Hedges in occupational therapy research texts

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ABSTRACT

The study examined an aspect of research writing, namely hedging. The aim was to establish the nature of the relation between the quality of the 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 exemplified good writing, and accordingly, would be appropriately hedged, and would provide a reliable basis for comparing the student groups. Hyland's (1998) 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 the 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.

Key words: research writing; scientific writing; academic writing; hedging; occupational therapy report writing

Introduction

The focus of the study described here is on hedging (which refers to a writer's expressing claims with appropriate levels of tentativeness, or degrees of certainty) in occupational therapy report writing. Research reports by OT undergraduate students at the University of Limpopo (Medunsa campus) and journal articles by professional occupational therapists were analysed.

There is widespread support for the need for ongoing research into scientific writing, more particularly into student scientific writing within an academic context. Besides being unfamiliar with the conventions of scientific discourse, students may not be accustomed to the nature of scientific argument and concomitant language use, especially in cases where the medium of instruction is English (the language of most scientific publications), which is often a second language (L2) for many tertiary students, as is the case in South Africa. One of the reasons for being unaware of the conventions of scientific argument and associated language use may be their previous school experiences of textbooks and teacher-talk, where information is usually presented as 'fact' or indisputable truth. Accepted knowledge is seldom ever experienced as the outcome of recursive scientific enquiry which is characterised by questions, a lack of certainty and often, unresolved issues requiring further investigation[1,2,3]. In this regard, many students are most likely not sufficiently aware that there are two types of scientific statements, namely those which present information as 'fact', or *factive statements*, and those that present information tentatively, or *non-factive* statements. The former are made when it is assumed that the information is regarded as being 'true' by experts in the field, who would not normally reject the statements. In contrast, non-factive statements present contestable information, which can either be

accepted or rejected. Therefore, it is important that the writer (scientist) expresses contestable claims with appropriate levels of tentativeness, or degrees of certainty, not only because 'truth' (accuracy) is valued in science, but also to have one's claims heard. In this regard, the major vehicle for disseminating new knowledge to other scientists is the research article (RA). The many studies into the language of the RA have clearly shown that the traditional view of science is that of being the discovery of truth about the natural world, which exists independently of the scientist, and which is established through formulation of theories tested by experimental method, is misdirected. Rather, the practice of science is largely rhetorical, in the sense that knowledge is negotiated: the scientist interprets data and adopts a particular stance towards the status of that knowledge, where language is the centre of interpretation and knowledge[4,5,6,7]. In line with the more current rhetorical view of science, scientific statements thus comprise both factive and non-factive statements (see earlier explanation of these terms). Factive statements are not hedged, whereas non-factive statements are hedged (refer to *Figure 1* below).
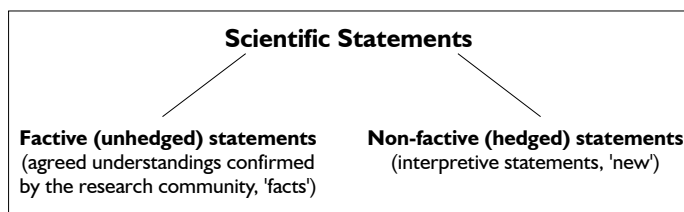

Figure 1: Factive and non-factive statements in science

It is important that undergraduate students, for whom research report writing is a degree requirement, be made aware of the language of scientific argument, with particular emphasis on expressions of tentativeness, or hedges, which enable

… 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[8:252].

In spite of the above insights, however, the literature survey on hedging in research writing showed that no attempts have been made to focus on student writing, or to compare student writing with professional writing. In general, hedging studies have focused on journal articles or other types of journal writing (a sub-genre of academic or scientific writing), such as clinical case notes and editorials in specialised fields, such as medicine[9], or journal articles have been compared with popular scientific articles[10], or science texts[6] have been compared with non-science texts. Furthermore, many studies have tended to concentrate on specific expressions and concomitant functions, for example, the active and passive voice[11], the use of questions[12], and of modal auxiliaries[4]. Although there have been studies that have compared English first language with L2 academic writing, these too have examined only professional rather than student writing[13,14]. Hyland's[15] seminal study on hedging 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[4,16,17,18].

Hedging is defined as the writer's withholding of full commitment to statements. The term refers to "any linguistic means used to indicate either a complete lack of commitment to an accompanying proposition, or a desire not to express that commitment categorically"[15:1]. Hedging does not include all devices used to express attitudes or to comment on the text (meta-discourse), 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[7], not all expressions of politeness act to qualify writer commitment. 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 other parts of the text. In

other words, context and co-text are necessary in the interpretation of hedges.

Aims of research

The aim of the current study was to examine the nature of the relation between the quality of article (professional writing) and report writing (student writing) in OT and the density of hedges in such writing. In this study, quality refers to good versus poor writing where the former is regarded as being appropriately hedged whereas the latter is not. In addition to examining the overall use of hedges in student writing, the study was interested in investigating how writers used hedging devices for specific rhetorical (communicative) purposes.

Methodology

Materials

The texts examined consisted of ten research articles written by professional OTs, which were taken from various editions of the *South African Journal of Occupational Therapy* (SAJOT). Journal articles were included because it is assumed that they exemplify good writing (defined under Aims above), and accordingly, would provide an appropriate basis for comparing the two student groups. The professional texts are referred to as model texts or Models K to T, where the letters represent the ten articles. My choice of articles from one journal and one discipline is based on the belief that being familiar with the subject matter (through my involvement as a language practitioner with OT course work from first through to fourth year) would aid my understanding of each writer's discourse strategy, and would allow for more reliable generalisations about the discourse in one field[11]. In addition, 28 research reports written by final fourth year OT students (mainly English Second Language users) (Medunsa campus, UL) over a period of three years, were analysed. The student texts are referred to as A/97 – I/97 (H/97 had to be excluded from the study, because this student failed to comply with the research component requirements), A/98 – J/98 and A/99 – J/99. The student texts were divided into achievement groups, namely high achievers (referred to as Highs or H) and low achievers (referred to as 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. The division was in order to establish whether the two achievement groups differed in the use of hedges, and whether the Highs reflected similar patterns to the use of professionals.

Data analysis

The study is a quantitative, empirical study in that it attempted to quantify certain textual features (linguistic expressions) and establish their role in scientific writing quality, by statistical comparison of the occurrence of such features in student texts. In this regard, first of all, densities had to be calculated for each hedging category per text. Densities were obtained by dividing the number of occurrences by the number of words in the relevant text and then multiplying by 1000. The densities were then used to calculate means for the overall use of hedges and hedging types. The means were used in the statistical procedures for establishing whether significant differences existed or not. The statistical procedures comprised *t*-tests because two sample means were being compared. In addition, in order to establish which textual features were more distinct than others, what Ellegard[19:104] refers to as a "distinctiveness ratio", was applied. This refers to the frequency of occurrence of one particular item in one set of texts. In this study, it was decided that the minimum frequency would be 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 applied, this is indicated in Tables II-VI, where the densities pertaining to the Model texts are highlighted in bold italics.

Analytical framework

Hyland's[15] analytical framework was adopted and modified for the purposes of this study and will now be described and illustrated with reference to the student and model texts. The hedging categories

reflect the rhetorical (communicative) functions that hedges perform in RAs. There are two main groups, namely *content-oriented (CO)* and *reader-oriented (RO)* hedging categories. The *CO category* comprises *accuracy-oriented (AO)* and *writer-oriented (WO)* hedges, where the *AO category* is further sub-divided into *attribute-type (At)* hedges and *reliability-type (Rt)* hedges. Each of these categories is briefly elaborated on in terms of the specific functions they perform, and their linguistic realisations. (For a more detailed treatment of hedges, refer to Coetzer[20]). The following diagram (*Figure 2*) helps to illustrate the sub-division more clearly.

the findings pertaining to their investigations. In this regard, claims are restricted to specific contexts. The following forms were used, namely modal auxiliaries; verbs; adjectives; nouns; the discourse-based strategy termed "limited or inadequate knowledge", and adverbials (refer to *Table IV*).

In scientific writing, **would** is used commonly to signify the hypothetical variant of **will**, and its use is therefore epistemic[15,21]. Extract [3] is an example of how the modal auxiliary, **would**, is used as an Rt hedge. The writer's intention is to convey a situation that might obtain, as reliably as possible, by basing the hypothesis
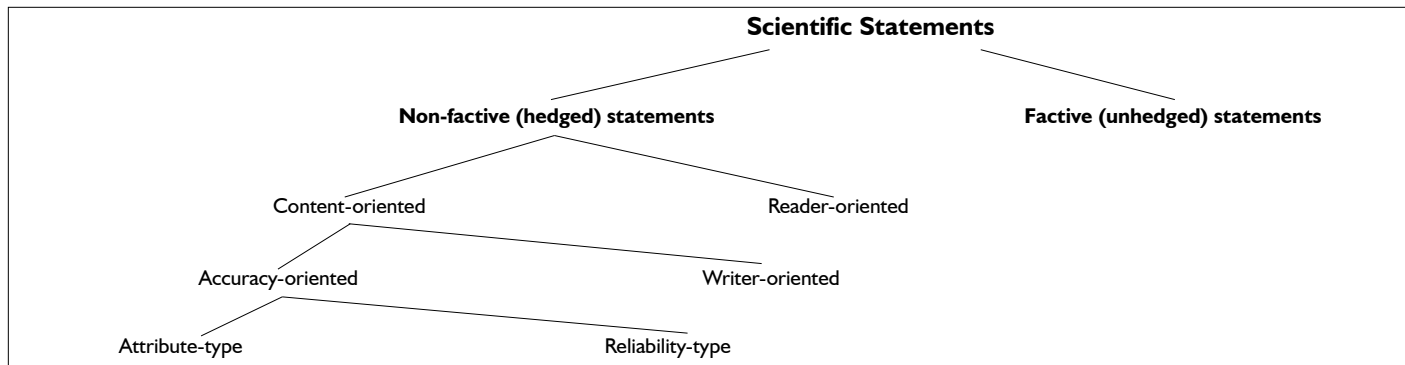

Figure2: Hedging categories according to Hyland's framework

Content-oriented hedges

The motivation for CO 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- (AO) and writer-oriented (WO) hedges.

Accuracy-oriented hedges

The principal function of AO is to achieve precision which may be by marking a departure from the ideal, or by indicating that a proposition is based on plausible reasoning or logical deduction in the absence of complete knowledge. Hedges of this kind specifically address the writer's concern with the relationship between propositions, or propositional elements, and reality. AO hedges help the writer to present information as fully, accurately, and objectively as possible. Two types of AO hedges are distinguished, namely attribute hedges (At) and reliability (Rt) hedges. Each has its own motivation.

The main motivation for using Attribute hedges is to indicate as precisely as possible how a phenomenon varies from an idealised conception of it. They can be realised by the following forms: modal auxiliaries, adverbials, adjectives and nouns (refer to *Table VI*). Below are two examples of At use.

In excerpt [1], **can be attributed to** (modalised verb form) functions as an At hedge by helping the writer to specify more precisely the reasons for unemployment in South Africa.

[1] 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)

An example of an adverbial that was used is **generally**, which in extract [2] indicates the degree of precision intended, in the sense in which the claim is held to be true.

[2] The research has revealed that the attitudes of Medunsa third year medical students are, generally, neutral towards people with mental illness. (A/99H)

Reliability type (Rt) 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. In the current study, writers frequently used Rt hedges in relation to

on prior theoretical or experimental premises, and by stating the conditions required to fulfil the hypothesis.

[3] In situations where both tests are used it might be better to use one text 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)

In research writing, writers often refer to limited or inadequate knowledge [excerpt 4]. Hyland[15] refers to this as a discourse-based strategy since this frequently involves more than one linguistic form. In the sample texts, limited knowledge was indicated by: **no research evidence; few studies; limited evidence; a lack of literature; limited literature, and insufficient information**. Writers employ this strategy for the purposes of either locating or justifying their own research, or to indicate problems or concerns associated with limited, or lack of information within a particular discipline. In addition, this strategy helps writers to express reliability or unreliability of claims against a background of the current state of knowledge within a specific field.

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

Writer-oriented hedges

While both accuracy-oriented hedges and writer-oriented hedges are content-oriented in the sense that they involve expressing views concerning propositional content, AO hedges are proposition-focused, whereas WO hedges are writer-focused. The latter serve to protect the writer from the possible consequences of negation by limiting personal commitment. They therefore diminish the author's presence in the text. Because WO hedges are usually associated with higher level, or more significant claims than AO ones, in the sense that the writer seeks to place significant results in a wider context and demonstrate a contribution of scientific knowledge rather than simply interpret findings, this puts the writer at risk of being wrong, and therefore self-protection may be necessary. WO hedges were realised by impersonal expressions; attribution to literature; verbs; adverbials; adjectives, and modal auxiliaries (refer to *Table III*).

A distinctive characteristic of WO hedges is the absence of writer agentivity. The use of impersonal expressions serves to create an objective stance in that the writer is removed, as it were, from the proposition. Although it is conceded that the absence of writer agentivity may simply be characteristic of the collaborative

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way knowledge works or is produced, and may be a stylistic preference rather than a hedge, those instances that were counted as hedges in this study were determined by the context, which as has already been stated, determines whether a linguistic expression functions as a hedge or not. In the corpus, impersonal expressions comprised impersonal subjects [extract 5] and passive constructions [excerpt 6].

[5] **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)*

[6] *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)*

In the attribution to literature category, ideas or claims are attributed to others (usually literature sources) directly. Quotations may also occur. The expression, **according to**, is often employed. Attributions are made in combination with verbs, modal auxiliaries, nouns, passive constructions and impersonal expressions. In extract [7], the writer distances herself from the proposition. The idea, though, was very relevant to her study, which was situated in an underdeveloped 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 anecdotal rather than reliable evidence.

[7] *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/99H)*

In the sample texts, adverbials were also used as WO hedges. The following excerpt [8] was taken from a report on a study of parents' expectations of their 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.

[8] *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/97H)*

Reader-oriented hedges

Reader-oriented hedges serve both interpersonal and normative functions. Besides wanting one's message to be understood (content-oriented), scientists also want their claims to be accepted (reader-oriented). This acceptance rests on the reader, and obviously, how the writer presents claims is instrumental in getting claims accepted; this is the interpersonal aspect. But as Hyland[15] points out, there is also the normative aspect, which involves the scientist's conforming to the implicit rules concerning deference due to colleagues in presenting information. This is necessary for knowledge accreditation. Several rhetorical goals are accomplished through RO hedges, and it is in terms of these goals that the hedging devices were identified. In my corpus, seven rhetorical goals were identified, namely:

➢ Making recommendations or suggestions
➢ Asking questions
➢ Appealing or referring to shared assumptions
➢ Personal attribution
➢ Addressing readers directly
➢ Personal reference to experimental limitations
➢ Suggesting alternative interpretations or possibilities

It is important to point out that the abovementioned rhetorical goals are not meant to be interpreted as absolute hedging categories. They are communicative strategies that scientific writers commonly resort to and are often associated with particular linguistic expressions. But once again, the context is necessary in determining which instances are functioning as hedges.

Due to space limitations, only three of the above RO strategies will be exemplified. In research writing, asking questions highlight unresolved issues or tentativeness of a solution, and aim at seeking a response by explicitly drawing the reader into the process of problem solving. Extract [9] illustrates this.

[9] **The question arises whether** *the testing procedure was valid and reliable. (F/99L)*

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. Excerpt [10] is an example of this use.

[10] *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)*

Suggesting alternative interpretations or possibilities is a subtle way of deferring to the reader. In the sample texts, writers used hypothetical conditionals, which were expressed as **if**-clauses in combination with either **would** or **could** (modal auxiliaries), to suggest alternative interpretations. This is illustrated in extract [11].

[11] *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)*

Results and discussion

The results will now be discussed in relation to each of the hedging categories, starting with the hedging category having the most significant differences. Although there was no significant difference in the overall density of RO hedges between the student groups, there were highly significant differences between the Models and student writing as a whole, and between the Models and each of the student groups, that is the Models and the Highs, and the Models and the Lows (see *Table I* on page 20 for the relevant hypotheses and results). *Table II* which follows provides the raw scores and densities for the linguistic expressions (forms) that each of the groups used to accomplish specific RO rhetorical functions.

An analysis of *Table II* on page 21 shows that in the RO hedging category, the Models consistently used not only more hedges than the students, but also employed a wider range of linguistic expressions than the students did. 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 RO hedges. Furthermore, 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. How scientists use questions in scientific texts, is examined by both Webber[12] and Hyland[15]. Webber states that questions are used when addressing a highly complex subject about which little as yet is known, and 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"[12:265]. There were also no instances of shared assumptions in the student writing. The reasons may be similar to those suggested 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 were not in a position to consider alternatives, based on this being their first "research" experience. Considering alternatives requires a

Table I: Hypotheses and results pertaining to the four hedging categories

Hypotheses: Reader-oriented hedges	Results
H1:RO **There will be a significant difference in the overall density Of RO hedges between** the Highs and the Lows.	$p = 0.2840$ non-significant
H2: RO … the Models and the student writing as a whole.	$p = 0.0001$ **
H3: RO … the Models and the Highs.	$p = 0.0001$ **
H4: RO … the Models and the Lows.	$p = 0.0083$ **
Hypotheses: Writer-oriented hedges	**Results**
H1: WO **There will be a significant difference in the overall density Of WO hedges between** the Highs and the Lows.	$p = 0.2510$ non-significant
H2: WO … the Models and the student writing as a whole.	$p = 0.0032$ **
H3: WO … the Models and the Highs.	$p = 0.0287$ *
H4: WO … the Models and the Lows.	$p = 0.0048$ **
Hypotheses: Reliability type hedges	**Results**
H1: Rt **There will be a significant difference in the overall density Of Rt hedges between** the Highs and the Lows.	$p = 0.5506$ non-significant
H2: Rt … the Models and the student writing as a whole.	$p = 0.0382$ *
H3: Rt … the Models and the Highs.	$p = 0.1230$ non-significant
H4: Rt … the Models and the Lows.	$p = 0.0503$ non-significant
Hypotheses: Attribute type hedges	**Results**
H1: At **There will be a significant difference in the overall density Of At hedges between** the Highs and the Lows.	$p = 0.6400$ non-significant
H2: At … the Models and student writing as a whole.	$p = 0.0422$ *
H3: At … the Models and the Highs.	$p = 0.0401$ *
H4: At … the Models and the Lows.	$p = 0.2054$ non-significant

** Significant at the 0.01 level (2 tailed)
* Significant at the 0.05 level (2 tailed)

broad base to work from, plus insight into the study and findings. In addition to this, the students had difficulty in using **if**-clauses, in combination with modal auxiliaries in the past tense form, to convey hypothetical conditionals. This obviously has teaching implications. 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.

As can be seen in *Table I*, as is the case with RO hedges, there was no significant difference in the overall density of WO hedges between the two student groups, but there was a highly significant difference in the overall density of WO hedges between the Models and student writing as a whole. While there was a significant difference between the Models and the Highs, there was a highly significant difference between the Models and the Lows. How the three groups compared with one another regarding the extent of WO hedges is now discussed. *Table III* on page 22 provides the raw scores and densities for the linguistic expressions that each of the groups used to accomplish particular rhetorical goals.

The major differences pertaining to the use of WO hedges between the Models and the student writing occurred with respect to attribution to literature, verbs, adverbials, and modal auxiliaries. 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. Although the studies on scientific and medical writing have shown that these writers, generally, employ a limited range of verbs[15], which was also noticeable in the current study, the students tended to use colloquial register verbs, which are not entirely appropriate in scientific or report writing. It is, therefore, recommended that students be exposed to the range of reporting verbs in English, in order to provide accurate commentary on the work of others. Nouns and the passive construction were also not used by the Lows as markers of attribution to literature; which may be because they find nominal and passive constructions difficult. What the Lows did resort to frequently with respect to attribution to literature, was the expression, **according to**. Such "over-use" is, however, not appropriate in formal report writing, where a more subtle differentiation in source attribution is needed. Furthermore, when the student writers made attributions to literature, they tended to give source references in parentheses, rather than integrating sources into the text itself. 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. With respect to the use of verbs as WO hedges, the Models employed verbs much more than the students. This finding is similar to that of using reporting verbs in attribution to literature, and may be worthwhile examining more closely. The Models used substantially more adverbials than the Lows as WO hedges, and in this regard, what was striking was the absence of forms such as **seemingly** and **apparently** in the Lows. An explanation for this may be that these words signal mental perception, or inferencing, and may therefore be problematic concepts. Furthermore, the adverbial forms as opposed to the verb forms (**seem, appear**), may be less familiar, or the students may simply not feel competent in using them. It is also most likely that the reasons suggested here are related to the fact that for the majority of these students, English is a L2, and what compounds this is that this was the students' first "real" experience of conducting research, and having to deal with the demands of writing a large scale report. (What should be pointed out is that each student was required to conduct his/her own study and to write his/her own research report; no group research was undertaken.) There was also a marked difference in the use of modal auxiliaries as WO hedges between the Models and the students. In *Table III on page 22*, it can be seen that the Models used modals almost twice as much as the Highs, where in comparison to them, the Lows hardly used modals. Again, this may be an indication that the weaker students are unfamiliar with the range of modal auxiliaries in the English language, and how they can be used as hedges, when used in combination with certain tenses. While the Highs did not use any adjectives as WO hedges, the Models used them twice as much as the Lows. Here, only the Models used **tentative** and **apparent**, where a reason

Table II: 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:						
would	1	0.03	1	0.01		
could	4	**0.14**	3	0.02	1	0.01
should	3	0.1	1	0.01	2	0.03
might	1	**0.03**				
Sub-totals	**9**	**0.32**	**5**	**0.05**	**3**	**0.06**
Verbs:						
suggest	2	0.07				
recommend					4	0.07
Sub-totals	**2**	**0.07**			**4**	**0.07**
Nouns:						
recommendation					1	0.01
Adverbial: content disjunct						
perhaps	1	0.03				
Sub-totals	**1**	**0.03**			**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**	**0.7**	**2**	**0.03**
Shared assumptions:						
it is understood that	1	**0.03**				
assume	1	**0.03**				
Sub-totals	**2**	**0.07**				
Personal attribution:						
personal pronouns	**2**	**0.07**			4	0.07
personal view			1	0.01		
Sub-totals	**2**	**2.07**	**1**	**0.01**	**4**	**0.07**
Involving reader:						
impersonal pronoun: *one*	**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:						
if-clauses + *could*	3	*0.1*				
if-clauses + *would*	1	**0.03**				
Sub-totals	**4**	**0.14**				

for the absence in the Lows may be that these forms are not be part of the students' active vocabulary.

There were no significant differences in the overall differences in the overall density of reliability type hedges between the two student groups, and between the Models and Highs, and Models and Lows. However, a significant difference at the 5% level was found when the Models were compared with the student group as a whole (refer to *Table I* on page 20).

A discussion of how Rt hedges, and to what extent they were used, follows. The writers from all three groups have tended to use similar forms in order to convey reliable information (refer to *Tables IV and V on pages 23 and 24*). One reason for the students' generally not having difficulty in using Rt 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 Rt 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 V*, a clearer picture of the distribution of overall densities relating to Rt 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 Rt hedges, the Models have the highest densities, followed by the Highs, and the Lows, in that order. What is noteworthy is that the student writers, in general, had difficulty in using the modal auxiliaries for this hedging function, in the sense that forms such as **will** and **must** were being used instead of more appropriate forms.

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,

Table III: Writer-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
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:						
"according to"	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:						
appear	8	0.28	11	0.01	1	0.01
seem	18	**0.64**	10	0.09	8	0.15
suggest			1	0.01	1	0.01
Sub-totals	**26**	**0.93**	**22**	**0.21**	**10**	**0.19**
Adverbials: content disjuncts:						
perhaps	5	**0.17**	10	0.09	1	0.01
possibly	2	**0.07**	1	0.01	2	0.03
seemingly	1	0.03	1	0.01		
apparently			2	0.01		
Sub-totals	**8**	**0.29**	**14**	**0.13**	**3**	**0.06**
Adjectives:						
possible	2	0.07			1	0.01
tentative	1	0.03				
apparent	1	0.03				
suggested					2	0.03
Sub-totals	**4**	**0.14**			**3**	**0.06**
Modal auxiliaries:						
may	13	**0.46**	21	0.19	1	0.01
might			4	0.03	4	0.07
could	8	0.28	14	0.13	5	0.09
would	6	0.21	12	0.11	6	0.11
Sub-totals:	**27**	**0.97**	**51**	**0.48**	**16**	**0.30**

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. The finding with respect to the Models is not unusual, since their training and experience place them in a better position to find and evaluate information than the students. In contrast, while the Highs at least demonstrated insight and were able to use concomitant forms, the Lows did not, and this may well be worth considering more closely in terms of developing reading and writing skills for research purposes. In this regard, Salager-Meyer and Salas state that expressions relating 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"[22:47-48]. Even though all three groups used adverbials as Rt hedges, the Models used them to a far greater extent than the students, particularly the Lows. However, in comparison with findings from several similar studies on hedging expressions in medical and scientific texts, which indicate that that adverbials are popular[15], the reasons for the virtual absence of adverbials in the current corpus are unknown.

Next, the results relating to the use of attribute type hedges will be discussed. There were no significant differences in the overall density of At hedges between the Highs and Lows, and the Models and the Lows. However, there was a significant difference between the Models and the students as a whole, and the Models and the Highs (see *Table I* on page 20). 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. In the corpus, modal auxiliaries, adverbials, adjectives and nouns were used to express At hedges. *Table VI* on page 24 provides the raw scores and densities for the linguistic expressions that each of the groups used.

In *Table VI*, it can be seen that the Models used the modal auxiliary **can** to convey At hedges much more than the students. In this regard, the students tended to use **can** in place of more suitable modal auxiliaries. 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. While the Models neither used nouns nor adjectives for this function, nouns were used by both student groups, whereas only the Highs employed adjectives. Although the lack of use of adjectives by the Models was unusual, the absence of adjectives in the Lows may suggest that some students avoid this because the syntactic constructions involving adjectives are complex; this obviously has implications for teaching.

To summarise the findings of the current study, modal auxiliaries, followed by adverbials, were the most commonly employed

Table IV: 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:						
may	20	**0.71**	69	0.64	19	0.35
might	4	**0.14**	9	0.08	16	0.3
could	12	**0.43**	40	0.37	12	0.22
would	1	**0.03**			1	0.01
Sub-totals	**37**	**1.33**	**118**	**1.10**	**48**	**0.90**
Verbs:						
seem	3	0.1	17	0.15	12	0.22
tend	6	0.21	8	0.07	4	0.07
suggest			2	0.01	2	0.03
appear			1	0.01	1	0.01
estimate					1	0.01
Sub-totals	**9**	**0.32**	**28**	**0.26**	**20**	**0.38**
Adjectives:						
possible	1	0.03	12	0.11	10	0.18
slight					1	0.01
probable			9	0.08		
apparent					1	0.01
Sub-totals	**1**	**0.03**	**22**	**0.21**	**11**	**0.21**
Nouns:						
tendency	1	**0.03**	2	0.01		
possibility	1	**0.03**	1	0.01		
evidence			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:						
perhaps			6	0.05	1	0.01
probably	6	**0.21**	11	0.1	2	0.03
possibly			2	0.01		
presumably	2	**0.07**				
less/likely	5	**0.17**	2	0.01	3	0.05
Sub-totals	**11**	**0.39**	**21**	**0.20**	**6**	**0.11**
Style disjuncts:						
approximately			9	0.08	1	0.01
more or less			2	0.01		
Sub-totals			**11**	**0.10**	**1**	**0.01**
Adverbial adjuncts:						
partly (downtoner)	2	**0.07**	2	0.01		
partially (downtoner)	2	**0.07**	1	0.01		
slightly(downtoner)	2	**0.07**				
almost (approximator)			2	0.01		
about (approximator)					1	0.01
some (downtoner)	1	**0.03**	10	0.09	3	0.05
to some extent (downtoner)	1	**0.03**	1	0.01	1	0.01
somewhat					1	0.01
sometimes (low frequency)	1	**0.03**	2	0.01	2	0.03
not always (low frequency)					1	0.01
seldom (low frequency)	1	**0.03**				
Sub-totals:	**10**	**0.36**	**17**	**0.16**	**9**	**0.17**
Adverbial conjunct:						
somehow	1	**0.03**				
Totals for Adverbials	**22**	**0.78**	**49**	**0.46**	**16**	**0.29**

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

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

Table VI: 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:						
can	3	0.1	1	0.01	1	
can be	14	0.5	36	0.33	23	0.43
can be attributed	1	0.03	1	0.01	1	0.01
Sub-totals	**18**	**0.65**	**38**	**0.35**	**25**	**0.47**
Adverbials:						
Style disjuncts:						
generally	3	0.1	9	0.08	11	0.2
commonly			2	0.01	1	0.01
Sub-totals	**3**	**0.1**	**11**	**0.09**	**12**	**0.21**
Adverbial adjuncts:						
usually	5	0.17	19	0.17	13	0.24
normally			4	0.03		
often	2	0.07	1	0.01	3	0.05
frequently			3	0.02	1	0.01
Sub-totals	**7**	**0.25**	**27**	**0.25**	**17**	**0.32**
Content disjuncts:						
essentially	1	0.03	5	0.04		
necessarily	2	0.07	3	0.02	2	0.03
Sub-totals	**3**	**0.11**	**8**	**0.70**	**2**	**0.03**
Totals for adverbials	**13**	**0.46**	**46**	**1.05**	**31**	**0.56**
Adjectives:						
general	2	0.01				
common			2	0.01		
Sub-totals			**4**	**0.02**		
Nouns:						
in general			6	0.05	2	0.03
on the whole					2	0.03
Sub-totals			**6**	**0.05**	**4**	**0.06**

forms in the present study. Similarly, modal auxiliaries were the most frequent means of hedging in Hyland's[15] and Vartalla's[10] corpora, and were regular features in mathematics, physics and biology texts[4,6]. Adverbials were the second most frequent means of hedging in my corpora, with 29 forms identified. This overlaps with Hyland's[15] findings, where 36 forms were identified. Hyland[15] attributes the popularity of adverbials to "their sentential mobility and semantic diversity" by explaining that "their use as 'down-toners' 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"[15:141]. In the current study, verbs and adjectives were used to a much lesser extent than modals and adverbials by all three groups. This finding is in line with those of studies on scientific and medical writing, which have shown that writers of such texts tend to employ a limited range of verbs[15]. Overall, nouns were also used sparingly, and given their importance in the formation and expression of abstract concepts in English, and their assistance in creating an objective stance by presenting the writer's belief as an abstraction, it may well 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[15] corpus, this category 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 corpora, compared with 15% in Hyland's[15] corpus.

Contribution of study and limitations

While the 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. With respect to the findings, however, it is important to note three limitations in the current study; the first being 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. Furthermore, 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. Thirdly, 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. In terms of its overall relevance, the contribution of the current study has been methodological and descriptive rather than theoretical, since the analysis was based on an existing framework[15]. The methodological contribution has been the comparative approach of the study, in that the student writing has been compared with professional writing. The descriptive aspect relates to providing a detailed account of the professional and student writing, and indicating where the deficiencies lay with regard to the student writing. In this regard, the quantitative results 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. Within the South African context, Leibowitz[23] 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[22:15].

Although it was not the aim of the present study, what was noted was that the differences in the use of hedges that emerged from the student and professional writers, for many of whom English is a L2, was that this was linked to the general quality of writing (in terms of language use; structure; coherence, *etc*.). Therefore, it is reasonable to assume that linguistic competence is a necessary condition for the masterful use of hedges in writing but linguistic competence alone does not guarantee appropriate use of hedges. Apprentice writers of academic texts need to be enculturated into this particular convention in academic and scientific writing. It was also interesting to note that one of the L1 speakers of English fell into the Low achievers and that very few hedges occurred in this writing. There were also L2 writers who fell into the High category and used plenty of hedges. Clearly further comparative research in this area is still required.

Implications for research writing in occupational therapy

While teaching was not the focus in this article, the pedagogical aspect remains important. In the light of the findings from this study, Salager-Meyer's[24] call for the need to study and teach hedging, is particularly apt

… since hedging is a common technique for communicating information in scientific discourse, it should be explicity studied and taught to the students in order to assist them in their studies and professional careers[24:153].

Clearly, students who are required to produce research reports for degree purposes, such as occupational therapy students, should be sensitised to the importance of adopting more hedges in their writing. (Refer to the Results and discussion section for suggestions on the teaching of specific hedging functions and

concomitant forms). One way of doing this is to expose them to good writing (model texts, such as journal articles in the same discipline) that is appropriately hedged, and to demonstrate by way of examples, the function of hedges, and the linguistic expressions that perform these functions. Once students are more familiar with hedges, they should be helped to evaluate their own writing more critically, and to employ suitable hedges where necessary. How the actual teaching is done would depend on each institution. At the Medunsa campus, this is largely my responsibility as the language facilitator across the four years of study in occupational therapy.
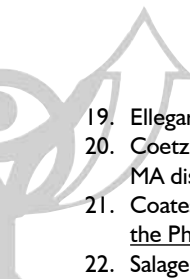
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