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'I hoped to counteract the memory problem, but I made no impact whatsoever': discussing methods in computing science using *I*

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Abstract

This paper is a corpus-based study of how native speaker computing students and experts use the pronoun **I** when elaborating their methodology ('methodological **I**'). Using two corpora, (i) a student corpus of about 62,000 words of postgraduate computing project reports, written at the end of the MSc programme and roughly equivalent to the master's dissertation; and (ii) an expert corpus of about 88,000 words of computing articles taken from prestigious journals, a quantitative analysis of the students' and experts' texts reveals that almost 80% of the personal pronouns found in the student corpus are of **I**, while the figure in the expert corpus is less than 3%. Over 400 occurrences of **I** in the student corpus, but only six occurrences of **I** in the expert corpus, were classified as methodological. A qualitative analysis of the data in the student corpus reveals how methodological **I** can help to achieve a range of textual effects. Methodological **I** is used to recount procedure step by step, to the extent that even unsuccessful stages of the research process are included. These failures are attributed to lack of knowledge, skills, or equipment. Working in concert with language which stresses the tight deadlines the students are obliged to meet, methodological **I** can promote the researcher by highlighting their resourcefulness in managing to get their project completed on schedule. Methodological **I** also helps the student writers to justify their procedure, showing it to be sound and rigorous, thus indirectly promoting the researcher by associating them with methodological diligence. However, even when the students feel

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obliged to record their procedural failures, methodological **I** can help them create a favourable impression on the reader by constructing them as tenacious neophytes whose repertoire of computing skills has increased considerably as a result of working on their research project. The study ends with the pedagogical implications of the findings for EAP teachers and students.

1. Introduction

A number of studies (e.g., Bazerman, 1988; Bazerman & Paradis, 1991; Hyland, 1996, 1998; Prior, 1998) have demonstrated that academic discourse varies enormously, consisting of a plethora of disciplinary variations. Simply put, writers in different disciplines write differently: physicists do not write like sociologists who do not write like philosophers. And there is evidence that even within the same discipline practices may vary widely, particularly when the writing of students and 'experts' (i.e. lecturers writing journal articles) is compared (e.g., Crammond, 1998; Dudley-Evans, 2002; Harwood, 2003; Hewings & Hewings, 2002; Hyland, 2002b; Samraj, 2002, 2004). This is because student writing and expert writing are in effect two very different genres, making different demands on the writer. Given this variation, then, studies which compare and contrast student and expert writing in the same discipline are necessary. Specifically, this paper is a quantitative and qualitative corpus-based study of how and for what purposes postgraduate students and experts writing in the discipline of computing use the personal pronoun *I* when elaborating their research methodology (hereafter 'methodological *I*'). After reviewing some of the research which investigates the variations between expert and student writing, I then focus on pronouns. Other corpus-based studies are discussed which show that personal pronouns can fulfil a number of pragmatic functions in academic prose. I then offer my own analysis, beginning with a quantitative analysis which compares the frequency and functions of pronouns in student and expert texts in general before focusing on frequencies of methodological *I* across the corpora. My qualitative analysis describes a number of effects the method pronouns help to create and illustrates these with extracts from my data. I also claim that some of the extracts rely on more than the pronoun to construct the effect they create, and include a discussion of cotext in my analysis. I end with a section on the pedagogical implications of my findings.

2. Expert writing and student writing

Researchers (e.g., Horowitz, 1988; Johns, 1988) pointed out some time ago that students are not required to do the same types of writing as their lecturers. According to Horowitz's (1988) survey, typical student writing tasks include summarizing and

reacting to a reading, reporting on an observation, and using a theory to interpret data. More recent studies (e.g., Crammond, 1998; Dudley-Evans, 2002; Harwood, 2003; Hewings & Hewings, 2002; Hyland, 2002b; Samraj, 2002, 2004) have borne out these findings, indicating that student writers do things differently to experts. For instance, Samraj (2002), analyzing master's level work in environmental science at an American university, found that two of the courses under the environmental science umbrella, wildlife behaviour and resource policy, demanded very different types of writing. Students were asked to write a review paper for their assignment in wildlife behaviour, which was 'to include a report of previous research as well as a discussion of competing hypotheses and suggestions for future research' (p. 166). In contrast, the resource policy assignments all took the form of memos in which any literature review would clearly have been out of place. And even the wildlife behaviour texts, which were structurally closer to the prototypical expert RA than the resource policy texts, featured introductions which Samraj says are 'quite unlike' (p. 167) the typical CARS RA introduction described by Swales (1990). Like Samraj's study, Dudley-Evans investigation of master's level student writing on a range of courses at Birmingham University (business, accounting and finance, and money, banking and finance) reveals that not only does student writing look very different from expert writing, but also that different degree courses demand very different types of written genres. In summary, then, student writing is not expert writing; hence we cannot assume that student writers will use personal pronouns in the same way as expert writers. I now look at the studies investigating academic writers' use of personal pronouns, focusing particularly on those pronouns used to describe methodology.

3. Personal pronouns in academic writing

A number of corpus-based studies have identified a range of functions that personal pronouns can play in academic writing (e.g., Bernhardt, 1985; Harwood, 2003; Hyland, 2001, 2002b; Kuo, 1999; Tang & John, 1999; Vassileva, 1998). Pronouns are said to help the writer organize the text and guide the reader through the argument (e.g., *First I will discuss x and then y*), state personal opinions and knowledge claims (*On the basis of my data I would claim*), recount experimental procedure and methodology (*I interviewed 60 subjects over the space of several months*), and acknowledge funding bodies, institutions, and individuals that contributed to the study in some way (*I thank Professor X for his help with the calculations*). In addition to performing this range of pragmatic acts, personal pronouns can help to reveal how academic writers construct their relationship with readers and with their discourse community (Kuo, 1999). Thus, while some uses of *I* are said to be low-risk, discrete instances of textual authorial intervention, other uses, such as when the writer makes a claim, carry much greater threat to face, and are potentially points at which the writer exposes themselves to attack by the audience. Hence, those who have constructed functional pronoun taxonomies (Harwood, 2003; Hyland, 2002b; Ivanic, 1998;

Tang & John, 1999) link pronoun functions with authorial presence. The visibility of the writer in their text will therefore depend upon the function of the pronoun in each particular case. On the face of it, then, methodological *I* would appear to be a fairly low-risk use. According to Tang and John (1999), for instance, this type of pronoun is often found alongside what Halliday (1994) calls material process ('doing') verbs like *work*, *read*, *interview*, and *collect*, simply helping to describe the stages the writer went though to do their research. They give the following examples of methodological *I* from their corpus of undergraduate student writing:

> *I* tape recorded a conversation with each co-researcher about the role of literacy in their lives, past and present.
>
> ...my information about [my informants] is drawn from a two year period, when *I* interviewed eight seniors, four each a year, on a weekly basis. (Tang & John, 1999, S37)

However, this recounting of the research process can be viewed rather differently: by using pronouns to highlight their own contribution to the work, expert writers can be seen to be advertising their worth as researchers. In the extract below, for instance, the fact that the writers were able to get round a methodological difficulty underscores their competence and "the merit of their approach" (Kuo, 1999, p. 125):

> In this work, *we* present an approach by which the present experimental restrictions can be overcome. (Physics RA) (Kuo, 1999, p. 126)

Similarly, methodological pronouns can help the writer display their judgement while testing a hypothesis or conducting an experiment:

> *We* used a measure based on interlaced batches to compute an unbiased estimate S2 of the variance of the performance characteristic within a single run... (Electronic Engineering RA) (Hyland, 2001, p. 220)

Finally, by helping the researcher to describe their procedures in depth, *I* and *we* also mark the writer's methodology out as their own, highlighting its uniqueness:

> In 1995 *I* went to Mexico and Chiapas to better understand the Zapatista movement. *I* visited many people, men and women, from and around the movement, and discussed with them the questions treated in this article. *I* am formulating them as "questions to Ramona". (Sociology RA) (Hyland, 2001, p. 220)

The aim of this study, then, was to systematically compare and contrast computing students' and experts' use of methodological *I* in terms of frequency and in terms of function, examining whether these pronouns were used to construct similar textual effects. Before I go on to discuss my data, however, I include a brief note on how the language surrounding methodological *I* can affect the tenor of academic prose.

4. Pronouns and cotext

Hyland (2001) gives the following extract from his corpus featuring methodological *I* which it is claimed helps to emphasize the writer's merit as a researcher:

> *I* reviewed the case material and found solid grounds for these activities (Hyland, 2001, p. 220)

While it could indeed be argued that the pronoun is promotional here, it is also worth drawing attention to the contribution made by the phrase *solid grounds*. In Hunston and Thompson's (2000) terms, *solid grounds* can be seen as carrying positive evaluation, reflecting well upon the researcher. In other words, other language can work in concert with *I* to create particular effects – in this case, a promotional tenor. Any discussion of writers' use of methodological *I* and the effect this helps to create on the reader, therefore, needs to take the language which surrounds the pronoun into account. That is, the *cotext* – defined by Janney (2002, p. 458) as 'the immediate linguistic environment in which a unit of discourse...occurs...in a discourse sequence' – also has a role to play. In my data analysis below, then, I begin by discussing extracts from my corpora where it seems that the textual effect on the reader is achieved predominantly by means of the pronoun. However, I also discuss extracts where the cotext has a significant role to play. When referring to cotextual effects, I draw upon a range of literature, particularly literature referring to metadiscourse (e.g., Hyland, 1998; Vande Kopple, 1985, 1997; Williams, 1990), reporting verbs (e.g., Hyland, 2002a; Thomas & Hawes, 1994), and evaluation (e.g., Hunston, 1989; Hunston & Thompson, 2000; Thetela, 1997).

5. Corpora and procedure

The texts in the corpora were manually scanned and converted to Text format. All abstracts, footnotes, endnotes, and reference lists were deleted, and the corpora were analyzed using the WordPilot 2000 concordancer (www.compulang.com/). There were no formally demarcated methods sections in the texts analyzed, and all the personal pronouns which occurred in the corpora were included in the quantitative analysis described in Section 6 below. All of the pronouns in the corpora had to be studied in context to ensure they were being used by the writer of the text and not by other parties such as the writer's informants.

5.1. The student corpus

The student corpus consisted of five MSc Computing Science project reports from Birkbeck College, London which had been awarded Distinctions, and ran to approximately 62,000 words. I selected only Distinction grade project reports in order to ensure that student writing which had been judged by subject specialists to be successful was analyzed. The assumption was that Distinction grade reports would be more relevant and useful to EAP teachers and students than writing which had been

judged to be merely satisfactory or failing, because the top grade presumably ensures a use of personal pronouns which is acceptable for MSc students writing this genre in this discipline. I refer to each text in the corpus by the abbreviation STUCOMP, followed by a number between 1 and 5 which corresponds to the text. So for example the fourth project report in the corpus is referred to as STUCOMP 4. Further details of the corpus are given in Appendix A.

5.2. The expert corpus

The expert corpus consisted of ten single-authored journal articles from the journals *ACM Transactions on Programming Languages and Systems* and *Theoretical Computer Science*, two journals which were nominated by specialists as among the most prestigious journals in the field, and ran to approximately 88,000 words. While collaboration and joint authorship are common in computing science, it was of course necessary to select only single-authored expert texts, because the writers of multiple-authored papers cannot use *I* (although they could use exclusive *we* to refer to themselves instead). Therefore, for any comparison between student and expert writing of the *I* pronoun, single-authored rather than multiple-authored papers were required for the expert corpus. I refer to each text in the expert corpus by the abbreviation EXCOMP, followed by a number (1–10) which corresponds to the text. So for example the fifth article in the corpus is referred to as EXCOMP 5. As with the student corpus, full details of the content can be found in Appendix A.

Text lengths and the overall size of the student and expert corpus are given in Tables 1 and 2 below.

6. Quantitative analysis

I first examine in this section the frequency with which the student and expert writers use pronouns in general, before focusing on the frequency with which the writers use *I* to achieve different effects, including that of outlining their methodology.

Table 1
Text lengths and overall size: student corpus

Text	Number of words per text
Student corpus	
STUCOMP 1	15,192
STUCOMP 2	11,817
STUCOMP 3	18,213
STUCOMP 4	7831
STUCOMP 5	8802
Total	61,855

Table 2
Text lengths and overall size: expert corpus

Text	Number of words per text
Expert corpus	
EXCOMP 1	7667
EXCOMP 2	9586
EXCOMP 3	10,797
EXCOMP 4	14,600
EXCOMP 5	5594
EXCOMP 6	5388
EXCOMP 7	15,316
EXCOMP 8	5457
EXCOMP 9	7098
EXCOMP 10	6170
Total	87,673

6.1. General quantitative analysis

6.1.1. Pronoun frequencies

The corpora were searched for all personal pronouns which referred to the writers, readers, or other researchers. Raw frequencies as well as frequencies per 1000 words of text are given for each pronoun in Tables 3 and 4 below.

The contrast between the student and expert corpus is striking: of the 645 pronouns found in the student corpus, 514 (almost 80%) are of *I*. However, just 20 (2.74%) of the 731 pronouns found in the expert corpus are of *I*. In contrast, the experts' pronoun of choice is *we* – almost 90% of all the personal pronouns in the expert corpus were cases of *we*. And although some of these occurrences are of inclusive *we*, referring to the whole community, two thirds of them are used exclusively, referring to the writer alone. While *I* occurs on average more than eight times every thousand words in the student corpus, it occurs less than once every 4000 words of text in the expert corpus.

Table 3
Personal pronouns across the student corpus: raw frequencies and frequencies per 1000 words of text

Personal pronoun	Raw frequency	Frequency per 1000 words
Student corpus		
He	3	0.05
Her	0	0.00
Him	0	0.00
I	514	8.31
Me	27	0.44
She	0	0.00
Them	0	0.00
They	2	0.03
Us	5	0.08
We	90	1.46
You	3	0.05

Table 4
Personal pronouns across the expert corpus: raw frequencies and frequencies per 1000 words of text

Personal pronoun	Raw frequency	Frequency per 1000 words
Expert corpus		
He	6	0.07
Her	6	0.07
Him	0	0.00
I	20	0.23
Me	2	0.02
She	1	0.01
Them	0	0.00
They	17	0.19
Us	37	0.42
We	640	7.30
You	2	0.02

6.1.2. Individual writers' variation

I also investigated the degree of variation in pronoun use by the different writers in each corpus. This was particularly necessary in the case of the smaller student corpus, which featured just five writers. The danger in a corpus with a small number of writers is that one or two writers who use pronouns in a very different way to the other writers will skew the frequency figures, and could lead the researcher to believe that pronoun use is uniform across the corpus when in fact it is not. Raw frequencies as well as frequencies per 1000 words of text are given for each writer's use of *I* in Tables 5 and 6 below.

Because the expert corpus features a greater number of writers than the student corpus, and because 9 of the 10 writers in the expert corpus more or less refrain completely from using *I*, we can say with a certain amount of confidence that the use of the pronoun *I* in expert computing science journal writing appears to be marked.[1] It is also noticeable that occurrences of *I* per 1000 words of text are extremely low, even in the case of the one writer who is prepared to use *I* on more than one or two occasions. In the student corpus, however, things are far less clear cut. Although only one of the student writers refrains from using *I* at all, the other four writers use *I* to differing degrees: while the writer of STUCOMP 2 uses *I* about three times every 1000 words, the writer of STUCOMP 5 uses *I* nearly twenty times per 1000 words. The writer of STUCOMP 1 uses 'author' to refer to himself 12 times, while passive constructions are also used rather than pronouns, e.g.:

> The majority of the coding and testing was done at the author's home on a 233 MHz AMD K6 processor personal computer, running Windows 98. (STUCOMP 1)

[1] In fact, disregarding EXCOMP 3, there are only five occurrences of *I* in the entire expert corpus. And four of these five occurrences are found in acknowledgements sections, where writers may feel more able to display a high degree of authorial presence. These same writers seem unable or unwilling to display this presence in the main body of the text, however.

Table 5
Use of *I* across the student corpus: raw frequencies and frequencies per 1000 words of text

Text	Occurrences of 'I': raw frequencies	Frequency per 1000 words
Student corpus		
STUCOMP 1	0	0.0
STUCOMP 2	39	3.3
STUCOMP 3	210	11.53
STUCOMP 4	94	12.0
STUCOMP 5	171	19.43
Total	514	–

Table 6
Use of *I* across the expert corpus: raw frequencies and frequencies per 1000 words of text

Text	Occurrences of 'I': raw frequencies	Frequency per 1000 words
Expert corpus		
EXCOMP 1	0	0.0
EXCOMP 2	0	0.0
EXCOMP 3	15	0.14
EXCOMP 4	0	0.0
EXCOMP 5	2	0.04
EXCOMP 6	0	0.0
EXCOMP 7	0	0.0
EXCOMP 8	0	0.0
EXCOMP 9	1	0.01
EXCOMP 10	2	0.03
Total	20	–

In summary, then, while the small size of the student corpus prevents us from definitively establishing exactly how frequently *I* typically occurs in the writing of student computing scientists in the genre of the project report, this general quantitative analysis suggests that postgraduate computing students may be less averse to using the *I* pronoun in their reports than their expert equivalents are to using *I* in their RAs.

The second part of the quantitative analysis compares and contrasts the frequency with which the student and expert writers use *I* to help perform different textual functions.

6.2. Quantitative functional analysis

Each instance of the personal pronoun *I* which was found in the corpus was classified according to a functional taxonomy similar to the taxonomies previously proposed by Tang and John (1999), Hyland (2002b), and Harwood (2003). It consists of the following categories:

1. 'I' to state results and claims.
2. 'I' to elaborate an argument.
3. 'I' to define terms.
4. Methodological 'I'.
5. 'I' to state a purpose.
6. 'I' to express self-benefits.
7. 'I' as disciplinary servant.

Most of the categories are self-explanatory, but I say a few words about each below.

6.2.1. I to state results and claims

6.2.2. I to elaborate an argument

I follow Hyland (2002b) here in differentiating between those personal pronouns which help the writer make an argument (e.g., *I believe x*) and those which help the writer make claims (e.g., *I have shown that x is true*).

6.2.3. I to define terms

Unlike Tang and John (1999) and Hyland (2002b), Harwood (2003) created a separate category in his taxonomy for pronouns which help the writer define their terms (e.g., *In this article I use the term* '*x*' *to mean y*) after finding it was a relatively common feature in his corpora.

6.2.4. Methodological 'I'

As we shall see, the students' elaboration of methodology does not conform to that of what we may think of as the prototypical methods section, where failures to conduct experiments successfully are not mentioned. Methodological *I* therefore includes accounts of procedures that *could* have been followed, but which were not followed for whatever reason, as well as procedures which were *attempted*, but which were unsuccessful. In a nutshell, then, methodological *I* helps the student writer elaborate any procedure *which was considered* for the purposes of the project report, regardless of whether the procedure was in fact used in the event. This is why this category is slightly different from the Procedural categories other researchers include in their pronoun taxonomies. Hyland's (2002b) 'Explaining a Procedure' category and Tang and John's (1999) 'Recounter of the Research Process' category both apparently focus exclusively on pronouns used to describe the *actual* method followed rather than also on the method merely *considered*.

6.2.5. I to state a purpose

In Hyland's (2002b, p. 1100) words, this category describes pronouns which help the writer frame their arguments, 'to state their discoursal purposes in order to signal their intentions and provide an overt structure for their texts'. Hence these pronouns play a signposting role (e.g., *In this part of the paper*, *I am going to do x*).

6.2.6. I to express self-benefits

In his earlier studies of personal pronouns in expert writing, Hyland did not identify this function. However, on studying student writing, he created this category which was used by student writers to 'comment on what they personally had gained from the project' they undertook (Hyland, 2002b, p. 1100). In other words, pronouns which occurred in sentences like *I acquired a range of skills during this research* would be included in this category.

6.2.7. I as disciplinary servant

Hyland (2002b) assigns uses of the first person in acknowledgements sections to a discrete category in his functional taxonomy (e.g., *I thank Professor X for his support and guidance*). These pronouns help to construct the writer as a disciplinary servant by ensuring that those who aided the writer's research are duly thanked. These often effusive displays of thanks (cf. Cronin, 1995; Giannoni, 2002; Hyland, 2004) add to this modest self-image the writer constructs with the help of these pronouns. However, not all of these displays of thanks occurred within acknowledgements sections in my corpora. Hence this disciplinary servant category can also include pronouns where the writer thanks others within the main body of the text.

Occurrences of *I* in the corpora were assigned to one of the functional categories described above. Results were as reported in Tables 7 and 8:

While the usefulness of any functional categorization of *I* in the expert corpus is questionable, since the main conclusion of the quantitative analysis is that *I* is infrequent in the expert computing RA, things are very different when it comes to the student corpus. Even though caution is necessary in attempting to make generalizations about this genre of student writing on the basis of a small corpus such as the one being used here, the fact that over 86% of the occurrences of *I* were classified as methodological is striking, and warrants further investigation. Hence the analysis in the rest of this paper is qualitative rather than quantitative, examining occurrences of methodological *I* in context, to determine the effect the pronouns help create. Given that the quantitative functional analysis above revealed that the student corpus featured 444 occurrences of methodological *I* while the expert corpus featured just 6 occurrences (all by a single writer), it is the student corpus which is the main focus here.

Table 7
Occurrences of 'I' by function in the student corpus

Function	Number of occurrences	%
Student corpus		
Results/claims	1	0.20
Argument	37	7.20
Defining	8	1.56
Methodological	444	86.38
Purpose	5	0.97
Self-benefits	18	3.50
Disciplinary servant	1	0.20
Total	514	100

Table 8
Occurrences of 'I' by function in the expert corpus

Function	Number of occurrences	%
Expert corpus		
Results/claims	0	0
Argument	8	40
Defining	0	0
Methodological	6	30
Purpose	1	5
Self-benefits	0	0
Disciplinary servant	5	25
Total	20	100

7. Qualitative analysis and discussion of the data

Five textual effects which methodological *I* helps the writer construct were identified and are discussed below in turn.

7.1. Methodological description

The most obvious function of method pronouns is to help the writer describe their procedure step by step:

> In order to generate byte offsets in Java **I** wrote a couple of IO classes of my own. Firstly, a simple class byteLine [C-82], which held a String representing a line of text, and an integer with the number of bytes in the line. [. . .] **I** then subclassed the library class LineNumberReader, to create my own class byteLineReader [C-82]. (STUCOMP 3)

The fact that the writers sometimes choose to take the reader step-by-step through complex processes can make such procedural sections exhaustive. A small portion of such a description is reproduced here:

> **I** make jdbc.odbc link driver available; this code registers this driver with class DriverManager. **I** do not keep a handle to the Driver once created

[[Computer programming follows]]

> **I** get connection to database using a static method of the class DriverManager. To get the connection **I** use a database string which has the format "jdbc:odbc: < database name > ". In practice **I** do not make use of usernames/passwords for my Access database. (STUCOMP 5)

However, in contrast with what we may imagine to be the prototypical stylized journal methodology section, in which the researcher fails to mention the blind alleys and false starts which are an integral part of the research process, the students' accounts include details of procedure which turned out to be superfluous:

> Initially, my design for the bombe was to have exploited the object-oriented features of Java by instantiating an appropriate number (say 15) of Scrambler objects, but after **I** had started coding **I** realised this was unnecessary and that a single scrambler method which could be passed arguments defining the offset of the drums and the wire to be encrypted was all that was required. (STUCOMP 2)

The students also record the uncertainties which arose during their work:

> . . .at this point **I** doubted whether an emulator running on a PC could match the bombe for speed and **I** had begun to think that Tony Sale's assertion that the bombe was necessarily faster than a PC was true. (STUCOMP 2)

In conjunction with the cotext, which features negative evaluation (cf. Hunston, 1989; Thompson & Hunston, 2000; Thetela, 1997) (e.g., *neither was particularly successful* in the extract below), methodological *I* also helps the students describe unfruitful attempts at programming:

> First the file was difficult to read and required parsing. Since the four-letter output would be used by all subsequent programs, as the word length increased the syntax of the output became increasingly and impenetrably nested. **I** wrote two programs cleanAnag and expandAnag which attempted to parse and unpack the output generated but neither was particularly successful. (STUCOMP 3)

> At one stage **I** placed my linking class in a non default-package for the first time and didn't update the signature accordingly and then spent some time wondering why my native method could not be found. (STUCOMP 5)

They even help describe basic lack of knowledge and equipment:

> When **I** first set about actually coding the driver, my knowledge of kernel level programming was at a bare minimum. (STUCOMP 4)

> At first, my work was limited by the hardware **I** had available. The computer **I** started work on was an old 386DX/40 with 8 megabytes of RAM, a 128k cache and a 120Mb hard disk, which **I** had put together from some old scraps, but worst of all was the fact that it only had a uni-directional parallel port, so **I** was limited to Nibble mode data transfers, which are three times slower than the transfer rate on a bi-directional port. (STUCOMP 4)

It is presumably a requirement of the computing project report that students give a warts-and-all account of their research. And it is this requirement which underscores the students' neophyte status and helps identify this as a neophyte genre.

7.2. Overcoming methodological pitfalls (1): The tenacious neophyte

The fact that computing students seem obliged to record the agonies of the research process in full can result, somewhat counter-intuitively, in a self-promotional tenor. We receive a positive impression of the writer because of their determination to get things right. Since false starts are not airbrushed from the report, the reader

appreciates the difficulties the researcher needed to overcome to get their program functioning successfully. Several extracts by the same author illustrate this point. In the first passage the student is already faced with *a significant problem*:

> The run time for the programs was already becoming **a significant problem** by the time **I** reached six-letter words. [. . .] Although it was possible to cut and paste to some extent, each new program required more and more variables and passes through an increasing number of Vectors. This created an overhead in programming time, introduced the potential for bugs, and made the programs difficult to maintain and increasingly difficult to read and understand. It also meant that if **I** wanted to change any aspect of the process, for example change the syntax of the output, **I** would have to re-code a whole series of files. (STUCOMP 3)

The researcher eventually has to begin at the beginning again:

> Rather than continue to implement this approach **I** decided to go back to the drawing board and try to write a single program, which could address all of these problems. (STUCOMP 3)

Unfortunately as one set of problems are overcome, more appear:

> Although this second attempt successfully tackled the problems which **I** had identified with the first, it generated a new problem of its own – that of memory use. (STUCOMP 3)

The attempt to resolve these difficulties leads to the following strikingly honest conclusion, with *whatsoever*, which metadiscourse researchers (e.g., Hyland, 1998) would call a booster, underlining the failure of the attempt:

> . . .rather than using fresh Vectors for each loop of the program, **I** reused the same pair of Vectors for the whole program, removing all of the elements at the end of each loop. In doing so and in forcing regular garbage collection **I** hoped to counteract the memory problem, but **I** made no impact **whatsoever**. (STUCOMP 3)

Another writer in the student corpus also records failure with the help of methodological *I* in combination with a booster (*entirely*):

> **I** spent almost two days carefully analysing my code looking for the bug, **entirely** without success. (STUCOMP 2)

So pronouns help the writer to describe these twists and turns step by step. We may not get the impression that the students are experts – but at least they are triers who possess a formidable amount of tenacity! Although one would obviously need specialist knowledge to appreciate exactly why these students are not achieving the desired effects, and to appreciate how sensible their attempts are at solving the problems, the writers are constructed as being able to work independently, trying out a range of options on their own rather than turning to their supervisors for help. With time and additional input, they will develop the necessary knowledge to become a fully fledged researcher. The picture which emerges is one of the apprentice swiftly gaining in knowledge and abilities:

> Originally, **I** thought of sending images sent directly from the camera, still in kernel space, to the ethernet driver and from there out onto the network. However, as mentioned above, **I** soon discovered that kernel code has to be short and swift, and compressing images, wrapping them up in TCP/IP headers and sending them over the network is not a task for the kernel. **I** therefore had to learn about the interface to network programming, using AF_INET sockets. (STUCOMP 4)

Rather than describing the procedural detail step by step, the method pronouns in this extract help to record how the student is building up their store of knowledge.

Interestingly, although there were only six occurrences of *I* in the expert corpus which were classified as methodological (and all by a single writer), most of these help the researcher show how he overcame methodological difficulties. However, unlike the student writers, this researcher provides no descriptions of procedures he followed which were unsuccessful, even though he does stress the effort which was needed to complete his calculations:

> In attempting to formalize guarantees in Isabelle, **I** discovered many implicit assumptions that had to be identified, clarified and formalized. Most of these were assumptions about UNITY itself that had not hitherto caused problems. The effort needed to mechanize a straightforward example (Charpentier and Chandy, 1999) was entirely out of proportion to what one might have expected from reading the paper. **I** describe a small fraction of this effort below. (EXCOMP 3)

> **I** have mechanized most of the proofs in Charpentier and Chandy (1999), with the exception of some large ones in the appendices. A typical example is the first composition proof from Section 4.2. This proof amounts to a page and a half; the reasoning is given in some detail. The effort needed to undertake this proof is difficult to quantify. It took the better part of a day merely to formalize and enter the allocation system specification. (EXCOMP 3)

It may therefore be important for computing scientists in both genres to go into detail and to show their workings (i.e. their proofs, calculations, etc.) in a similar way to mathematicians. Although a far bigger sample of data from an expert corpus would be needed to say so with any degree of confidence, perhaps the difference between the expert and student writers' accounts is that the experts conveniently omit any mention of failure. Given that methodological *I* is such a rare feature of expert computing text, however, a broader investigation which focused on a wider range of language than pronouns and their cotext would be needed to determine whether this is the case or not. This is obviously beyond the scope of the present paper.

7.3. Overcoming methodological pitfalls (2): Disciplinary competence and self-promotion

A second group of pronouns which help the writer show how they overcame methodological difficulties refers to the disciplinary competence the student acquired

before they began their research, rather than the competence acquired during the research process itself. In the following extracts this competence enables the researcher to anticipate that a certain approach is unfeasible while the project is still at the planning stage, and another solution is found:

> Due to the large number of adjectives in the dictionary tagged as having no inflected form, devising a system for generating the inflections using the dictionary did not seem practicable. Instead, **I** used a rule-based algorithm based on the tags in the dictionary. (STUCOMP 3)

> **I** also wrote a class called indexArray [C-84] to hold the indexes in primary memory. Rather than using a Vector, which would grow to be larger than necessary, **I** encapsulated an array of String in the indexArray class with an accessor method to find the highest offset below the search string using a binary search of the array. (STUCOMP 3)

Contrast these extracts with those in 7.2 above that record failure. The pronouns in the extracts here help the writer to show that they possess enough knowledge to realize early on which procedures are likely to be successful. The student does not even begin to pursue the unprofitable routes.

The self-promotional tenor running through these extracts is constructed with the help of a variety of interpersonal metadiscourse (cf. Hyland, 1998; Vande Kopple, 1985, 1997; Williams, 1990) rather than through methodological *I* alone. In the following extracts, boosters (*substantially*), attitude markers (*unfortunately*), as well as evaluative lexis (cf. Hunston, 1989; Hunston & Thompson, 2000; Thetela, 1997) (*difficulties*, *problem*) are all deployed by the researcher to underscore the formidable nature of the obstacles which confront them. The pronouns help the writer to show themselves capable of overcoming or at least circumventing these difficulties:

> The grid window [C-149] was **substantially** more **difficult** to construct, due to the reliance on more **complex** components. The main **difficulties** involved displaying and updating the grid and the lights. [. . .] **Unfortunately** Java Swing paints any heavyweight components [17], including most members of the Java awt package, last regardless of any layering. This meant that the grid would always be on top of any menus, dialog boxes or other frames [18]. To get around this **problem I** had to subclass the component JPanel and paint on that. [C-155] (STUCOMP 3)

> Algorithms for tracking error (or the risk of the portfolio relative to another, the benchmark) were not provided for me and **I** had to develop them myself. (STUCOMP 5)

We can also read the booster/pronoun combination (*once again I*) in the next extract as promotional. The booster stresses that the Java programming language the researcher is using has repeatedly presented the programmer with difficulties, meaning considerable effort needs to be put into attaining work of a high standard:

> **Once again I** found Java one mutator method short of my requirements.

In combination with the cotext (the verb *was able to* in the next extract), methodological *I* helps the researcher show how they resolved matters, constructing a promotional effect:

> Fortunately the event also provides a debugging method, getDescription, which returns a String representation of the anchor. **I** was able to use this to construct my own URL objects with appropriate host and protocol fields. [C-135] (STUCOMP 3)

7.4. Overcoming methodological pitfalls (3): Speed, efficiency, and tight deadlines

The tight deadlines master's computing students must adhere to in completing their research projects can lead to further methodological difficulties. The lack of time means that sometimes the most obvious procedures cannot be followed and alternative solutions must be found. Methodological *I* helps to promote the ingenuity and resourcefulness of the researcher in finding these solutions:

> . . .**I** simply did not have time to write my own routines – **I** did consider writing a pseudo /dev/vga device which gives the required permissions when opened, and making it readable by a certain group, say vga, and then directly programming the vga hardware (which is not a difficult task), however as these programs are not strictly speaking part of what **I** planned for my project **I** decided that the development time was not worth the gain. (STUCOMP 4)

The fact that the student includes an account of what they thought about doing as well as what they ended up doing adds to the construction of a creative, resourceful researcher. The problems caused by the limited time available for the MSc computing project are far less serious in the next extract, involving aesthetic appeal rather than methodological soundness:

> **I** designed a background image for the desktop and some images for the frames and buttons to give the application a smarter feel. However, time constraints have meant that the design of the graphics has not been developed as fully as **I** had envisaged. (STUCOMP 3)

Once again, however, the tight deadlines do not prevent the student from displaying their programming potential. The implication is that the quality of the work would be enhanced given more time.

In the next passage, the problem of speed arises once more. To add to the difficulties the student is facing, their computing equipment has a limited memory capacity. And although the student writer succeeds in overcoming both these difficulties, the phrase *I managed to work around* makes it clear that resolving these problems was no formality, and that they deserve credit for their efforts:

> Most of the files were generated by scanning the dictionary for entries which could fit a particular pattern, or by creating a pattern and checking to see if a dictionary entry matched it. This process could be done most efficiently using

> data structures in primary memory, but in some cases there was not enough memory for this to be possible. However, scanning the files on disk was an extremely time-consuming process. **I managed to work around** these problems by keeping the algorithms as efficient as possible to reduce the number of checks, and by using temporary files to store results to keep the size of the data structures to a minimum. (STUCOMP 3)

The other type of speed which is important to the writers in the corpus, and in the discipline of computing in general, is programming speed, since the user wants their program to run as quickly as possible. Given this, slowness or inefficiency is a pitfall the researcher is keen to avoid:

> To keep runtime to a minimum **I** elected to produce source files with these data already generated, rather than trying to generate them dynamically. (STUCOMP 3)

By associating the researcher with this speediness, then, the method pronouns also self-promote:

> In the case of comparative and superlative adjectives the tags also conveyed information about how to construct the inflections, for the others **I** had to devise my own set of rules to generate as many forms as possible automatically. In the latter case, the programs were re-run several times to uncover more subtle rules which allowed me to generate a higher percentage of inflections automatically. (STUCOMP 3)

7.5. Methodological soundness & rigour

Pronouns help the computing students construct the impression of methodological soundness and rigour in a number of different ways. The most obvious way for the students to show that their methodology is sound is to describe the strengths of their approach:

> **I** used a Hashtable because it provides a method for checking if something is in a list (the containsKey method) which is **faster** and **less cumbersome** than checking for items in sequentially ordered data structures. (STUCOMP 3)

As well as helping the writer to justify their methodology, the pronoun subtly self-promotes, associating the writer with their (wise) methodological decision in the same way as experts' method pronouns (cf. Hyland, 2001; Kuo, 1999). Similarly, the positively evaluative lexis used in the cotext (*faster*, *less cumbersome*) demonstrates the importance of efficiency and ease of use in computing science. The successful implementation of such a methodology reflects well on the student programmer. Another technique used to construct soundness while simultaneously promoting the researcher is to show that things could have been done differently. In combination with the reporting verbs (cf. Hyland, 2002a; Thomas & Hawes,

1994), methodological *I* in the following text helps the writer highlight the uniqueness of their procedure and its benefits:

> At this point my database has the information required to perform risk calculations, and to provide the optimizer with inputs. **I decided** to add another table giving the names of the factors underlying the factor model. By **adding** this table, FACTORNAMETABLE [...], **I was able to** make all my code/project independent of the names and number of factors in the risk model. (STUCOMP 5)

Methodological *I* also helps the student writers show they are not afraid of going the extra mile to explore more methodological avenues than are strictly necessary in their quest for soundness. In the extract below, this effect is achieved by using a pronoun/attitude marker (*reliable*) combination:

> **I** considered using the information determining comparative and superlative inflections in the tags, however after a brief investigation **I** decided that this was less **reliable** than simply examining the ending of the adjective. (STUCOMP 3)

If a time-saving alternative is less sound, it will not be implemented. Rigour is the priority. By associating the student writer with this rigour, the pronouns also promote the student as a researcher of diligence. Indeed, sometimes pronouns can construct the writer as conscientious without a full description of the methodologically unsatisfactory procedures that were discounted. In the extract below, the pronouns help to promote the researcher simply because the method the writer does decide to follow is so stringent:

> After the tenth code revision, **I** finally decided that the camera driver was stable enough to be used as a basis for writing the client-server applications, and so **I** stopped work on the driver (although see Section 6.1, ''Future Improvements'', for what **I** would have done if **I** had the time). (STUCOMP 4)

This writer is not satisfied by the ten revisions they have had the time to implement. The aside which follows makes it clear that ideally still more revisions would have been implemented if the student had not been required to complete their dissertation within the space of a few months. So the image the methodological *I* helps to construct is of a writer who puts a high priority on rigour. The fact that the pronouns help the student express their frustration at lacking the time to make their work even more methodologically sound creates a subtle promotional effect. Perhaps the implication is that their work will be of the highest methodological standard if they go on to become professional researchers and/or programmers, and have more flexible deadlines.

Another instance where the student writer claims to have gone the extra mile in perfecting their method occurs in the following extract:

> During development many of my classes have been independently tested, typically by overriding toString and adding a main method. This has helped

> isolate and eradicate many errors. Beyond this, the principal application testing **I** have conducted has been to ensure that its results are internally and externally consistent. [...] External consistency means that the results provided by my application match those given by the original application. The presence of such consistency is strong evidence of correct application operation since on previous occasions **I** have manually (by hand) replicated many of XC's outputs. Here **I** provide two examples from the many cases that **I** have examined.... (STUCOMP 5)

By the end of the extract, the impression is that there has been ample testing. And the fact that the writer provides only two examples 'from the many cases I have examined' denotes extreme confidence that their procedures will satisfy even the most demanding reader. The implication is that the writer has analyzed many more examples than would have been strictly necessary to satisfy the examiners of the project report. If all of this rigour is not enough, however, the same writer then goes on to detail all the testing they intend to do that deadlines prevented them from doing before the dissertation was submitted. Note the use of the boosting phrase *not only...but also* in combination with methodological *I* to highlight that efficiency as well as rigour is at the forefront of the writer's concerns:

> When conducting these tests **I** will be wishing to ensure **not only** that the produced results are still correct **but also** that they continue to be produced in a reasonable amount of time, given the problem that is being solved. (STUCOMP 5)

We may feel intuitively that the majority of extracts quoted in this section so far would not look out of place in an established researcher's journal article. There were times, however, when the writers' student status *is* apparent. For instance, it is hard to imagine the following argument in an RA:

> Perl (which stands for Practical Extraction and Report Language) was designed for handling and manipulating text, and **I** believe in using the most adequate tool for whatever **I** am doing. (STUCOMP 4)

The reason this strikes us as odd (apart from the writer feeling the need to explain the Perl acronym) is because the writer is being too obvious in their attempts to construct rigour. The more professional extracts above achieve the construction of rigour *implicitly*. That is, rather than stating 'I demand rigour', they show that this is the case by the fact that their methodology is itself rigorous. Similarly, the following extract which relates to programming languages and their potential problems would also look out of place in expert writing:

> Java's networking support makes it an ideal choice for the client/server application **I** hoped to implement and, anyhow, **I** had just finished a short Java course and was keen to put my new knowledge to use. (STUCOMP 5)

While we cannot imagine an expert recounting details of their training in this fashion, the student writer arguably achieves a subtle self-promotional effect. In these terms, at least, their pronoun use is a success. They are constructed as someone who is keen to acquire the core skills of the discipline, and who is enthusiastic about applying these skills to research.

8. Summary

This study has analyzed the occurrences of methodological *I* in student and expert writing in computing both quantitatively and qualitatively. The quantitative analysis revealed that methodological *I* appears to be more frequent in student writing. It was also found that a higher proportion of occurrences of *I* were used to describe methodology in the students' texts than in the experts' texts. The qualitative analysis revealed that computing master's students can use methodological *I* to achieve a range of textual effects. Methodological *I* is used to recount procedure step by step, to the extent that even unsuccessful stages of the research process are included. These failures are attributed to lack of knowledge, skills, or equipment. However, although the students feel obliged to record their procedural failures, methodological *I* can help them create a favourable impression on the reader by constructing the students as tenacious neophytes whose repertoire of computing skills has increased considerably as a result of working on their research project. Working in concert with language which stresses the tight deadlines the students are obliged to meet and the value of getting programs to run speedily, methodological *I* can promote the researcher by highlighting their resourcefulness in managing to get their project completed on schedule and operating quickly. Methodological *I* also helps the students to justify their procedure, showing it to be sound and rigorous, thus indirectly promoting the researcher by linking them with the methodological diligence.

9. Pedagogical implications

I have suggested that although some extracts featuring method pronouns would sit comfortably in expert RAs, others would not. And while this may occasionally be because of the student's poor academic writing skills, I argue that it is more commonly because of the unique demands of the student genre of the computing project report. Unlike the prototypical RA, this genre appears to require student writers to describe their failed attempts at arriving at an appropriate methodology, as well as requiring a description of the skills the writers acquired in the process of conducting their research. And since it seems likely that other genres and other disciplines of student writing will feature different types of method pronouns, it would seem necessary for both EAP students and teachers to take on the role of researchers into the dominant norms of the target genre (cf. Harwood & Hadley, 2004; Ivanic, 1998; Johns, 1997). EAP teachers and students could construct corpora of student texts and also

interview subject specialists to determine the unique features of student genres and to determine the extent to which these genres share textual features of the expert RA. Teachers and students could attempt to make quantitative and qualitative comparisons of how pronouns are used within a number of target genres, and to draw up a qualitative functional taxonomy for methodological *I* across the relevant disciplines and text types. A final proposal makes reference to the issue of cotext which has featured throughout. Instead of the EAP specialist limiting their investigations to pronouns in general or methodological *I* in particular, they could get students to investigate specific cotextual features which surround pronouns, like lexical items or verb types.[2]

Acknowledgement

I am grateful to two anonymous reviewers for their constructive and insightful comments.

Appendix A

Student corpus contents

1. Condon, E. P. (2001). Intelly GPS.	STUCOMP 1
2. Ellsbury, G. (1998). Breaking the Enigma: two emulators for cryptological machines.	STUCOMP 2
3. Hardcastle, D. (1999). SphinX crossword compiler's toolkit.	STUCOMP 3
4. Kapadia, S. (1997). A driver for the Connectctix colour QiuckCam.	STUCOMP 4
5. Maggs, S. (2001). An optimizer server using Java/JNI.	STUCOMP 5

Expert corpus contents

1. Blume, M. (1999). Dependency analysis for standard ML. *ACM Transactions on Programming Languages and Systems*. 21(4), 790–812.	EXCOMP 1
2. Boyland, J. T. (1996). Conditional attribute grammars. *ACM Transactions on Programming Languages and Systems*. 18(1), 73–108.	EXCOMP 2
3. Paulson, L. C. (2001). Mechanizing a theory of program composition for UNITY. *ACM Transactions on Programming Languages and Systems*. 23(5), 626–656.	EXCOMP 3

[2] I am grateful to an anonymous reviewer for this suggestion.

Appendix A (*continued*)

4. Qian, Z. (2000). Standard fixpoint iteration for Java bytecode verification. *ACM Transactions on Programming Languages and Systems*. 22(4), 638–672.	EXCOMP 4
5. Reps, T. (1998) ''Maximal-munch'' tokenization in linear time. *ACM Transactions on Programming Languages and Systems*. 20(2), 259–273.	EXCOMP 5
6. Kimbrel, T. (2001). Online paging and file caching with expiration times. *Theoretical Computer Science*. 268, 119–131.	EXCOMP 6
7. Kolano, P. Z. (2002). Proof assistance for real-time systems using an interactive theorem prover. *Theoretical Computer Science*. 282, 53–99.	EXCOMP 7
8. Smith, B. M. (2001). Constructing an asymptotic phase transition in random binary constraint satisfaction problems. *Theoretical Computer Science* 265, 265–283.	EXCOMP 8
9. Turner, P. R. (2002). Residue polynomial systems. *Theoretical Computer Science*. 279, 29–49.	EXCOMP 9
10. Vovk, V. (2001). Probability theory for the Brier game. *Theoretical Computer Science*. 261, 57–79.	EXCOMP 10

References

Bazerman, C. (1988). *Shaping written knowledge*. Madison, Wisconsin: University of Wisconsin Press.

Bazerman, C., & Paradis, J. (1991). Introduction. In C. Bazerman & J. Paradis (Eds.), *Textual dynamics of the professions: historical and contemporary studies of writing in professional communities* (pp. 3–10). Madison, Wisconsin: University of Wisconsin Press.

Bernhardt, S. A. (1985). The writer, the reader, and the scientific text. *Journal of Technical Writing and Communication, 15*(2), 163–174.

Crammond, J. (1998). The uses and complexity of argument structures in expert and student persuasive writing. *Written Communication, 15*(2), 230–268.

Cronin, B. (1995). *The scholar's courtesy: The role of acknowledgement in the primary communication process*. London: Taylor Graham.

Dudley-Evans, T. (2002). The teaching of the academic essay: is a genre approach possible? In A. M. Johns. Genre in the classroom: Multiple perspectives. Mahwah: Lawrence Erlbaum Associates.

Giannoni, D. S. (2002). Worlds of gratitude: a contrastive study of acknowledgement texts in English and Italian research articles. *Applied Linguistics, 23*(1), 1–31.

Halliday, M. A. K. (1994). *An introduction to functional grammar* (2nd ed.). London: Edward Arnold.

Harwood, N. (2003). Person markers and interpersonal metadiscourse in academic writing: a multidisciplinary corpus-based study of expert and student texts. Unpublished Ph.D. thesis, Canterbury Christ Church University College.

Harwood, N., & Hadley, G. (2004). Demystifying institutional practices: critical pragmatism and the teaching of academic writing. *English for Specific Purposes, 23*(4), 355–377.

Hewings, M., & Hewings, A. (2002). It is interesting to note that…: a comparative study of anticipatory 'it' in student and published writing. *English for Specific Purposes, 21*(4), 367–383.

Horowitz, D. M. (1988). What professors actually require: academic tasks for the ESL classroom. *TESOL Quarterly, 20*(3), 445–462.

Hunston, S. (1989). Evaluation in experimental research articles. Unpublished Ph.D. thesis, University of Birmingham.

Hunston, S., & Thompson, G. (2000). *Evaluation in text: Authorial stance and the construction of discourse*. Oxford: Oxford University Press.

Hyland, K. (1996). Writing without conviction? Hedging in science research articles. *Applied Linguistics, 17*(4), 433–454.

Hyland, K. (1998). Persuasion and context: the pragmatics of academic metadiscourse. *Journal of Pragmatics, 30*, 437–455.

Hyland, K. (2001). Humble servants of the discipline? Self-mention in research articles. *English for Specific Purposes, 20*, 207–226.

Hyland, K. (2002a). Activity and evaluation: reporting practices in academic writing. In J. Flowerdew (Ed.), *Academic discourse* (pp. 115–130). Harlow: Longman.

Hyland, K. (2002b). Authority and invisibility: authorial identity in academic writing. *Journal of Pragmatics, 34*, 1091–1112.

Hyland, K. (2004). Graduates' gratitude: the generic structure of dissertation acknowledgements. *English for Specific Purposes, 23*, 303–324.

Ivanic, R. (1998). *Writing and identity: The discoursal construction of identity in academic writing*. Amsterdam: John Benjamins.

Janney, R. W. (2002). Cotext as context: vague answers in court. *Language and Communication, 22*, 457–475.

Johns, A. M. (1988). The discourse communities dilemma: identifying transferable skills for the academic milieu. *English for Specific Purposes, 7*, 55–60.

Johns, A. M. (1997). *Text, role, and context: Developing academic literacies*. Cambridge: Cambridge University Press.

Kuo, C.-H. (1999). The use of personal pronouns: role relationships in scientific journal articles. *English for Specific Purposes, 18*(2), 121–138.

Prior, P. A. (1998). *Writing/disciplinarity: A sociohistoric account of literate activity in the academy*. Mahwah, NJ: Lawrence Erlbaum Associates.

Samraj, B. (2002). Texts and contextual layers: academic writing in content courses. In A. M. Johns (Ed.), *Genre in the classroom: Multiple perspectives* (pp. 163–176). Mahwah: Lawrence Erlbaum Associates.

Samraj, B. (2004). Discourse features of the student-produced academic research paper: variations across disciplinary courses. *Journal of English for Academic Purposes, 3*(1), 5–22.

Swales, J. M. (1990). *Genre analysis: English in academic and research settings*. Cambridge: Cambridge University Press.

Tang, R., & John, S. (1999). The 'I' in identity: exploring writer identity in student academic writing through the first person pronoun. *English for Specific Purposes, 18*, S23–S39.

Thetela, P. (1997). Evaluation in academic research articles. Unpublished Ph.D. thesis, University of Liverpool.

Thomas, S., & Hawes, T. P. (1994). Reporting verbs in medical journal articles. *English for Specific Purposes, 13*(2), 129–148.

Thompson, G., & Hunston, S. (2000). Evaluation: an introduction. In S. Hunston & G. Thompson (Eds.), *Evaluation in text: Authorial stance and the construction of discourse* (pp. 1–27). Oxford: Oxford University Press.

Vande Kopple, W. J. (1985). Some explanatory discourse on metadiscourse. *College Composition and Communication, 36*(1), 82–93.

Vande Kopple, W.J. (1997). Refining and applying views of metadiscourse. Paper presented at the CCCC convention, Phoenix, Arizona. ERIC ED 411 539.

Vassileva, I. (1998). Who am I/who are we in academic writing? A contrastive analysis of authorial presence in English, German, French, Russian and Bulgarian. *International Journal of Applied Linguistics, 8*(2), 163–190.
Williams, J. M. (1990). *Style: Toward clarity and grace*. Chicago: University of Chicago Press.

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