggest*. In general, *seem* was used the most often, followed by *appear*. There were 18 instances (0.64) of *seem* in the Models, eight (0.15) in the Lows, and ten (0.09) in the Highs. Regarding the use of *appear*, the density of the Models (0.28) is much higher than that of the Highs and Lows which have the same density of 0.01. In comparison, *suggest* was used to a far lesser extent; there were only two instances.

Extract [18] is an example of a verb being used as a writer-oriented hedge. The writer is cautious about making a categorical statement regarding the reasons for attempted suicide, since this is an enormously complex phenomenon, and views concerning reasons for suicide are very likely to be equally complex, and varied. In order to protect herself from possible reader rejection, the writer uses a writer-oriented hedge.

[18] Among the reasons for attempted suicide, family problems, usually combined with poor communication, *appear* to be common. (Model R, p38)

4.3.1.4 Adverbials

Adverbials, namely, content disjuncts, were also used much more as writer-oriented hedges by the Models than the students (cf. Table 2). The following four content disjuncts were used as writer-oriented hedges, namely: *perhaps*; *possibly*; *seemingly*; and *apparently*. While *perhaps* was used the most often by all three groups, the differences in the densities pertaining to the use of *possibly*, *seemingly*, and *apparently* are slight. *Seemingly* occurred once in both the Models and the Highs; there were no instances in the Lows. *Apparently* occurred in the Highs only. A reason for the absence of *seemingly* and *apparently* in the Lows may be that these are words that signal mental perception, or inferencing, and may, therefore, be problematic concepts. In addition, the adverbial forms (*seemingly*; *apparently*), compared with the verb forms (*seem*; *appear*), may be less familiar, or the students may simply not feel competent in using them. It is likely that the reasons suggested here are related to the fact that for the majority of these students, English is a L2, and as was mentioned earlier (cf. § 4.2.8), a compounding factor is that this was the students' first "real" experience of research, and the associated demands of writing a large scale report.

In extract [19] *seemingly* is used as a writer-oriented hedge (cf. § 3.3.1.1 (c) [69]):

[19] Although much has been written advocating joint protection¹⁵, little research has been done on the forces that contribute to the deformity during everyday, brief, and *seemingly* innocent tasks^{14,6}. (Model N, p33)

4.3.1.5 Adjectives

While the Highs did not use any adjectives as writer-oriented hedges, the Models used adjectives at least twice as much as the Lows (cf. Table 2). The following adjectives were used, namely: *possible*; *tentative*; *apparent*; and *suggested*. *Possible* occurred in both the Models (0.07) and the Lows (0.01), and *suggested* occurred in the Lows only. Only the Models used *tentative* and *apparent*. The reason for the students' not using *tentative* and *apparent* may be that these forms may not be part of the students' active vocabulary.

The following Model text is an example of using *apparent* as a writer-oriented hedge (cf. § 3.3.1.1 (c) [72]).

[20] In the study in Soshanguve, it was *apparent* that disabled persons were sometimes hesitant to accept assistive devices which emphasised their disability. (Model O, p41)

4.3.1.6 Modal auxiliaries (not used in conjunction with references to literature)

It is important to note that modal auxiliaries in this sub-category are not used in conjunction with references to literature (cf. § 4.3.1.2).

There was a marked difference in the overall density of modal auxiliaries as writer-oriented hedges among the Models, Highs and Lows. In Table 2, it can be seen that the Models used modal auxiliaries almost twice as much as the Highs, and in comparison with both the Models and the Highs, the Lows hardly used modal auxiliaries.

In general, four modal auxiliaries were employed as writer-oriented hedges, namely: *may*; *might*; *could*; and *would*. Although there were no instances of *might* in the Models, the Models had the highest densities for *may* (0.46), *could* (0.28) and *would* (0.21), in comparison with the Highs and the Lows (cf. Table 2).

In extract [21], *may* is used to hedge writer commitment. The attempt at self-protection is two-fold. The writers are careful not to claim outright that the subjects (psychiatric clients) might not have had insight into their condition and concomitant symptoms. Or the writers are reluctant to categorically state that the reasons given for resignation may well have been associated with the condition, mental illness, since such a claim may jeopardise not only the clients, but also all persons with mental illness.

[21] Fourteen of these said that they quit work because of their mental illness, while the rest resigned for diverse reasons, which *may* have been indirectly related to their condition. (Model M, p13)

4.3.2 Summary of results: writer-oriented hedges

The results pertaining to the use of writer-oriented hedges are the same as those for the four general hypotheses, with one exception, namely, the difference in the overall density between the Models and Highs is significant, and not highly significant.

The major differences with regard to the extent of the use of writer-oriented hedges between the Models and the student writing occurred with respect to attribution to literature, verbs, adverbials, and modal auxiliaries (cf. Table 2). The highest incidence of attribution to literature occurred in the Models, where the following devices were used as a means of attributing ideas to others: reporting verbs, nouns, and passive and impersonal expressions. In § 4.3.1.2, it was suggested that an explanation for the limited use of reporting verbs in the student writing may be ignorance concerning the range of available reporting verbs, and not understanding concomitant denotations. Nouns were also not used by the Lows as markers of attribution to literature.

With respect to the use of verbs as writer-oriented hedges, the Models employed verbs much more than the students. Possible reasons are given in § 4.3.1.3. This finding is similar to that of using reporting verbs in attribution to literature, and may be worthwhile examining more closely, although the studies on scientific and medical writing have shown that writers, generally, employ a limited range of verbs (Hyland, 1998b).

The Models used substantially more adverbials than the Lows as writer-oriented hedges. A possible reason for this is provided in § 4.3.1.4. There was also a marked difference in the use of modal auxiliaries as writer-oriented hedges between the Models and the students, where the Models used modal auxiliaries to a much greater extent. A suggested explanation for the difference between the Models and student writing regarding the use of modal auxiliaries is provided in § 4.2.8.

4.4 HYPOTHESES AND RESULTS: RELIABILITY TYPE HEDGES

The hypotheses and results pertaining to the use of reliability type hedges (cf. § 4.4.1) are:

H1: Rt There will be a significant difference in the overall density of reliability type hedges between the Highs and Lows.

$df = (1,26)$ F Value = 0.37 $p = 0.5506$ ($p > 0.05$)

There is no significant difference.

H2: Rt There will be a significant difference in the overall density of reliability type hedges between the Models and the students' writing.

$df = (1,36)$ F Value = 4.63 $p = 0.0382$ ($p < 0.05$)

There is a significant difference at 5%.

H3: Rt There will be a significant difference in the overall density of reliability type hedges between the Models and the Highs.

$df = (1,24)$ F Value = 2.56 $p = 0.1230$ ($p > 0.05$)

There is no significant difference.

H4:Rt There will be a significant difference in the overall density of reliability type hedges between the Models and Lows.

df = (1,20) *F* Value = 4.34 *p* = 0.0503 (*p* > 0.05)

There is no significant difference.

The statistical tests revealed no significant differences in the overall density of reliability type hedges within the student group itself, that is, between the Highs and Lows. Furthermore, no significant differences were found when the Models were compared with the two achievement groups independently, that is the Highs and the Lows. This was as a result of the large variance within the student group. However, a significant difference at the 5% level was found when the Models were compared with the student group as a whole.

A discussion of how reliability hedges, and to what extent they were used, follows. Refer to Table 3.1, which provides the raw scores and densities for the linguistic expressions that each of the groups used, and Table 3.2, which gives the overall densities for reliability expressions for each of the groups.

Table 3.1: Reliability expressions in Models, Highs and Lows: raw scores and densities per 1000 words

Linguistic expressions	Models raw scores	densities	Highs raw scores	densities	Lows raw scores	densities
Modal auxiliaries:						
<i>may</i>	20	0.71	69	0.64	19	0.35
<i>might</i>	4	0.14	9	0.08	16	0.3
<i>could</i>	12	0.43	40	0.37	12	0.22
<i>would</i>	1	0.03			1	0.01
Sub-totals	37	1.33	118	1.10	48	0.90
Verbs:						
<i>seem</i>	3	0.1	17	0.15	12	0.22
<i>tend</i>	6	0.21	8	0.07	4	0.07
<i>suggest</i>			2	0.01	2	0.03
<i>appear</i>			1	0.01	1	0.01
<i>estimate</i>					1	0.01
Sub-totals	9	0.32	28	0.26	20	0.38
Adjectives:						
<i>possible</i>	1	0.03	12	0.11	10	0.18
<i>slight</i>					1	0.01
<i>probable</i>			9	0.08		
<i>apparent</i>			1	0.01		
Sub-totals	1	0.03	22	0.21	11	0.21
Nouns						
<i>tendency</i>	1	0.03	2	0.01		
<i>possibility</i>	1	0.03	1	0.01		
<i>evidence</i>			1	0.01		
Sub-totals	2	0.07	4	0.04		
Limited/inadequate knowledge						
no research evidence	3	0.1	5	0.04	4	0.07
few studies/limited evidence	3	0.1	2	0.01	1	0.01
lack of literature	1	0.03	2	0.01		
limited literature			2	0.01		
insufficient information	9	0.32	17	0.15	4	0.07
Sub-totals	16	0.57	28	0.26	9	0.17
Adverbials:						
Content disjuncts:						
<i>perhaps</i>			6	0.05	1	0.01
<i>probably</i>	6	0.21	11	0.1	2	0.03
<i>possibly</i>			2	0.01		
<i>presumably</i>	2	0.07				
<i>less/likely</i>	5	0.17	2	0.01	3	0.05
Sub-totals	11	0.39	21	0.20	6	0.11
Style disjuncts:						
<i>approximately</i>			9	0.08	1	0.01
<i>more or less</i>			2	0.01		
Sub-totals			11	0.10	1	0.01
Adverbial adjuncts:						
<i>partly (downtoner)</i>	2	0.07	2	0.01		
<i>partially (downtoner)</i>	2	0.07	1	0.01		
<i>slightly (downtoner)</i>	2	0.07				
<i>almost (approximator)</i>			2	0.01		
<i>about (approximator)</i>					1	0.01
<i>some (downtoner)</i>	1	0.03	10	0.09	3	0.05
<i>to some extent (downtoner)</i>	1	0.03	1	0.01	1	0.01
<i>somewhat</i>					1	0.01
<i>sometimes (low frequency)</i>	1	0.03	2	0.01	2	0.03
<i>not always (low frequency)</i>					1	0.01
<i>seldom (low frequency)</i>	1	0.03				
Sub-totals	10	0.36	17	0.16	9	0.17
Adverbial conjuncts						
<i>somehow</i>	1	0.03				
Totals for Adverbials	22	0.78	49	0.46	16	0.29

4.4.1 Reliability type hedges and principal realisation devices

In Chapter 3, it is stated that the principle motivation of reliability hedges is the writer's desire to clarify the state of knowledge, and to acknowledge factual uncertainties. Reliability type hedges therefore serve to present content as reliably as possible against that which is known or based on either scientific evidence or experiential reasoning. Unlike attribute type hedges, reliability type hedges help the writer to restrict claims to specific contexts. Attribute type hedges, on the other hand, allow for broader, more general statements. However, both strive for accuracy in terms of content (cf. § 3.3.1.1 (b)).

There were no significant differences in the overall density of reliability type hedges between the two student groups, and between the Models and Highs, and Models and Lows. There was, however, a significant difference between the Models and the student group as a whole (cf. Tables 3.1 and 3.2). The reason for this is given in § 4.4. The writers from all three groups have tended to use similar forms in order to convey reliable information. One reason for the students' generally not having difficulty in using reliability type hedges may be their exposure to them in occupational therapy literature (prescribed textbooks), where they occur frequently and consistently.

In the corpus, both the professionals and the students used reliability type hedges mainly to account for, or explain results pertaining to their own research. Usually, other studies or anecdotal evidence were also mentioned for the purposes of confirming or contrasting findings.

In Table 3.2 below, a clearer picture of the distribution of the overall densities pertaining to reliability type hedging expressions among the Models, Highs and Lows emerges. With regard to the use of modal auxiliaries; nouns; references to limited knowledge; content disjuncts; and adverbial conjuncts as reliability hedges, the Models have the highest densities, followed by the Highs, and the Lows, in that order.

Table 3.2: Summary of reliability expressions in Models, Highs and Lows: overall densities per 1000 words

Linguistic expressions	Models densities	Highs densities	Lows densities
Modal auxiliaries	<i>1.33</i>	1.10	0.90
Nouns	0.07	0.04	
Limited knowledge	<i>0.57</i>	0.26	0.17
Content disjuncts	<i>0.39</i>	0.20	0.11
Adverbial conjuncts	<i>0.03</i>		
Adverbial adjuncts	<i>0.36</i>	0.16	0.17
Verbs	0.32	0.26	0.38
Adjectives	0.03	0.21	0.21
Style disjuncts		0.10	0.01

As can be seen in Table 3.2, the Models made much more frequent use of modal auxiliaries, references to limited knowledge, the adverbials, content disjuncts and adverbial adjuncts, and nouns, to convey reliability type hedges, than the students.

The subsequent discussion of how the writers expressed reliability hedges is organised in terms of the forms that were used, namely: modal auxiliaries; verbs; adjectives; nouns; adverbials; and the discourse-based strategy, that is, reference to limited knowledge.

4.4.1.1 Modal auxiliaries

In the corpus, in general, modal auxiliaries were the most frequently employed forms for conveying reliability type hedges (cf. § 4.2.1.1 (a)). However, the Models used modal auxiliaries much more frequently than the students (cf. Tables 3.1 and 3.2).

The following four modals were used: *may*; *might*; *could*; and *would*. In all groups, *may* occurred the most often. The Models and Highs used *may* to a similar extent, in contrast to the Lows, who used *may* to a much lesser extent. A similar pattern is evident for *could*, which was the second most common modal auxiliary in expressing reliability type hedges. In comparison with *may* and *could*, *might* was used to a much lesser extent by the three groups, particularly among the Lows, for whom the density is only 0.03 in comparison with 0.14 for the Models and 0.08 for the Highs.

In the following student text [22], *may* was used as a reliability hedge to convey propositional content as reliably as possible. The hedged claim is based on research evidence gleaned from a literature review, and on information provided by the clinical staff at the Ga-Rankuwa Psychiatric Unit.

[22] Since most MEDUNSA students come in[to] contact with mentally ill people at some stage and the fact that they will be health professionals in future, their attitudes will assume a major role in the treatment of mental illness in that they *may* determine how mentally ill people view themselves and the world around them. (F/99, p1, L)

In [23], the hedged claim, signalled by *could*, is restricted to the writer's own study and findings. This is a good example of how reliability hedges help the writer restrict claims to a specific context.

[23] There was remarkable improvement in all the three condition[s]. The reason for this *could* be that most of the subjects were attending the hemiplegia group every Thursday, and were receiving [more] stimulation than others. (F/98, p23, L)

In comparison with the other hedging expressions that were identified in the current study, the students did experience some difficulty in using modal auxiliaries specifically for this function: that is, as reliability type hedges. The problem lay in not distinguishing degrees of certainty, and in not expressing appropriate levels of certainty or tentativeness, which is evident in excerpts [24] to [27]. Suggestions for improvements are indicated in parentheses.

[24] It [this data] *will* (could) provide them with a general overview of the potential of the present members in the SHO [Self-Help Organisation]. (E/98, p4, H)

[25] This would also be beneficial for therapists because they *will* (may; could) gain an understanding of the factors that underlie independence and at the same time (could) develop new effective treatment methods. (J/99, p6, L)

[26] Creek (1990) stresses that analysing an activity enables the occupational therapist to ... discover the skills the activity *will* (could) develop in the client (D/99, p10, H)

[27] Most literature originates from overseas, no relevant literature was found that applied to South African communities, such as Winterveldt therefore further studies *must* (it is strongly recommended that) be conducted within the South African context. (H/97, p11, H)

4.4.1.2 Verbs

In general, there was no major difference in the use of verbs as reliability hedges among the three groups. The overall densities are very close, with 0.38 for the Lows, 0.32 for the Models, and 0.26 for the Highs. The following verbs were used: *seem*; *tend*; *suggest*; *appear*; and *estimate*. All three groups used *seem* and *tend*. Although there were no instances of *suggest* or *appear* in the Models, these forms were used by both student groups. *Estimate* occurred once in the Lows. What is a little unexpected, is the use of *tend* and *estimate* by the students.

The use of *tend* in extract [28], is used in the same sense as *could* is in [22] above. The claim is similarly restricted to a specific context. The writer is concerned with propositional reliability in relation to a particular situation, rather than making generalisations. Regarding verbs like *tend*, *appear* and *seem*, Vartalla (1999:186) makes the point that “they can be utilized to express tentativeness when the author’s or another researcher’s ideas and findings are described”, which is the case in extract [27].

[28] The female sample also shows a positive correlation with age, in that the frequency of activity participation *tends* to increase with increasing age. (Model K, p30)

4.4.1.3 Adjectives

Four adjectives were used, namely: *possible*; *slight*; *probable*; and *apparent*. The adjectives with the highest counts were *possible* and *probable*. These forms were used primarily by the students. Only the Highs used *probable* and *apparent*. There was only one instance of *apparent*. The single use of *apparent* is not surprising, since this appears to be a form that the students have difficulty in using. It is also interesting to note that the Lows did not use *probable*, but did use *possible*. Perhaps this is because *possible* is a word heard more often, or the students do not understand that *possible* and *probable* signal different degrees of certainty, where *probable* signals a higher degree of certainty than *possible*. This, however, was not examined in the current study.

The use of *probable* in [29] is another example of how writers use reliability hedges in relation to their own findings, or within a specific context, for the purposes of presenting information as reliably as possible, in terms of what is known, or against the background of research evidence.

[29] Another *probable* reason which might have prevented acceptable nail cleaning was her depressed mood. (I/97, p38, H)

4.4.1.4 Nouns

Only the Models (0.07) and Highs (0.04) used nouns as reliability hedges, to almost the same extent. Three nouns were used, namely: *tendency*, *possibility*, and *evidence*. *Evidence* occurred once only in a High. A suggestion for the absence of nouns in the Lows is provided in § 4.3.1.2.

In excerpt [30], *tendency* functions as a reliability hedge. The claim is made with reference to the writer's own observations of a MEDUNSA student group's behaviour towards mentally ill patients.

[30] It has also been observed that students have the *tendency* to discuss their mentally ill patients with their friends and laugh at problems which are very real to the patient. (A/99, p1, H)

4.4.1.5 Limited or inadequate knowledge

In research writing, writers often refer to limited or inadequate knowledge. Hyland (1998b:141) refers to this as a discourse-based strategy since this frequently involves using more than one linguistic form. Writers employ this strategy for the purposes of either locating and justifying their own research, or to indicate problems or concerns associated with limited, or a lack of information within a particular discipline (cf. § 3.3.1.1 (b)).

Although all three groups of writers referred to limited or inadequate knowledge to indicate or highlight problems or concerns associated with limited information in the area of investigation, the Models referred to limited knowledge almost twice as much as the students. There were also more references to limited knowledge by the Highs in comparison to the Lows (cf. Tables 3.1 and 3.2). The more frequent use by the Models may be attributed to the fact that the professional writers had read widely, had easier access to literature sources, and were aware of the lack of, or inadequate information regarding topics. In terms of their training and experience, they would also be in a better position to find and evaluate information.

In the corpus, limited knowledge was indicated by referring to: *no research evidence; few studies; limited evidence; a lack of literature; limited literature; and insufficient information*. According to Salager-Meyer and Salas (1991:47-48), expressions pertaining to limited knowledge are “mainly used in [research papers] to show a knowledge gap which in turn justifies the publication of the research being reported (cf. § 2.6).

In [31] below, the writer’s reference to insufficient information constitutes a reliability hedge, in that the writer communicates the concern expressed by the Ga-Rankuwa Hospital Occupational Therapy staff regarding the lack of information on the use of the airsplint in elbow spasticity treatment.

[31] The staff members of the Ga-Rankuwa Hospital Occupational Therapy department requested the study because they were using the airsplint with other techniques to inhibit elbow spasticity in adult head injured and stroke patients. However, they had *never evaluated the effect of the airsplints scientifically*. (F/98, p1, L)

In the student text [32], it would appear that the writer has not carefully thought through the content; is what she claims to be a “fact” indeed a fact, or rather a commonly held view or perception? It is this kind of distinction between fact and opinion that is important in science, and which needs to be clearly communicated in writing about science. Uninitiated students need to be made aware of this.

[32] There is evidence that supports the *fact* that doctors have negative feelings and avoidance tendencies towards patients who have chronic disabling illnesses and the hostile or severely disabled (Duckworth, 1988). (A/99, p9, H)

4.4.1.6 Adverbials

All three groups used adverbials as reliability hedges. However, the Models used adverbials to a far greater extent than the students, particularly the Lows. In terms of overall densities, the Models had the highest density of 0.78, followed by the Highs,

which had a density of 0.46, which was, in turn, followed by the Lows with a density of 0.29. Four kinds of adverbials were employed, namely: content disjuncts; style disjuncts; adverbial adjuncts; and adverbial conjuncts. Adverbial disjuncts and adjuncts were used the most often by all three groups. Each of these sub-classes is considered next.

4.4.1.6 (a) Content disjuncts

The Models used content disjuncts almost twice as much as the Highs, and substantially more so than the Lows. Five forms were used, namely: *perhaps*, *probably*, *possibly*, *presumably*, and *less/likely*. While *probably* and *less/likely* were used by all three groups, the densities are markedly higher for the Models in comparison with the students (cf. Tables 3.1 and 3.2). *Presumably* did not feature in the students' writing; perhaps they are not familiar with its meaning.

Extract [33] is an example of how a content disjunct is used as a reliability type hedge. The hedged claim, conveyed by *presumably*, may be based on either the writer's clinical experience with hand/finger clients, or on a literature survey. Either way, the statements are made in terms of the actual state of knowledge, or in terms of what is actually observed rather than what is assumed (cf. § 3.3.1.1 (b)).

[33] In the normal hand with pre-articular structures unaffected by disease the ulnar deviation forces produced by (especially) the long flexors of the second and third fingers is *presumably* counter-balanced by the radial interossei and lumbricals. (Model N, p32)

4.4.1.6 (b) Style disjuncts

Although there were no instances of style disjuncts as reliability hedges among the Models, the Highs used style disjuncts much more than the Lows. Two forms were used, namely *approximately* and *more or less* (which in essence has the same meaning as *approximately*). There were nine cases of *approximately* in the Highs, with one in the Lows. Only the Highs used *more or less*.

In [34] below, *approximately* operates as a reliability hedge in the sense that the writer is careful to provide reliable information with regard to the unemployment rate in Winterveldt. Having insight into the extent of unemployment and the social problems associated with it could impact on the study, which was to investigate mothers' attitudes towards their disabled children. The community rehabilitation facilitators who work in the area had provided the information regarding the unemployment rate.

[34] Winterveldt is an underdeveloped and disadvantaged area. It has low socio-economic status and the unemployment rate is *approximately* 80%. (I/99, p1, H)

4.4.1.6 (c) Adverbial adjuncts

The Models used adverbial adjuncts as reliability hedges almost twice as much as the students. The Models had a density of 0.36, whereas the densities for the Highs and Lows were essentially the same, with 0.17 for the Highs, and 0.16 for the Lows. The following forms were used, namely: *partly; partially; slightly; almost; about; some; to some extent; somewhat; not always; and seldom*. Only the Models and Highs used *partly* and *partially*, with *slightly* occurring in the Models only. The use of the forms: *almost; about; some; to some extent; not always; and seldom*, by the students is expected, but what is surprising, is the use of *somewhat* by a Low. However, upon closer examination of the student's text, one sees that the proposition is attributed to a source; perhaps the student incorporated the cited author's use of *somewhat* into her own writing. The excerpt in question is [35] below.

[35] To understand the *somewhat* confused attitudes of contemporary society towards mentally ill persons, it is helpful to examine current situations and thinking in the light of their historical background (Nancy, 1995). (F/99, p9, L)

4.4.1.6 (d) Adverbial conjuncts

Only one adverbial conjunct, namely, *somehow*, was used as a reliability type hedge. This occurred in a Model text. With regard to the corpus as a whole, the reasons for the virtual absence of adverbial conjuncts are not known.

With reference to extract [36] below, the writer uses *somehow* to indicate that a precise understanding of the relationship that is thought to exist between psychosocial distress and mental health on the one hand, and stresses/strain and support on the other hand, is lacking. *Somehow* functions as a reliability hedge in that an attempt is made to present the content as truthfully (reliably) as possible, while acknowledging factual uncertainties.

[36] The dominant thinking around psychosocial distress and mental health is that they are *somehow* related to stresses/strain and support. (Model M, p11)

4.4.2 Summary of results: reliability type hedges

In contrast with the findings for the four general hypotheses (cf. § 4.1), there were no differences in the overall density of reliability type hedges between the Models and Highs, and the Models and Lows. There was, however, a significant difference between the Models and the student writing as a whole. These findings are attributed to the large variance within the student group. There has, therefore, been a particular need to examine specifics more carefully.

In the reliability type hedging category, the major differences in terms of the use of hedges that occurred between the Models and the student writing were in respect of the use of modal auxiliaries; nouns; references to limited knowledge; content disjuncts; and adverbial conjuncts (cf. Tables 3.1 and 3.2). While the Models and Highs employed nouns to a similar extent, the Lows did not use nouns as reliability hedges. Possibly, the reasons are the same as those mentioned in § 4.3.1.2 and § 4.3.2. The Models also made many more references to limited knowledge than the students. An explanation for the difference is provided in § 4.4.1.5, where it is mentioned that professionals not only have easier access to literature sources, but also have more

insight into the gaps in knowledge based on their training and experience. The Models also employed adverbials, namely, content disjuncts and adverbial adjuncts, much more frequently than the Lows.

4.5 HYPOTHESES AND RESULTS: ATTRIBUTE TYPE HEDGES

The hypotheses and results pertaining to the use of attribute type hedges (cf. § 3.3.1.1 (b)) are:

H1:At There will be a significant difference in the overall density of attribute type hedges between the Highs and Lows.

df = (1,26) *F* Value = 0.22 *p* = 0.6400 (*p* > 0.05)

There is no significant difference.

H2:At There will be a significant difference in the overall density of attribute type hedges between the Models and the students' writing.

df = (1,36) *F* Value = 4.35 *p* = 0.0422 (*p* < 0.05)

There is a significant difference at 5%.

H3:At There will be a significant difference in the overall density of attribute type hedges between the Models and the Highs.

df = (1,23) *F* Value = 4.73 *p* = 0.0401 (*p* < 0.05)

There is a significant difference at 5%. The significance is on transformed* scores.

(* cf. § 3.4.3)

H4:At There will be a significant difference in the overall density of attribute type hedges between the Models and the Lows.

df = (1,20) *F* Value = 1.7132 *p* = 0.2054 (*p* > 0.05)

There is no significant difference.

There were no significant differences in the overall density of attribute type hedges between the Highs and Lows, and the Models and Lows. However, there is a significant difference between the Models and the students as a whole, and the Models and the Highs. The latter result is unexpected, given that there is no difference between the Models and the Lows; however, this is attributed to the large variance within the student group itself.

4.5.1 Attribute type hedges and principal realisation devices

The main purpose of attribute type hedges is to express precision in terms of the phenomena being described or discussed.

The use of attribute hedges allows deviations between idealised models of nature and instances of actual behaviour to be accurately expressed. They enable writers to restructure categories, define entities and processes exactly, and to distinguish how far results approximate to an idealised state. They specify more precisely the attributes of the phenomena being described. (Hyland, 1998b:164) (cf. § 3.3.1.1 (a)).

In the corpus, modal auxiliaries, adverbials, adjectives and nouns were used to express attribute type hedges. Refer to Table 4 below, which provides the raw scores and densities for the linguistic expressions that each of the groups used.

Table 4: Attribute type hedging expressions in Models, Highs and Lows: raw scores and densities per 1000 words

Linguistic expressions	Models raw scores	densities	Highs raw scores	densities	Lows raw scores	densities
Modal auxiliaries:						
<i>can</i>	3	0.1	1	0.01	1	0.01
<i>can be</i>	14	0.5	36	0.33	23	0.43
<i>can be attributed</i>	1	0.03	1	0.01	1	0.01
Sub-totals	18	0.65	38	0.35	25	0.47
Adverbials:						
Style disjuncts:						
<i>generally</i>	3	0.1	9	0.08	11	0.2
<i>commonly</i>			2	0.01	1	0.01
Sub-totals	3	0.1	11	0.09	12	0.21
Adverbial adjuncts:						
<i>usually</i>	5	0.17	19	0.17	13	0.24
<i>normally</i>			4	0.03		
<i>often</i>	2	0.07	1	0.01	3	0.05
<i>frequently</i>			3	0.02	1	0.01
Sub-totals	7	0.25	27	0.25	17	0.32
Content disjuncts:						
<i>essentially</i>	1	0.03	5	0.04		
<i>necessarily</i>	2	0.07	3	0.02	2	0.03
Sub-totals	3	0.11	8	0.07	2	0.03
Totals for Adverbials	13	0.46	46	1.05	31	0.56
Adjectives:						
<i>general</i>			2	0.01		
<i>common</i>			2	0.01		
Sub-totals			4	0.02		
Nouns:						
<i>in general</i>			6	0.05	2	0.03
<i>on the whole</i>					2	0.03
Sub-totals			6	0.05	4	0.06

In Table 4, it can be seen that the Models used the modal auxiliary *can* to convey attribute type hedges much more than the students. While the Models neither used nouns nor adjectives to express attribute hedges, nouns were used by both student groups, whereas only the Highs employed adjectives.

A discussion of the use of modal auxiliaries, adverbials, adjectives, and nouns as attribute hedges follows.

4.5.1.1 Modal auxiliaries

The only modal auxiliary that was used in the corpus was *can*; however three combinations were used, namely *can*, *can be*, and *can be attributed to*. Although these expressions occurred in all the writing groups, in respect of the overall use, the Models employed *can* more frequently than the students.

In the Model text [37], *can be attributed* functions as an attribute hedge by helping the writer to specify more precisely the reasons for unemployment in South Africa.

[37] In South Africa, ... unemployment *can be attributed* to factors such as job alienation, inferior education, forced removals, poor housing, disproportional land distribution, inadequate health provision (Model Q, p33)

In several instances in the students' writing, *can* was used inappropriately. The following examples from the student texts ([38] to [43]) demonstrate this. Suggested replacements are given in parentheses.

[38] Creek (1997) states that occupational therapy group work *can* (may; could) be a quick and effective means of assessing patients functioning. (C/98, p18, H)

[39] The above information *can be* (could be) used as a criteria to determine if any new potential members have the competencies required to do the job for fence making. (E/98, p44, H)

[40] This *can* (could) show a lack of interaction within the family unit or it *can be* (could be) interpreted as information that is being withheld. (A/97, p21, H)

[41] Other contributing factors *can be* (may be; could be) attitudes of employers and society (Trombly, 1995). (B/97, p5, H)

[42] A better conclusion *can be* (might be) made if another study of a bigger sample *can be* (could be) done. (C/99, p21, H)

- [43] *Perhaps* a standardized measuring instrument *can be* (could be) designed to make the treatment more effective. (F/98, p24, L)

4.5.1.2 Adverbials

Overall, the Highs used adverbials at attribute type hedges to a much greater extent than the Models and the Lows. As can be seen in Table 4, there were hardly any differences regarding the extent to which style disjuncts and adverbial adjuncts were used by the three groups. However, the Highs employed content disjuncts much more frequently than the Models and the Lows. Only two content disjuncts were employed, that is, *essentially* and *necessarily*. Extracts [44] and [45] are examples of using content disjuncts to specify more precisely the attributes of the phenomena being described.

- [44] Stage 6, being the highest stage is *essentially* characterized by normal, isolated movement¹⁰. (Model L, p40)

- [45] Correlational research looks at surface relationships, but does not *necessarily* probe for causal reasons underlying them. (B/99, p17, H)

Although the students did not have difficulty in using adverbial adjuncts as attribute type hedges, the following extract [46] demonstrates that the student has not evaluated her proposition carefully. Clearly, *many* should replace *all*.

- [46] This spasticity results in an abnormal or typical posture that is often seen in *all* hemiplegic patients with spasticity. (C/99, p6, H)

4.5.1.3 Adjectives

Only the Highs used adjectives as attribute hedges, namely, *general* and *common*. For each of these, there were only two cases. What was striking was the absence of these forms in the professional writing (Models), since these are as common as their

adverbial counterparts. The Lows, on the other hand, may have found the adjectival forms more difficult than the adverbial forms in terms of overall sentence construction.

In the following excerpts [47] and [48], *general* and *common* are functioning as attribute hedges by specifying more precisely how the terms, “observation” and “diagnoses” should be understood. The writers are not restricting the validity of the claims, but are hedging their descriptions of the phenomena under discussion.

[47] It is a *general* observation that mothers with disabled children are not catered for, meaning no one considers their needs. (H/97, p4, H)

[48] The *common* diagnoses found in [the] Ga-Rankuwa Psychiatric Unit are: schizophrenia, mood disorders, psychosis, psychoactive substance disorder and anxiety based disorders. (G/98, p1, H)

4.5.1.4 Nouns

Only the students used nouns as attribute type hedges. The two noun phrases that were employed were *in general* and *on the whole*. These nouns are functioning in the same way as the two above-mentioned adjectives are (cf. § 4.5.1.3). Both the Highs and Lows used *in general*. *On the whole* was used by the Lows.

4.5.2 Summary of results: attribute type hedges

The findings for the use of attribute type hedges differ somewhat from the findings pertaining to the general hypotheses (cf. § 4.1), where there were only significant differences between the Models and the student writing as a whole, and the Models and the Highs. However, there was no difference between the Models and the Lows. An explanation for this unexpected finding is given in § 4.5. There were no differences between the student groups.

As is the case with the other hedging categories, there were more occurrences of modal auxiliaries in the Models compared with the student writing (cf. Table 4). A

possible explanation for this is given in § 4.2.8. With respect to using *can* as an attribute type hedge, the students tended to use *can* in place of more suitable modal auxiliaries (cf. § 4.5.1.1). This appears to be a Black South African English usage, and it may be important to use examples from students' writing to demonstrate this usage (perhaps over-use) to L2 students, and point out more suitable modal auxiliary forms.

4.6 CONCLUSION

In this section, the major findings pertaining to the extent to which specific hedging functions, and concomitant hedging expressions were used, will be highlighted. The findings are discussed in relation to the major and specific functions of hedges, that is: reader-oriented, writer-oriented, reliability type and attribute type hedges.

4.6.1 Reader-oriented hedging functions

In the reader-oriented hedging category, the Models consistently used not only more hedges, but also a wider range of linguistic expressions than the students (cf. Table 1). The major differences in terms of the extent of use occurred with respect to modal auxiliaries in making recommendations or suggestions, asking questions, referring to shared assumptions, and using hypothetical conditionals to suggest alternative interpretations or possibilities.

In making recommendations or suggestions, the preferred forms by the Models were modal auxiliaries rather than verbs or adverbials. The Models also used direct question forms rather than indirect forms, which the Lows employed. Although there were no differences with regard to addressing readers directly, the students tended to use awkward expressions, in the sense that the expressions are not typical of English L1 formal report writing (cf. excerpt [5] in § 4.2.5). Sometimes writers wish to address readers directly, in order to accomplish a specific rhetorical goal. Therefore, students should receive guidance on the range of expressions that can be used for this function, and should be informed when this strategy is appropriate, or inappropriate.

While there were essentially no differences in the use of personal reference to experimental limitations, occasionally, the students used awkward expressions, in the

sense that the expressions were round-about and monotonous (cf. excerpt [7] in § 4.2.6). It is, therefore, important to assist students in expressing experimental limitations, and in this regard, it may be helpful to get them to work with their own research and actual limitations that obtain from their own investigations.

Only the Models suggested alternative interpretations or possibilities. Hypothetical conditionals were used, which were expressed by means of *if*-clauses in combination with *could*, and *if*-clauses in combination with *would*. Although an explanation is suggested for the absence of suggesting alternative interpretations or possibilities among the student writing (cf. § 4.2.7), it would appear that the students, in general, have difficulty in using *if*-clauses in combination with modal auxiliaries in the past form. It may, therefore, be necessary to show students how to express alternative interpretations or possibilities using *if*-clauses. In addition, because hypothetical conditionals are often stated in scientific texts (natural and social sciences), in ways that may not be obvious to L2 speakers of English, it may be important to draw students' attention to the language that is used in formulating hypothetical conditionals.

4.6.2 Writer-oriented hedging functions

In the writer-oriented hedging category, the major differences among the three groups with respect to the extent of the use of hedges, and hedging expressions, occurred in relation to attribution to literature, verbs, adverbials, adjectives, and modal auxiliaries used on their own. With reference to these sub-categories, in general, the Models used more hedges, and employed a wider range of linguistic expressions than the students.

Attributions to literature occurred more frequently in the Models than the students. When the students made attributions to literature, they tended to give source references in parentheses, rather than integrating sources into the text itself. Furthermore, the Lows often employed the phrase, *according to*, to introduce others' ideas. For example, in some student texts, *according to* was used five times on a page to refer to sources. Such "over-use" is not appropriate in formal report writing, where a more subtle differentiation in source attribution is needed. The reason for these uses may be that they are less demanding constructions than having to integrate various

“voices” (that is, the writer’s voice alongside that of another) within the proposition itself. In this category, the students were also using substantially fewer reporting verbs than the Models. However, it would appear that, in general, writers do not employ a variety of reporting verbs (cf. Hyland, 1998b, in § 4.3.1.2). The students also tended to use colloquial register verbs, which are not entirely appropriate in scientific or report writing. It is, therefore, recommended that they be exposed to the range of reporting verbs in English, in order to provide accurate commentary on the work of others. Nouns were also used to make references to literature, but only the Models and Highs used nouns for this purpose. The absence of nouns in the Lows could be because this group had difficulty in using nouns for expressing this function.

Verbs, adverbials, and adjectives were also employed as writer-oriented hedges. Verbs were used to a much greater extent by the Models, in contrast with the two groups of students, who used verbs to a similar extent. Similarly, the Models used adverbials much more than the students. In general, the students avoided the adverbial forms, namely, *seemingly* and *apparently*, and the associated adjectival form, *apparent* (cf. § 4.3.1.4 and § 4.3.1.5). They, however, did not have difficulty in using the concomitant verb forms, namely, *seem* and *appear*.

Modal auxiliaries (not used in conjunction with references to literature) were also employed to a much greater extent by the Models than the student writers as writer-oriented hedges. In contrast with the Models and the Highs, the Lows hardly used modal auxiliaries as writer-oriented hedges. The modal auxiliaries that were used were: *may*, *could*, *would*, and *might*. *May*, *could* and *would* featured much more in the professional writing than in the student writing.

4.6.3 Reliability type hedging functions

With regard to reliability type hedges, the Models used modal auxiliaries, nouns, references to limited knowledge, content disjuncts and adverbial adjuncts, to a much greater extent than the students. Although *may* occurred the most often in all three writing groups, the Lows used *may* to a much lesser extent than the Models. A similar pattern was observed for *could*. In the student writing, it was also observed that the

students had some difficulty in using modal auxiliaries specifically for this function, (that is, as reliability type hedges), in the sense that forms such as *will* and *must* were being used instead of more appropriate forms (cf. § 4.4.1.1, excerpts [24] to [27]).

Only the Models and Highs used nouns to express reliability type hedges. A reason for the general absence of nouns as hedges in the Lows is suggested in the discussion of nouns as writer-oriented hedges in § 4.3.1.2.

In § 4.4.1.5, it is mentioned that the Models referred to limited knowledge almost twice as much as the students, and that the Highs also made more reference to limited knowledge than the Lows. Possible reasons for this finding are also suggested.

Adverbials were also used to a far greater extent by the Models in comparison with the students, particularly the Lows. The adverbials in question are content disjuncts and adverbial conjuncts (cf. § 4.4.1.6). In this regard, the students did not use forms like *presumably* and *somehow*. These occurred in the Model texts only; however, the use was very limited.

4.6.4 Attribute type hedging functions

In the corpus, attribute type hedges were conveyed by modal auxiliaries, adverbials, adjectives and nouns. The modal auxiliary that was used was *can*, which was used to a much greater extent by the Models compared with the students. For the purposes of this rhetorical function, it was also observed that, sometimes, the students used *can* inappropriately (cf. § 4.5.1.1, excerpts [38] to [43]). Adjectives as attribute type hedges were used by the Highs only, and although the lack of use by the Models was unusual, the absence of adjectives in the Lows may suggest that some students avoid this use because the syntactic constructions involving adjectives are complex. This obviously has implications for teaching.

From the discussion of the findings, it can be concluded that, in contrast with the student writers, the professional writers not only used hedges and hedging functions to a much greater extent, but also employed a wider range of expressions to do so. This overall finding has important implications. The analysis of the Model texts has not

only shed light on the use of hedges in professional writing, but has also shown that the student writers were using fewer hedges, and has revealed where the deficiencies lay.

Table 5 below summarises the findings of the study with regard to the main functions of hedging.

Table 5: Summary of findings of the statistical tests: ranked in order of significance

Findings	Highly significant difference
Models > Students (H2)	**
Reader-oriented: Models > Students (H2:RO)	**
Reader-oriented: Models > Highs (H3:RO)	**
General : Models > Highs (H3)	**
General : Models > Lows (H4)	**
Writer-oriented: Models > Students (H2:WO)	**
Writer-oriented: Models > Lows (H4:WO)	**
Reader-oriented: Models > Lows (H4:RO)	**
Findings	Significant difference
Writer-oriented: Models > Highs (H3:WO)	*
Reliability type: Models > Students (H2:Rt)	*
Attribute type: Models > Highs (H3:At)	*
Attribute type: Models > Students (H2:At)	*
Findings	Non-significant difference
Reliability type: Models and Lows (H4:Rt).	
Reliability type: Models and Highs (H3:Rt)	
Attribute type: Models and Lows (H4:At)	
Writer-oriented: Highs and Lows (H1:WO)	
Reader-oriented: Highs and Lows (H1:RO)	
Reliability type: Highs and Lows (H1:Rt)	
Attribute type: Highs and Lows (H1:At)	
General: Highs and Lows (H1)	

** Significant at the 0.01 level (2-tailed)

* Significant at the 0.05 level (2-tailed)

In the following section, there is a shift of focus since the hedging forms that the writers used in this study are discussed.

4.6.5 An overall perspective on the use of hedging forms

With regard to the overall use of hedges, modal auxiliaries, followed by adverbials, were the most commonly employed expressions in the present study. Similarly, modal auxiliaries were the most frequent means of hedging in Hyland's (1998b) and Vartalla's (1999) corpora. In the current study, the most frequent modal auxiliaries were *may*; *could*; *can*; *might*; and *would*, in that order. In Hyland's (1998b) study, the most frequent modal auxiliaries were *would*; *may*; *could*; and *might* in that order. The findings were the same for Butler's (1990) corpus, except that the order was different, namely: *may*; *would*; *could*; and then *might*. In Adams Smith (1984), *may* was the most frequent modal in research papers, which was followed by *should*, and in Grabe and Kaplan's (1997) corpus, it was found that whereas physics writing revealed much more use of the modals, *can*; *could*; *would*; and *should*, biology revealed greater use of *may* and *might*. In the present study, *may* was the most frequent modal auxiliary (11.5% of the total). Butler (1990) and Adams Smith (1984) had the same finding with respect to the use of *may*, which constituted approximately 35% of the total use in Butler, and 42% in Adams Smith (cf. § 2.3; 2.5).

Modal auxiliaries in the past form can also be used to express hypothetical conditionals, in combination with *if*-clauses. In the current study, only the Models used hypothetical conditionals to suggest alternative interpretations. *If*-clauses, in combination with either *could* or *would* were used. In the literature (for example, Butler, 1990; Coates, 1983; Hyland, 1998b) *would* is recognised as the main hypothetical modal with epistemic meaning. Butler (1990) and Hyland (1998b) found that a common use of epistemic *would* in scientific writing is as the hypothetical variant of *will* (as a marker of prediction), and that often, in making predictions about unreal worlds, *would* is used with an explicit condition. Earlier, it was mentioned that the lower incidence of modal auxiliaries in the student writing could be attributed to their not fully comprehending how the modals and concomitant tense forms can express different hedging functions, and signal different shades of epistemic meaning.

As was mentioned in § 4.3.1.4, adverbials were the second most frequent means of hedging after modal auxiliaries in my corpora. Twenty-nine forms were identified, the most frequent being: *usually*; *perhaps*; *generally*; *probably*; *some*; *less/likely*; *approximately*; *possibly*; and *necessarily*, in that order. Similarly, in Hyland's (1998b) study, adverbials were the second most frequent means of hedging, after verbs. The most frequent adverbials were: *probably*; *apparently*; *relatively*; *essentially*; and *generally*, in that order. He identified over 36 forms. Hyland (1998b:141) attributes the popularity of adverbials to "their sentential mobility and semantic diversity", by explaining that "their use as 'downtoners' to reduce the force of the predicate, and as adjuncts and disjuncts to either comment on the style or truth-value of statements, demonstrates their versatility and usefulness in qualifying scientific claims".

In the present study, in general, verbs and adjectives were used to a much lesser extent than modal auxiliaries and adverbials by the Models and the two student groups. In this corpus, the writers employed a limited range of verbs. The most frequent verbs were *seem* and *appear*, whereas *appear* and *suggest* were the most commonly employed items in Hyland's (1998b) corpus. In general, though, studies on scientific and medical writing have shown that writers employ a limited range of verbs (Hyland, 1998b).

Adjectives were also used to a very limited extent by the three groups of writers in the current study, in comparison with Hyland's (1998b) corpus, where 20% of the hedges in the research articles comprised adjectives.

While the Lows used the noun, *recommendation*, to make recommendations (cf. § 4.2.1.1 (c)), they tended to avoid using nouns as writer-oriented and reliability type hedges. Since nouns are important in the formation and expression of abstract concepts in English, and assist in creating an objective stance by presenting the writer's belief as an abstraction (Hyland, 1998b:141), it may be important to teach students how to use nouns as hedges.

Finally, in my corpora, personal reference to experimental limitations constituted only 1.05% of all hedges, whereas in Hyland's (1998b:141) corpus, personal reference to

experimental limitations constituted the most frequent of the three discourse-based strategies. The other two are reference to a model, theory or methodology, and admission to lack of knowledge. All in all, these three strategies made up 5.06% of all hedges in my corpus, compared with 15% in Hyland's (1998b) corpus (cf. § 4.2.6).

In Chapter 5, the focus will be on the implications of these findings, and on suggestions for further research.

CHAPTER 5

CONCLUSION

5.0 INTRODUCTION

The objectives of this chapter are to review the contribution of this study in terms of the aims set out in Chapter 1, to comment briefly on the implications of the study, and to point out some limitations of the study, as well as areas for further research.

As was indicated at the beginning of the dissertation, the present research was concerned with the study of scientific writing, and more specifically, research writing (cf. § 1.1.1). The underlying aim of the study was to establish the nature of the relation between the quality of article and report writing in the field of occupational therapy and the density of hedges in such writing. The texts comprised undergraduate occupational therapy research reports, which were divided into two achievement groups, namely high achievers and low achievers, and journal articles by health professionals, mainly occupational therapists. Journal articles were included because it was assumed that they would exemplify good writing, and accordingly, would be appropriately hedged, and would, therefore, provide a reliable basis for comparing the two student groups (cf. § 1.1 and § 1.2).

Chapter 2 provided an overview of some of the research into scientific writing, and more specifically on hedging as an important feature of scientific writing. Research and ideas in areas that are relevant to the current study were discussed, such as: a systemic-functional theory of language; the notions of academic writing and scientific writing; types of writer comment; tentativeness in scientific writing, and hedging in written medical discourse. Finally, Hyland's (1998b) study of hedging in research articles was discussed in some detail, since this formed the basis of the hedging analysis in the present study.

Chapter 3 described and illustrated the analytical framework, with reference to the texts analysed in the present study. The procedures regarding the selection of data were explained, and some statistical background was given.

In Chapter 4, the results of the various tests were discussed in relation to the main and specific hedging functions, that is: reader-oriented, writer-oriented, reliability type, and attribute type hedges. Throughout, the emphasis was on the major density differences among the three groups of writers, namely, the Models, the Highs, and the Lows. The results will not be reviewed here, as this was done in Chapter 4 (cf. § 4.6), but in what follows the contribution of the study and its implications will be considered for teaching and further research.

5.1 CONTRIBUTION OF THE STUDY

The contribution of the current study has been methodological and descriptive, rather than theoretical, since the analysis was based on an existing framework (Hyland, 1998b). The methodological contribution has been the comparative approach of the study, in that the student writing has been compared with professional writing. Although it is conceded that article writing and report writing are slightly different genres, it is, nevertheless, argued here that genre as a variable plays a minimal role in the model and student corpora, more particularly because similar sections were analysed namely: Introduction, Literature Review, Method, Results, and Discussion. It is clear from the literature survey (Chapter 2) with respect to hedging in research writing that no attempts have been made to focus on student writing, nor to compare student writing with professional writing. Generally, studies have focused on journal articles, or other types of journal writing, such as clinical case notes and editorials, in specialised fields, such as medicine (Adams Smith, 1984). Or journal articles have been compared with popular scientific articles (Vartalla, 1999), or science texts have been compared with non-science texts (Grabe & Kaplan, 1997). Furthermore, many studies have tended to concentrate on specific expressions and concomitant functions, for example, the active and passive voice (Riley, 1991), the use of questions (Webber, 1994), and of modal auxiliaries (Butler, 1990). Although there have been studies that have compared English L1 with L2 academic writing, these too, have examined only professional writing (Luukka & Markkanen, 1997; Vassileva, 1997). Hyland's (1998b) study was also confined to professional writing. English L2 textbooks have also been examined to see whether the coverage of hedging expressions has been representative of the kind of language used in professional writing (Butler, 1990; Holmes, 1988; Hyland, 1994; Myers, 1992). A further important aspect of the

methodological contribution of the present study relates to the inferential statistics, which have revealed significant differences in the use of hedges between the professional writers and student writers.

The descriptive aspect of the contribution of the current study is the fact that the student writing was primarily English L2 writing, which is important in the South African context, in the sense that English is a L2 for the majority of tertiary students, for whom the medium of instruction is English. The need for continuing research into student writing in South Africa for the purposes of helping student writers “develop authentic, critical voices as they feel their way into academic discourses” is underlined by Mohamed (in Leibowitz & Mohamed, 2000:2).

The descriptive aspect is also given validity because of the statistical tests. A further aspect of the descriptive contribution lies in providing a detailed account of the professional and student writing, and in indicating where the deficiencies lay with regard to the student writing. The quantitative results of the statistical tests and the qualitative description could be used to inform further hedging analyses, and in the teaching of hedging in scientific writing, more specifically report writing, to students. In the next section, the implications of the results and the qualitative interpretation of the results, will be discussed.

5.2 IMPLICATIONS FOR TEACHING AND FURTHER RESEARCH

Because the analysis of hedging undertaken here was a study of the written product, it is important to note that the teaching of writing was not the main concern of this study. Some suggestions will, however, be made regarding some implications of the present study for the teaching of scientific writing skills to tertiary students, for whom research report writing is a qualification requirement. Within the South African context, Leibowitz (2000:15) emphasises the importance of successful writing and the teaching of writing at tertiary level:

... writing is an important aspect of one's development as a student, teacher, or teacher of writing in the academy. Successful writing is vital to success in any of these roles, and lack of success with writing operates as a significant barrier to success. Providing support

for the development of writers at all levels in the institution is essential in the South African multilingual context,

My suggestions for the teaching of scientific writing are made in relation to the findings pertaining to the four rhetorical hedging functions, namely: reader-oriented, writer-oriented, reliability type and attribute type hedges. Overall, it should be remembered that, in comparison with the student writers, the professional writers not only used hedges and concomitant hedging functions to a much greater extent, but also employed a wider range of expressions in doing so.

In the reader-oriented hedging category, it was found that the Models used not only more hedges and hedging functions, but also a wider range of linguistic expressions than the students. The main differences regarding the extent of use occurred with respect to modal auxiliaries in making recommendations or suggestions, asking questions, referring to shared assumptions, and using hypothetical conditionals to suggest alternative interpretations or possibilities. The Models mainly resorted to modal auxiliaries when making recommendations or suggestions. Direct question forms also occurred more often than indirect forms in the Model texts. References to shared assumptions were generally scarce; there were only two cases in the Model texts, and none in the student writing. Similarly, only the Models suggested alternative interpretations or possibilities. The lower incidence, or absence of asking questions, references to shared assumptions, and suggesting alternative interpretations or possibilities, may be because students do not have the necessary background to do so, or may feel insecure (cf. § 4.2.2; § 4.2.3; § 4.2.5; § 4.2.7).

In spite of the above, though, it is important that undergraduate students, especially those for whom research report writing is a qualification requirement, be informed about reader-oriented hedges, and be shown what kinds of linguistic expressions could be used in order to accomplish particular reader-oriented hedging functions. Various strategies could be used, for example, the students could analyse journal articles (model texts) in their field of study to see how professional writers express reader-oriented functions. In addition to examining what kinds of reader-oriented hedges are being used, students could examine more closely the kind of language that professional writers use to make recommendations, to ask questions, to refer to shared

assumptions, and to suggest alternative interpretations or possibilities. Cloze tasks may also prove helpful, after students have been familiarised with the notion of reader-oriented hedges, and concomitant rhetorical functions. For example, a cloze task could be based on the Discussion section of a journal article in a particular discipline; here all the reader-oriented hedging expressions could be omitted, and students could be required to fill in the missing expressions. The feedback session could comprise a class discussion in which both function and form are described and explained. Cloze tasks could also focus on specific forms for expressing specific functions, for example, using indirect question forms to raise questions in areas about which little is known, or in relation to controversial areas in the field.

For the sake of teaching specific linguistic structures within a particular context, for example, how hypothetical conditionals are stated using *if*-clauses in combination with modal auxiliaries in the past form, it may be necessary to modify texts, instead of using purely authentic materials. Ultimately, however, the students should be given the opportunity to explore the use of and the expression of reader-oriented hedges in their own report writing. This, however, will take time, and will require consistent and sufficiently detailed feedback from the writing facilitator. This, of course, applies to the other three hedging categories as well. The value of what Starfield (2000:110) calls “good” feedback cannot be over-emphasised. Both Starfield and Parkerson (2000:126) state that written feedback is more effective than verbal feedback, and mention that some research indicates that feedback given during the writing process is more valuable to students than at the end.

In the writer-oriented hedging category, in general, the Models used more hedges and hedging functions, and employed a wider range of linguistic expressions. The major differences among the three groups of writers regarding the extent of the use of hedges, and hedging expressions, occurred with respect to attribution to literature, verbs, adverbials, adjectives, and modal auxiliaries used on their own. In attributions to literature, the students tended to give source references in parentheses, rather than integrating sources within the text itself. They also used fewer, and a more limited range of reporting verbs than the Models. In addition, the Lows tended to over-use the phrase, *according to*, to introduce others’ ideas. The students also tended to use colloquial register verbs in reporting on the ideas of others, such as *feel* and *say*.

These findings were not unexpected, given that MEDUNSA lecturers, generally, complain that the students are not skilled in source referencing, and integrating sources, and that they tend to use inappropriate reporting verbs. It was also found that the Lows did not use nouns in references to literature, for which it was suggested that this group may find nominal constructions difficult.

Based on the findings pertaining to the attribution to literature function, it is suggested that students be made aware of how attributions to literature function as writer-oriented hedges, and why this is an important convention in report writing. In this regard, Angelil-Carter (2000:175) points out that it is imperative that students understand the underlying rationale for referencing, which in turn, "can lead to an understanding of how academic research is constructed upon the texts of others, of how authors are placed within the field, of how debate ... takes place".

With respect to the attribution to literature function, students should be shown how sources can be referred to, particularly within the proposition itself. This will entail teaching a range of reporting verbs, modal auxiliaries in conjunction with reporting verbs, and using noun phrases. A useful strategy may be to get the students to do peer editing of one another's writing. Seeing and discussing model texts (here, good student writing) and how sources are used within them, as well as poor texts (that is, poor student writing) which demonstrate inappropriate referencing strategies or plagiarism, may also be helpful. According to Angelil-Carter (2000:175): "A focus on referencing may be an effective route towards fostering an understanding of the nature of academic discourses and the construction of knowledge". It is, therefore, suggested that students be given reading texts that use many sources, so that students have several opportunities to detect the different voices, and what the writer's stance toward these voices is. Clearly, students need to be assisted in recognising multiple voices in their reading. Later, hopefully, this will be reflected in their writing.

The Models also used verbs and adverbials as writer-oriented hedges to a far greater extent than the students. Again, it is suggested that the students be exposed to the range of verbs that could be used as writer-oriented hedges. A way to do this may be to require the students to revise verbs in their own writing, and to get them explain the changes in a class discussion, following a revision session. Regarding adverbials, it

was found that the students avoided the forms, *seemingly* and *apparently*, and the associated adjectival form, *apparent*. However, the students did not have difficulty in using the concomitant verb forms, namely, *seem* and *appear*. Perhaps the avoidance of the adverbial forms is that these forms may be less familiar than the verb counterparts, or the students may simply not feel competent in using them. A reason for not using the adjectival form may be that, in general, adjectival constructions are more integrated and more structurally complex than adverbials or verbs (Biber & Finegan, 1989:111). As was suggested for the teaching of reader-oriented hedges, the students could examine journal articles to see why and how professional writers are using adverbials and adjectives as writer-oriented hedges. Once again, it is suggested that cloze tasks might be helpful. Thereafter, students should receive guidance on using these forms as writer-oriented hedges in their own report writing. In my own teaching situation, this guidance comprises both general feedback to the class, and one-to-one consultations, which are catered for in the occupational therapy timetable. Here, feedback is both verbal and written. Occasionally, it may be worthwhile to have one-to-one consultations with individual students to talk through specific hedging difficulties that the students may have. The main advantage of one-to-one consultations is reiterated by Parkerson (2000:120), the co-ordinator of the Writing Centre Project at the University of the Western Cape, who says that this may be “the only way some students will receive the individual attention they need to make academic progress”.

As was the case with reader-oriented hedges, modal auxiliaries (not in conjunction with attribution to literature) were used much more as writer-oriented hedges by the Models compared with the students. The Lows hardly used modal auxiliaries on their own as writer-oriented hedges. Because the findings have shown that, in general, the students have difficulty in using modal auxiliaries as hedging devices, it is crucial that they be made aware of modal auxiliaries as an important hedging resource. Here again, the most effective method may be to provide commentary on the absence of modal auxiliaries, or the inappropriate use of modal auxiliaries as writer-oriented hedges in the students' own report writing. Again, this could be in the form of general feedback to the class, or in one-to-one consultations with individual students.

In the reliability type hedging category, the Models used modal auxiliaries, nouns, references to limited knowledge, content disjuncts and adverbial adjuncts, to a much greater extent than the students. The most frequently occurring modal auxiliary in the corpus was *may*, which the Lows used to a much lesser extent than the Models. A similar pattern was observed for *could*. The students also tended to use *will* and *must* instead of more tentative forms. The findings with respect to using modal auxiliaries as reliability type hedges, and as reader-oriented and writer-oriented hedges, suggest that the students, in general, have difficulty in using modal auxiliaries as hedges, and require assistance in this regard. It would appear that they are not sufficiently aware of how the different modal auxiliaries signal varying degrees of certainty, and that tense-form may alter the meaning. A strategy that could be employed for teaching reliability type functions using modal auxiliaries is to have students paraphrase or summarise parts of model texts, in which modals are used for this function, for the purposes of seeing whether, and how, the students incorporate the modals to express this function. Omissions or inappropriate uses could then be discussed in relation to the students' paraphrases or summaries.

Nouns as reliability type hedges were also employed by the Models and Highs only. In § 4.3.1.2, it was suggested that the general absence of nouns as hedges by the Lows may be because this group finds nominal constructions difficult. It may be necessary, therefore, to show students how to construct noun phrases in relation to specific hedging functions.

In the reliability type category, it was also found that the Models made almost twice as many references to limited knowledge as the students, and that the Highs made more references to limited knowledge than the Lows. The finding regarding the Models was not unexpected, given that the professionals would be in a better position to gauge knowledge gaps in the discipline than the students. Nevertheless, it is important that the students be made aware of the variety of expressions that could be used to convey this function, since references to limited knowledge will not only come up in their own reading on research in their field, but students may also wish to point out limited knowledge with respect to their own research. To demonstrate such expressions, prescribed textbooks could be used in addition to the Introduction and

Literature Review sections in journal articles, where references to limited knowledge are most likely to appear.

Content disjuncts and adverbial adjuncts were also used as reliability type hedges to a greater extent by the Models in comparison with the students, particularly the Lows. The forms that were not used by the students were *presumably* and *somehow*. However, these were used to a very limited extent by the Models. Because of their sentential mobility and semantic diversity, students may find adverbials easier to use than nouns and adjectives, and adverbials may, therefore, be an effective way of introducing the notion of hedging and hedging expressions.

Attribute type hedges were conveyed by modal auxiliaries, adverbials, adjectives and nouns. The modal auxiliary was *can*, which was employed to a much greater extent by the Models compared with the students. In this category, it was observed that the students, sometimes, used *can* inappropriately (cf. § 4.5.1.1, for examples from student texts). It is, therefore, necessary to show how *can* can be used, and what constitutes inappropriate use. Examining examples from student texts would probably be the most effective way of doing so. Only the Highs used adjectives, and while the absence of adjectives in the Models was unusual, what is of more concern was the fact that the Lows did not use adjectives. This suggests that the students may need help in using adjectives as attribute type hedges, and concomitant adjectival constructions.

The primary aim of this section was to highlight specifics with regard to the students' difficulties in using hedges in terms of the four hedging functions, for the purposes of addressing these difficulties in the teaching of scientific writing, more specifically report writing. While a couple of teaching strategies were suggested, there are obviously many more that can be used. However, the intention was not to suggest detailed teaching strategies. The one approach to the teaching of scientific writing that does, however, appear to have widespread support, is that of an integrated approach (for example, Braine, 1989; Brett, 1994; Hill, Soppelsa & West, 1982; Horowitz, 1986; Orr, 1995; Casanave & Hubbard, 1992). In this regard, Orr (1995:191) states:

Generally, research seems to favour the incorporation of writing skills throughout the university curriculum, rather than isolated presentation by a single department (usually the Department of English).

In the literature, several advantages of an integrated approach are pointed out. First of all, students see the direct relevance of the writing task as this relates to their field of study. Secondly, in addition to developing writing skills, they are also learning the subject, for example, by practising the vocabulary of the discipline (Hill, Soppelsa & West, 1982:345). Thirdly, if discipline-specific model texts are used, these act as supplementary sources of information on the field in the discipline. Therefore, besides the text analyses for the purposes of learning to encode data into scientific language, the reading experience is also meaningful (Charney & Carlson, 1995:116). The fourth advantage of an integrated approach is that students learn to develop persuasive and argumentative skills in their field of study. Within the South African context, an integrated approach also appears to have support for building and enhancing students' academic literacy. Dyers (2000:199) describes the need for ongoing attention to discipline-specific language within the academic context as follows:

Even if ... students do a full foundation/bridging year before they start their formal studies, academic disciplines will still need to address how language is used within those disciplines, and to familiarise students with these conventions.

Finally, with respect to the teaching of scientific writing, assistance and feedback on language and style from both writing facilitators and subject specialists (for example, the research supervisors), sufficient opportunities for practising writing, and modelling (that is, showing students examples of good and poor writing), are emphasised (cf. § 1.1 and Leibowitz, 2000:30).

Although certain issues related to the present study were not addressed, these may yield interesting results, which could shed further light on the present findings. Some of these will be mentioned briefly.

The limitation pertaining to analysing slightly different genres has already been mentioned. The second limitation is the relatively small sample size of student and Model texts, which may not be representative of the occupational therapy student and

professional population in South Africa. However, the findings could be suggestive of patterns that might occur among similar groups. Thirdly, the marks that were used to divide the students into the two achievement groups comprised both a written (the report) and oral mark (an oral presentation for which the main criterion was to demonstrate insight into the study), which had an equal weighting. Therefore the assessment may not have been an accurate reflection of writing quality alone, which could have influenced the composition of the achievement groups. Although this could have influenced the outcomes of the study with regard to the High-Low distinction, it would not have influenced the Models-Students distinction.

Fourthly, the findings may not reflect the use of hedging devices in the “hard” or natural sciences, such as chemistry; physics; anatomy; physiology; and pathology, since the analysis embraced social science texts only. Further research may, therefore, compare the use of hedging devices in hard and social sciences. In this regard, it may be interesting to compare undergraduate students’ writing with that of postgraduate students. It may also be worthwhile to compare student research report and professional article writing with South African textbook writing, to see if there are differences in how the writers present information to different audiences.

Because the student texts were mainly those of L2 English speakers, within the South African context, it may be fruitful to compare English first language (L1) student scientific writing with English L2 student scientific writing, particularly at undergraduate level, to establish whether the two groups use hedges differently. In this respect, it may also be interesting to compare the use of hedging in scientific writing in English L1 and/or L2 with that of indigenous African languages. This may show whether cultural norms influence not only the extent of hedges, but also the choice of linguistic items.

Since the main concern of the current study was to apply a framework to the analysis of hedging functions in writing as a product, attention was not given to writing as a process. However, a process-oriented, qualitative analysis of hedging in student writing may yield worthwhile insights. Such an approach might not only foster a better understanding of writing problems among students, but could also have “a positive effect on the [student] writer’s awareness of audience” (Hubbard, 1994:77),

in that the student writer's use of hedging functions and concomitant expressions could be explained as she processes the text. Arguably, developing a sense of audience is particularly important in developing hedging skills in scientific writing. Obviously, this should encompass discussing errors and omissions.

It may also be worthwhile to conduct a study into the errors, omissions, and student difficulties in respect of hedging devices in student scientific writing, which the current study had not set out to do. This may be particularly important given that the constraints on presenting information in scientific writing may be more rigorous than in other writing (cf. Hyland, 1998b, in § 2.1).

Although the current study had not set out to investigate the effects of hedges on readers, it may be insightful to conduct a study within the South African context, among tertiary students, to see what these effects are. According to Bruce (in Crismore & Vande Kopple, 1990:55), the effects of hedges "lead to active involvement of readers, which in turn results in increased understanding of both authors and content and in intensified or changed attitudes of readers".

In relation to investigating the effects of hedges on readers, it might be interesting to explore how students develop critical reading through writing, in the sense that critical reading skills imply that readers are aware of "the ways in which writers can manipulate readers into accepting their points of view" (Dyers, 2000:189). As the current study has indicated, one of the important strategies for gaining reader acceptance is that of using hedges appropriately. In occupational therapy, for example, one could examine the effects of hedges on undergraduate students with regard to a contentious topic, such as the philosophy of occupational therapy. Students could be required to read several texts on the same topic. This could be followed by a class discussion, and then a reading comprehension task that incorporates questions on the various writers' hedging strategies. Thereafter, the students could be required to evaluate (compare and contrast) the various perspectives in a writing task, which necessitates the use of appropriate hedging. The value of evaluating different texts on the same topic is reiterated by Dyers (2000:200): "By comparing and contrasting texts dealing with the same topic, ... lecturers can expose their students to ways in which different authors present their points of view and try to influence readers."

In light of the findings in this and other studies, it is important to emphasise that whatever research is undertaken with respect to hedges in scientific writing, the rhetorical and social contexts which govern linguistic choices, should not be ignored. Riley (1991:252) indicates that this has, sometimes, been the case in studies of scientific language.

5.3 CONCLUSION

In conclusion, it can be stated that although the current study still leaves some questions unanswered, it could be regarded as having made some contribution to the explication of the role of hedging in scientific writing in that it did establish the nature of the relation between the quality of article and report writing in the field of occupational therapy and the density of hedges in such writing, in the sense that the professional writers not only used hedges and concomitant hedging functions to a much greater extent, but also employed a wider range of expressions in doing so.

In light of the findings from this study, Salager-Meyer's (1994:153) call for the need to study and teach hedging, is particularly apt:

... since hedging is a common technique of communicating information in scientific discourse, it should be explicitly studied and taught to the students in order to assist them in their studies and professional careers.

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