Authorial voice in academic writing: A comparative study of journal articles in English Literature and Computer Science

Yin Ling Cheung & Louwena Lau
National Institute of Education, Nanyang Technological University (Singapore)
yinling.cheung@nie.edu.sg, llsw1301@gmail.com

Abstract

Academic writers represent themselves in their texts in different ways, notably through use of first person pronouns to construct an authorial voice and enhance arguments. This study examines how expert writers in the disciplines of Literature and Computer Science use first person pronouns. The hypothesis is that in the absence of objective fact, Literature writers resort to frequent use of first person pronouns backed by stronger authorial roles to build credibility and convince readers, while Computer Science writers avoid first person pronouns in line with conventional wisdom in the hard sciences. The findings suggest that the general dichotomy between hard and soft sciences regarding first person pronouns usage may not apply in all cases. Our study discusses the similarities and differences in the disciplinary conventions in Literature and Computer Science, thus making contributions towards pedagogy and scholarship of the role of first person pronouns in voice construction in academic texts.

Keywords: authorial voice, academic writing, English Literature, Computer Science, journal articles.

Resumen

La voz del autor en la escritura académica: un estudio comparativo de artículos de investigación en revistas de literatura inglesa y de ciencias de la computación

Los autores de artículos académicos se representan a sí mismos en sus textos de diferentes maneras, en especial a través del uso de pronombres de primera persona para construir su voz como autores y realzar sus argumentos. Este

estudio examina cómo los escritores experimentados de dos disciplinas (literatura y ciencias de la computación) emplean pronombres de primera persona. La hipótesis es que los investigadores de Literatura, en ausencia de datos objetivos, recurren a un uso frecuente de los pronombres de primera persona y a la adopción de una voz mucho más personal para otorgar credibilidad a su discurso y convencer a los lectores, mientras que los investigadores de Informática evitan los pronombres de primera persona, como es habitual en las ciencias puras y aplicadas. Los resultados sugieren que la dicotomía general que suele establecerse entre las ciencias "duras" (puras y aplicadas) y las "blandas" (humanidades y ciencias sociales) en relación con el empleo de pronombres de primera persona no siempre se manifiesta. Asimismo, este trabajo discute acerca de las similitudes y diferencias en las convenciones disciplinares en literatura y en ciencias de la computación, de tal forma que contribuye a la pedagogía y al estudio del papel de los pronombres de primera persona en la construcción de la voz del autor de textos académicos.

Palabras clave: voz del autor, escritura académica, Literatura inglesa, Informática, artículos de investigación.

1. Background of the study

In the study of academic writing, the projection of a writer's identity on the page has been a continuing focus of research interest. The interweaving of language and identity suggests the presence of the writer is inevitable inwriting and has been explored through the concepts of voice and stance. While they are acknowledged as central to the social interaction between reader and writer in a text, definitions of each vary. According to Hyland (2012), stance largely involves the writer's expression of attitudes and assessment of knowledge in a text to say something new, while voice, which is more reader-oriented, concerns the framing of knowledge according to disciplinary conventions. Hewings (2012) sees stance as the textual characteristics involved in persuasion, evaluation, and judgements, while voice takes on a wider perspective, involving the construction of writer identity. Research into voice thus helps to locate the "person behind the written word" (Hirvela and Belcher, 2001: 85), perceived by the reader. Whether this is an actual person, a persona or identity created to suit audience, context and purpose, the creation of a strong authorial voice is important in building a credible "discoursal self" (Ivani□, 1998: 24) to persuade and engage readers and is considered integral to good writing.

At higher level of academic writing, constructing an appropriate authorial voice that aligns with disciplinary conventions is considered essential if writers are to be deemed competent by the discourse community (Harwood, 2005c; Hyland, 2010). The ability to frame knowledge in ways the reader values, by reshaping the language used by others in the same institutional context, adds to writer-reader interaction.

A strategy used by writers to create authorial voice is the use of first person pronouns, probably the strongest indicator of a writer's presence in the text. Some studies focusing on first person pronouns across disciplines have revealed differing usage conventions for first person pronouns in the so-called hard and soft sciences. In the hard sciences, the writer's presence in the text is frequently downplayed, heightening perception of the objectivity and reliability of research activities and methods. Conversely, in the humanities and social sciences, personal reference appears to be more important in establishing credibility and making clear one's contribution to the field in the absence of empirical proof (Hyland, 2005). While the dichotomy between hard and soft sciences is used as a convenient way of categorising academic disciplines (Harwood, 2005a; Hyland, 2001, 2002), the reality is disciplinary conventions are dynamic and these assumptions may not always hold. For example, Sword (2012) found higher percentages of first person pronouns in the hard disciplines compared to the soft ones in her study comprising 500 articles across 10 disciplines. Hyland and Jiang (2016) found that first person pronouns in the hard disciplines had increased while certain soft disciplines featured fewer such pronouns in 360 journal articles from four disciplines over 50 years.

In many studies so far, it has been found that the first person plural, we, is the most prominent in academic writing. According to McCarthy (2015), some researchers still insist on the collective we even though articles may be individually authored. This is especially true of the hard sciences, where there is need to balance significance of one's research but portray a modest persona in doing so. It is not uncommon to find the first person plural in single-authored articles performing an assortment of roles, while the first person singular I is barely visible or may be completely absent (Harwood, 2005c; Hyland, 2001; Kuo, 1999; Yakhontova, 2006). Due to its prevalence, some studies have focused on the inclusive and exclusive use of we which can be used to refer to the writer, the writer and the reader, the writer and disciplinary colleagues or humankind in general (McCarthy, 2015; Wu & Zhu, 2014). Writers have taken advantage of this ambiguity to achieve aims

such as building rapport with readers, thereby expediting acceptance and concurrence of claims (Harwood, 2005b); diminishing responsibility by attributing a point of view to a whole community; or highlighting current issues.

Though fewer in number, other studies have investigated the full range of first person pronouns forms, providing insights into how writers differ in their use of these pronouns in different disciplines. For example, Carciu (2009) found in her study of biomedical writing that our, considered a weaker form compared to we, was used to convey a more tentative position, whereas Lafuente Millán (2010) saw it as a strong marker of ownership in his study across four different disciplines.

At present, a complete mapping of all disciplinary conventions remains to be achieved; many sub-disciplines and smaller fields such as Statistics, Performing Arts, and Literature, have yet to be examined. Factors such as the pressure to publish and perception of their readers as a specialised audience requiring less explicit engagement, could change the way writers present themselves and interact with their audience (Hyland & Jiang, 2016). There are also limitations in the taxonomies developed by researchers including Beerits (2016), Harwood (2005a), Lafuente Millán (2010), MacGrath (2016) and Sheldon (2009) to facilitate the qualitative analysis of first person pronouns because they were developed specifically for the corpora in the respective studies and hence may not be generalisable. Therefore, much scope remains for research into how writers use first person pronouns to achieve the goals of conveying their personal intentions in alignment with disciplinary conventions, as they interact with audiences in different disciplines.

By comparing the use of first person pronouns in Literature and Computer Science, we aim to investigate the general patterns of first person pronoun use in hard and soft disciplines. According to Biglan (1973), hard science fields are paradigmatic; that is, all members of the field subscribe to a shared set of underlying theories. In Computer Science, well-designed experimental work to test theories or provide proof is valued (Zobel, 2014). The authorial voice thus takes on the role of the researcher in an empirical process, whereas in Literature, one seeks to coax readers to accept the "informal logic and audience appeals" (Wilder, 2005: 83) through a strong authorial voice, in the absence of empirical evidence. The views proffered in literary writing are personally motivated and multiple interpretations of works increase an

understanding of an issue (Stevens & Stewart, 1996). This view of the soft and hard fields was affirmed in a study of RAs in Second Language Writing (SLW), a sub-discipline of Applied Linguistics and Computer Networks and Communications (CNC), a sub-discipline of Computer Science (Zhang & Cheung, 2017). It was found that in CNC papers, readers were assumed to possess a certain level of background knowledge and thus writing was more tightly-structured and standardised, following predictable paths. In SLW, knowledge is more subjective, varying due to the influence of social, cultural and historical factors. Consequently, writers had to argue for the validity of their own study against alternative interpretations.

Given the differences in structuring knowledge, epistemic beliefs and research processes, the two contrasting fields of Literature and Computer Science can serve as foils for one another by throwing peculiarities of the other into sharp relief, thereby uncovering patterns of use to add to our knowledge of academic genres and contribute to pedagogy and student understanding of voice construction. The research questions for this study are as follow:

1. What disciplinary variations emerge in the frequency of first person pronoun forms and roles in Literature and Computer Science RAs?
2. How do the functional roles behind the first person pronouns differ in Literature and Computer Science RAs?

2. Analytical framework

Tang and John's (1999) taxonomy, based on Systemic Functional Linguistics (SFL), links linguistic forms of first person pronouns to their various functions in the text. The taxonomy was adopted for this study to analyse first person pronoun functions in hard and soft disciplines. The taxonomy comprises six possible identities for first person pronouns in academic writing imbued with degrees of authorial power.

The taxonomy has provided the basis for other researchers to scrutinise a variety of corpora including RAs written by L1 and L2 researchers within one discipline (e.g. Dontcheva-Navrátilová, 2013); across disciplines (e.g. McGrath, 2016); across different languages and disciplines (e.g. Muñoz, 2013; Sheldon, 2009); and in PhD theses (e.g. Starfield & Ravelli, 2006). The

adaptations involved conflating identities or adding new identities to Tang and John's (1999) framework. However, these new roles were specific to the corpora in the respective studies.

For this study, two new roles, Researcher and Explainer, were added to better accommodate the dataset and facilitate qualitative analysis (see Table 1).

- 'I' as Researcher.

  The Researcher describes, explains and provides the rationale for conducting research by providing an overview of the landscape, justifying the approach and defining terms. In this role, the writer demonstrates his expertise of the topic, drawing on his knowledge of the field, the research done so far and pulling in references from external sources when necessary and appropriate to provide a rationale for the current study. This role is more prominent in the literature papers where the Researcher weaves the perspectives proposed into an argument in the absence of a methodological section. In other words, the Researcher is a guide through the argument and not the structure of the text, thus while the Architect has an overview of the flow of the article, the Researcher has an overview of the flow of the proposition or argument.

- 'I' as Explainer of the Research Process.

  The Explainer is akin to a class teacher demonstrating application of formulas and explaining assumptions. The Explainer interprets results and information presented in diagrams and tables for the research process and is pertinent only to Computer Science RAs. Unlike the Guide role which is involved with textual organisation throughout the article, the Explainer specifically takes the reader through the steps in the research process detailed in the article. Hence, it is mainly associated with the methodology section of the Computer Science papers.

  In addition to the new roles detailed above, some adjustments have been made to the Guide and Architect roles: the Guide draws the attention of the reader to a specific point in the article, while the Architect controls the overall flow of the article and is commonly found near the beginning of the article or section where the author informs the reader of the structure of the whole article or the following section. The revised coding scheme is shown as follows:

	Meaning	Typical expressions
'I' as Representative	"…generic first person pronoun, used as a proxy for a larger group of people …reduces the writer to non-entity." (p. S27)	our languages, our nation's bicentennial, our society, enable us, taught us
'I' as Guide	"…writer as guide during the reader's journey…locates reader and writer together in the time and place of the essay, draws reader's attention to points plainly visible within the essay." (p. S27)	as we saw, as we have seen, we now turn, let us denote, let us assume, we have the following
'I' as Architect	"…foregrounds person who writes, organises, structures and outlines the material in the essay." (p. S28)	In this paper we will, In this section we discuss, we prove later, we conclude in section 5, In the rest of the paper
'I' as Recounter of the Research Process	"…recounts various steps in the research process…which might include reading source texts, interviewing subjects, collecting data and so on." (p. S28)	we ran the simulation, our training set consisted of, we have also performed tes
'I' as Explainer **(new role found only in Computer Science papers)**	….demonstrates step-by-step how various formulas are applied, explains assumptions made… interprets results which relate to findings resulting from research.	we get, we have, we assume, we conclude that, we find, we know, we can say
'I' as Researcher **(new role)**	… explains and provides rationale for carrying out research, provides overview of landscape, justifies approach and defines terms…references material external to the topic or text, draws from the writer's own experience.	we define, we discuss we refer the reader to, the models we employ, we are never told, turns our attention towards, reminds us, we are told
'I' as Opinion Holder	"…shares an opinion, view or attitude with regard to known information or established facts." (p. S28)	we believe, we feel, we leave as a future challenge, I argue, we wish, we suggest
'I' as Originator	"…involves the writer's conception of ideas or knowledge claims advanced in essay…calls for the writer to present or signal these as new in the essay." (p. 29)	we find, we introduce, I argue, I affirm, I suggest, my contention, my claim, my point

Table 1. Coding scheme for first person pronoun roles (adapted from Tang & John, 1999).

3. Methodology

To address the research questions, a corpus of 160 RAs (80 Computer Science and 80 Literature) totalling about 1.3 million words was collated from journals listed in the Arts and Humanities, and Science citation indexes by Clarivate Analytics. Eleven journals selected from each discipline capture intra-genre variation (see Appendix A). Single-authored papers were selected, to avoid bias or inadvertently increase the frequency of first person plural pronouns in the study due to multiple-authored papers. The articles span 20 years from 1991 to 2011, the time frame determined by accessibility

to soft copies of the articles due to journals' moving walls. Each of the 20 years is represented in the dataset for both disciplines, though they were not pulled with equal distribution from each year. The intention was to capture changes in academic writing in the disciplines, but no clear diachronic trends emerged from the data.

The AntConc Version 3.4.4 concordancer was used to identify all occurrences of *I*, *we*, *us*, *our*, *ours*, *me*, *my* and *mine*, in the articles, excluding abstracts, footnotes, acknowledgements, references, tables, diagrams and captions. The corpus was compiled manually to ensure instances of first person pronouns highlighted by the concordancer were valid. Descriptive statistics of the corpus are shown in Table 2.

	Literature RAs	Typical expressions
No. of RAs	80	80
Total no. of words	662165	638632
Mean no. of words	8277	7983

Table 2. Descriptive statistics of the corpus.

The plural form we, which was most frequent in both disciplines, was classified into inclusive and exclusive uses to determine which was more dominant in the respective sub corpora. Possible writer intentions are discussed.

3.1. Coding the data

3.1.1. Pronouns and co-text

To control disparities in the data due to varied article lengths, frequencies of first person pronouns were normalised per 10,000 words. All first person pronouns were manually coded. Each pronoun was examined in context to determine its functional role. During coding, the linguistic environment surrounding the pronoun was important to determine its role. Factors taken into consideration included (a) immediate co-text, i.e., text within the same sentence; (b) wider linguistic environment, i.e., sentences which occur before or after the sentence featuring the pronoun; (c) verb which co-occurs with the pronoun; and (d) position of pronoun in the article. For example, in (1), the immediate co-text suggests this could be classified as Explainer since it involves the discussion of an equation:

(1) *Furthermore, we will consider problems where f is restricted to a bounded domain* $\Omega \in R^n$. *This is particularly important when the variables x are related to physical quantities which are bounded in the real world.* (CS26)

However, the sentences are in the Introduction of the article. This is unusual as the Explainer role normally occurs after information such as the purpose of the paper, the approach and definition of terms. Considering preceding and following sentences, as well as the auxiliary verb *will*, which suggests future intention, we coded it as the Researcher, discussing what he intends to show in the paper.

3.1.2. Overlapping of roles

Some researchers referencing Tang and John's (1999) taxonomy either conflated the roles of Guide and Architect (Dontcheva-Navrátilova, 2013) or excluded one (Lafuente Millán, 2010; Martín, 2003). In this study, the Guide draws the attention of the reader to a specific point in the article, while the Architect controls the overall flow of the article. The Guide can reference what is ahead or has gone before and can be found throughout the article, but the Architect role is commonly found near the beginning of the article or section to inform the reader of the structure of the whole article or following section.

Overlaps in other categories have been found in previous studies (Leedham & Fernandez Parra, 2017; McGrath, 2016) and are also encountered in the current corpus. In (2), the phrase *In this paper*, suggests *we* could be classified as Architect, but the verbs *present* and *are derived* in the following sentence suggested that an Originator role was more appropriate and this pronoun was coded as such.

(2) ***In this paper***, ***we present*** *the Sugeno integral semantics of linguistic quantifiers in which a quantifier is represented by a family of fuzzy measures [35] and the truth value of a quantified proposition is computed by using Sugeno's integral [35]. Several elegant logical properties of linguistic quantifiers are derived including a prenex normal form theorem. (CS59)*

Adopting McGrath's (2016) approach in general, where two roles seem to be present in one pronoun, it would be assigned the role for which the case is stronger.

3.1.3. Dual roles in one sentence

In literary texts that feature complex sentences, different pronouns can be perceived to perform different roles in the same sentence. For example, the presence of the adverbs earlier and now in (3) may suggest that the two pronouns should be classified as Guide but the verb suggest and adverb also seem to indicate that the author is putting forth a claim that the novel is taking on a different function, thus giving the second pronoun an Originator role.

> (3) ***I have noted earlier*** *that the novel may be read as hysterical symptom; what* ***I would now like to suggest*** *is that the novel also performs the function of masquerade. (LIT45)*

3.1.4. Subjectivity in coding

During data coding, a degree of subjectivity can occur as interpretation of language can vary. Furthermore, unfamiliarity with Literature and Computer Science could be a factor influencing interpretation.

3.2. Reliability measure

An MA in Applied Linguistics student enrolled in a university in Singapore served as co-rater. Two rounds of inter-rater agreement were calculated for separate sub-sets of data using Cohen's Kappa and final inter-rater reliability was 0.82. The second author of this paper looked through the whole corpus to ensure consistency in coding. Means and standard deviations of pronouns in each role were calculated before independent t-tests were carried out with IBM SPSS 23 to determine the differences between the two subcorpora. The alpha was set at .05 for all the inferential analyses in this study.

4. Results and discussion

The findings reveal the number of first person pronouns in Computer Science RAs was more than 2.5 times the number in Literature articles (see Table 3), unlike the findings in previous studies (Harwood, 2005b; Lafuente Millán, 2010). Authorial voice was conveyed without use of these pronouns in only eight Computer Science articles, whereas all the Literature articles featured at least one instance of a first person pronoun (see Table 4).

Therefore, the difference in first person pronoun use between Computer Science and Literature RAs is not whether these are absent or present, but rather, how and the degree to which writers in these disciplines utilise these self-mention markers to persuade readers and present results.

While associating certain characteristics with hard and soft disciplines is convenient for classification, the findings here suggest these should not be always assumed to be the case (cf. Sword, 2012). As competition is more intense in a large field like Computer Science, the use of first person pronouns can act as a strong persuasive force, facilitating solidarity with the reader (Hyland, 2010) and engendering a promotional tenor (Harwood, 2005b) in a crowded research space. The increasing recognition of human agency in the process of scientific discovery could also account for a higher frequency of first person pronouns in the Computer Science RAs. In the case of Literature, while first person pronouns are employed to create a credible persona and strengthen arguments, writers also use other strategies to construct a strong authorial voice, such as framing opinion as assumed truth, using agentless passive constructs and extensive use of metadiscourse markers.

	Total	Per 10,000 Words
Liiterature	662165	30.00
Computer Science	638632	76.24

Table 3. Raw and normalised occurrence of first person pronouns in RAs

	Literature		Computer Science	
	No. of articles	%	No. of Articles	%
I	8	10%	71	89%
We	69	86%	73	91%
Us	49	61%	62	78%
Our	55	69%	50	63%
Ours	2	3%	2	3%
Me	2	3%	6	8%
My	5	6%	48	60%
Mine	0	0%	5	6%

Table 4. Articles featuring occurrences of first person pronouns

Though all RAs were single-authored, plural pronouns (*we, us, our, ours*) dominated both fields. Conversely, the singular pronouns (*I, me, my, mine*) occurred three times more in Literature. Table 5 summarises the descriptive statistics of the first person pronouns in the corpus.

	Literature			Computer Science		
	Raw	Mean	SD	Raw	Mean	SD
We	837	10.48	15.99	3871	48.44	53.57
Our	220	2.75	3.94	537	6.71	10.33
Us	287	3.58	3.57	271	3.34	5.42
Ours	2	0.03	0.16	5	0.06	0.46
I	504	6.30	5.01	161	2.00	9.47
My	113	1.41	1.78	21	0.26	1.43
Me	17	0.21	0.79	3	0.04	0.25
Mine	5	0.06	0.26	0	0.00	0.00
TOTAL	**1985**	**3.10**	**7.11**	**4869**	**7.61**	**25.03**

Table 5. Mean and SD for first person pronouns in RAs

Literary scholars' use of first person pronouns spreads out among the eight pronominal forms, probably due to the language proficiency which literary writers are expected to display, resulting in a wider range of expressions and textual structures in the construction of a strong authorial voice.

4.1. Analysis of most commonly occurring pronominal forms

4.1.1. We the most preferred pronoun

The *we* pronoun occurred four times as much in the Computer Science subcorpus as in the Literature subcorpus, in line with the collaborative nature of knowledge creation in hard sciences, where computer scientists mark their individual contributions and also display appropriate collegiality. In Literature, the high frequency of *we* demonstrates that, while the individualistic, unique point of view conveyed via the *I* is expected, this has to be tempered by a more communal tone at appropriate junctures.

However, writers exploit the ambiguity of the first person plural, switching seamlessly between its inclusive and exclusive forms to achieve desired effects within the same article. In (4), where the writer regards readers to be literary scholars, it is inclusive; but it excludes those not in this category.

> (4) *As literary critics working within interdisciplinary studies, **we** are interested in authors who drew the medical laboratory into the imaginative landscape of the novel…(LIT69)*

Inclusive *we* dominated (90%) in the Literature RAs, where it strengthened arguments by creating a more familiar tone to enhance interaction with readers. Though *we* occurred four times more in the Computer Science articles, it was distributed between the exclusive (56%) and inclusive (44%)

forms. The slightly higher number for the exclusive *we* in Computer Science could be attributed to the discipline's preference for using *we* rather than *I* to reflect the communal nature of knowledge conventions (Yakhontova, 2006; Harwood, 2005a) as the former is used as a strategic tool to maintain a balance of authority and humility. Since scientists are expected to display a modest collegial persona, the use of *we* over *I* may reduce the force of imposition (Myers, 1989).

We was used extensively in the Explainer role to take the reader though the methodology in Computer Science RAs. By alternating between the inclusive and exclusive *we*, writers gave the impression readers were participants in a joint process through the methodology and drew on the strength of the discourse community (Harwood, 2005b) to establish themselves as confident professionals with strong technical expertise. In (5), through the use of the inclusive *we*, the writer assumes readers possess shared knowledge about the field.

(5) *Note that when **we** test the past temporal operators in the if clause against the past history, **we** do not have to traverse the entire past history of temporal predicates. (CS20)*

Where *we* is used for structuring the text, making decisions for methods or processes involved and making claims, it is exclusive. In (6), although *we* is used, in this context, it is the writer who is putting forth the proposal for the control schemes, thus showing his expertise in the field.

(6) *In the following **we** will propose two control schemes that will accomplish the above objective. (CS2)*

For the Literature RAs, the role behind the highest number of *we* pronouns is that of Researcher, while it was the second highest for Computer Science. Plural pronouns were used to involve readers in the elaboration of arguments and persuade them about the soundness of the interpretations proposed by the writers.

4.1.2. Our more frequent in computer science than literature

Similar to findings in Lafuente Millán's study (2010) where the possessive adjective *our* was more frequent in hard disciplines, it is the second most frequently used pronominal form in Computer Science occurring more than twice as frequently compared to Literature.

In the Computer Science RAs, *our* was most often (64%) used to express ownership. At other times (26%), it complemented the inclusive *we* and built communality by suggesting the reader's joint involvement with the writer in the empirical process, as seen in (7) or when discussing the field with the reader. To a smaller extent, *our* was also used by writers to hedge their claims (10%) such as in (8) below, where the writer takes on the role of Opinion Holder to offer his perspective, using the plural pronoun "*our* feeling is that…", opening the space for others who may feel differently.

(7) *We may thus restrict* ***our*** *attention to a formula of the form* $(u_{1,\ldots}u_k) * (u_{1,\ldots}u_k, x)$, *where the* $u_{m+1,\ldots}u_k$ *are actually* x_i *quantified from further outside.* (CS29)

(8) ***Our*** *feeling is that it is not easy to find a simple and significant extension to evaluable formulas because there are relatively few formulas that are equivalent…(CS12)*

Literary scholars used the pronoun inclusively to suggest writer and reader agree on something or that what they say can be generalised to humankind in general. The pronoun in (9) seems to implicate a larger community beyond the writer and reader of the article as morals and morality are usually upheld at societal level.

(9) *These terms are unmistakably moral but are no longer a part of* ***our*** *moral vocabulary. (LIT2)*

4.1.3. Similar frequencies of Us in both subcorpora

The pronoun *us* was third most frequent in the corpus but used to different effects in the two disciplines. In Computer Science, almost half (46%) were *Let us* imperatives, commonly followed by verbs such as *consider*, *assume*, *suppose*, *take* and *look*. The reader is assumed to be an intellectual equal and invited to participate in examining the methodology and evaluation in the research process. The writer in (10) presupposes the reader has ability to analyse the phenomena under discussion. Such invitations exert a strong rhetorical effect on attracting readers' interest, endorsing the recommended approach and acknowledging validity of the writer's work (Fløttum, Kinn & Dahl, 2006).

(10) *Let* ***us*** *here analyze the simplifications in the discretization of the continuous mixture that its usage enables. (CS61)*

At times *Let us* did not include the reader (4%) but rather assumed their indulgence or ratification, as conveyed by the expressions *Let us put it bluntly* or *Let us make the following comments.*

In contrast, *Let us* was almost absent from Literature RAs, constituting only 4% of the *us* pronouns in these papers as the writer does not involve his reader in an empirical fact-finding process. In the Literature papers, *us* was used mainly to enhance reader involvement and textual coherence as illustrated by (11) where the pronoun is used to remind readers of how an insight into socio-economic conditions can add to deeper understanding and appreciation of the text.

(11) *Social and economic conditions also help **us** to resituate texts in their cultural moment. (LIT18)*

4.1.4. I the second most common pronoun in literature RAs

Based on the greater subjectivity of Literature, *I* was the second most frequent pronoun in the Literature RAs. It was present in 89% of Literature RAs compared to 10% of Computer Science RAs. The unambiguous reference to the writer could be reflective of the discipline that values originality in interpretation and relies on an assertive authorial voice to carry the arguments in the absence of empirical evidence. In (12), the singular first person pronoun takes on the role of Originator as the writer openly backs her claim with *I would argue* and differentiates her view from that of another member in the field, by beginning the sentence with *On the contrary*.

(12) *On the contrary, **I** would argue that the women are seen to be using the limited means available to them to settle their disputes, and that the level of resourcefulness which they are obliged to display in doing so is evidence of the gender-specific nature of their efforts. (LIT39)*

The frequency of the first person pronouns in this study has also uncovered intradisciplinary variations. In the Computer Science subcorpus, *I* was absent in a majority of the articles but was heavily used in a handful. This finding is consistent with previous studies of expert writing in Computer Science where the occurrence of *I* was low (Harwood, 2005a) or completely absent (Kuo, 1999), thus making it hard to generalise about the use of the pronoun. Similarly, in the Literature RAs, though the *I* pronoun was used by most writers, it was absent in some articles, possibly due to factors such as

sociocultural or individual author preferences which may contribute to the construction of authorial voice of writers in academic fields.

4.1.5. My is used to claim ownership

The possessive adjective *my* was featured in more than half the number of articles in the Literature RAs but appeared in a mere five articles in Computer Science. The majority of the uses of *my* in Literature (85%) and Computer Science (77%) conveyed ownership while the remainder were perceived to be hedges or referential. Previous studies have found *my* to be non-existent in the hard sciences. Harwood's (2005a) study of writing in Computer Science does not feature the pronoun while in Lafuente Millán's (2010: 42) study, *my* was found to be non-existent in the hard science disciplines but "slightly more frequent" in Applied Linguistics and Business Studies. However, in Doncheva-Navrátilová's (2013: 16) paper, they were rare. The presence of *my* in Computer Science in this study suggests that conventions shape rather than dictate writing in the disciplines and there is leeway for individual choices in the use of these pronouns. In Literature, the use of *my* is important to convey the assertiveness of the writer when making a claim as in (13), where the Originator role is fronted by the possessive adjective. The writer makes clear her difference of opinion from an *exhaustive study* in unequivocal terms, taking ownership of her point of view.

(13) *Celeste Turner Wright remarks in her exhaustive study of this figure in Elizabethan literature... In* ***my*** *view, however, the antiusury tradition did not simply become extinct as England embraced the ethos of capitalism. (LIT20)*

Apart from expressing ownership, the pronoun was used as a hedge in small number of instances (6%) where the writer acknowledges the subjectivity of the argument or limits of his/her expertise in the role of a Researcher as seen in (14).

(14) *To the best of* ***my*** *knowledge there is no hard evidence to support the links between Cantos and Kestoi, no document, letter, no explicit reference. (LIT34)*

Similarly, in Computer Science, the pronoun expressed ownership (77%), though there were a higher number of hedges (19%), perhaps reflecting the more communal culture of the discipline. In (15) below, the writer cites his

experience, allowing for others who may have had different experiences and uses *It is suggested* in the next sentence to lessen assertiveness in putting across his proposition.

> (15) *In particular, **my** experience with PDMOSA says that PDMOSA algorithm performs reasonably well for continuous function problems with not too many variables. It is suggested that all algorithms should be used to generate a larger set of optimal solutions... (CS50)*

The examination of first person pronoun frequencies in the corpus reveal that they are important in creating a credible persona to persuade the reader, acknowledge works of others and promote one's own contributions (Hyland, 2009). These objectives would have influenced the frequency and use of the pronouns in the corpus.

4.2. Functional roles of first person pronouns

4.2.1. Continued learning

The most powerful roles in the Tang and John (1999) taxonomy adopted for this study are those of Researcher, Opinion Holder, and Originator. These account for about 85% of first person pronouns in the Literature subcorpus. They account for less than 30% of roles fronted by first person pronouns in the Computer Science RAs. This suggests that literary scholars used first person pronouns to project themselves assertively in their texts.

Differences in the functional roles of the first person pronouns in Literature and Computer Science were found to be statistically significant for Representative, Guide, Architect and Opinion Holder, though Cohen's d ranged between modest to moderate (see Table 6).

	Literature		Computer Science				
	Mean	SD	Mean	SD	t	df	p
Representative	0.01	0.02	0.00	0.02	1.95	158	0.05
Guide	0.03	0.04	0.11	0.14	-5.14	158	0.00
Architect	0.02	0.02	0.06	0.08	-5.09	158	0.00
Researcher	0.20	0.23	0.17	0.27	0.88	158	0.38
Opinion Holder	0.07	0.09	0.03	0.07	3.00	158	0.03
Originator	0.64	0.05	0.06	0.08	0.26	158	0.80

Tabe 6. Independent t-test findings for Functional Roles (α=.05)

4.2.1. Representative – one among others

The slightly higher number of pronouns in Literature could be due to the discipline's association with the human condition. In the Computer Science subcorpus, one article in the sub-field of Artificial Intelligence accounted for almost half the occurrences of the role where the writer was discussing the developments in the field to date. Since reference is made to many rather than the few, this role is represented by the plural pronouns we, us and our as the writer identifies as one in a larger group in (16) below.

(16) … *Shaw stresses in Pygmalion that such clues, in an era unduly sensitized to the social import of language, may indicate not only* ***our*** *past, and* ***our*** *present, but may also determine* ***our*** *future:…(LIT11)*

4.2.2. More overt textual organisation in computer science through guide and architect

Personal intrusions into the text for the purpose of organising discourse are less frequent in the Literature RAs, similar to Dontcheva-Navrátilová's Applied Linguistics corpus (2013). In a discipline known for its rhetorical dexterity reflected in the journal articles presented as a single, continuous essay, such overt organisation of the text in the Architect role might be less preferred, unlike Computer Science RAs which feature marked sections. When both subcorpora are compared, these roles occur more frequently in the Computer Science subcorpus, in contrast to Lafuente Millán's (2010) observation that more first person pronouns were used in the soft science fields to organise information because of less linear arguments and more flexible structures. This attests to the uniqueness of the disciplinary conventions in Literature.

Literature scholars weave textual signposting into their essays and metadiscourse markers such as frame markers, transitions and code glosses were used to structure flow of arguments in Literature articles, accounting for lower frequency of the Architect. The Guide role occurs more frequently than Architect as they often make reference to specific points in the text rather than its overall structure.

The Architect function emerged more frequently in Computer Science with more than 300 instances compared to 72 in Literature. The higher occurrence of the Architect role in making explicit the organisation of the

paper could be reflective of disciplinary discourse where knowledge-making practices display a linear progression and steps in the process have to be evident for other researchers to replicate methods.

Although Architect seems to be a textual function, this role was used by writers in both disciplines to establish expertise by differentiating their work from others, such as the first *I* in (17) and *we* in (18).

(17) *It is these plays that **I** want to consider here; and since **I** believe the issue of truth and promise to be a source of major misunderstanding in the interpretation of Henry IV, **my** primary emphasis will be on this, the greatest of the histories. (LIT38)*

(18) *Despite the fact that the original two-estimate system considered a and b as absolute endpoints, in this paper **we** define these estimates as determined fractiles. (CS48)*

In Computer Science, the Guide role is invoked when the first person pronoun is used with adverbs such as "now", "next", "first" and "here". In Literature RAs, expressions such as "As *we* shall see", "As *I* have already shown" signal the Guide role. The Guide reminds readers of what has been discussed or what is to follow. In (19), the reader is reminded of a topic which was discussed previously with the phrase *We will return*. The use of *I* with the verbs *want* make for assertive claims of ownership over the content and flow of argument, even though in a weaker functional role.

(19) ***We** will return to the discrepancy between story and discourse regarding the mode of historical representation, but for the moment, **I** want to consider the implications of the "monumentalism" through which the characters approach history. (LIT19)*

Let us and *Let's* are also used in this category in Computer Science articles to invite readers into the process as willing participants in the textual dialogue as seen in (20).

(20) ***Let's** consider the water jug problem in AI [53,73]. (CS10)*

4.2.3. Recounter of the research process

No instances of this role were found in the Literature subcorpus. References about the writer's previous experiences featured in some articles were related

as personal anecdotes such as (21) rather than steps in an experimental process.

(21) *A guard, happily waiving the rules, took* ***me*** *down to the stacks, and there it was, its soft brown and buff cover as* ***I*** *had last seen it well over half a century before in the guest lounge of a holiday camp patronized by skilled low-paid workers. (LIT49)*

In the Computer Science subcorpus, this role was second least frequently fronted by first person pronouns, comprising 2% of the pronouns used, perhaps because the focus is on methodology detailed in the RAs. The exclusive *we* and *I* front these roles which reinforce the researcher's expertise by summarising the procedures which may have been carried out prior to the writing of the paper as seen in (22).

(22) *In order to assess the contribution of the board's operationalized code provisions and cases,* ***I*** *conducted a series of experiments, including ablation experiment. (CS46)*

4.2.4. Explainer of the research process

The Explainer is a new role added to the Tang and John (1999) taxonomy based on analysis of first person pronouns in the Computer Science subcorpus. In this role, the *we* pronoun collocates with verbs such as "have", "obtain", "get", "assume", "find" and "note" to guide readers through complex calculations involving models and formulas. By taking advantage of the fuzziness between the inclusive and exclusive forms of the first person plural pronoun, writers can create the impression that readers are participants in the process, even if *we* may refer to the multiple researchers who could be behind a single-authored paper. This role accounted for 54% of the total number of first person pronoun references in the Computer Science subcorpus as proof of formulas and calculations involved in the steps or stages in the articles. In (23), the writer reinforces this joint process with the reader not only by using the first person plural, but also issuing an invitation to do so with the phrase *Let us consider*.

(23) ***Let us*** *stress that isomorphism is necessary but not sufficient for ag-equivalence, or, in other terms, ag-equivalence is a stronger condition of topological similarity. For showing this,* ***we*** *present the following example.* ***Let us*** *consider the two isomorphic polyhedral S and S' in Fig. 14. (CS41)*

Use of the exclusive *we* and possessive pronouns mark the writer's ownership of the methodology as illustrated in (24), while in (25), the pronouns are used to show they are up-to-date with developments by commenting on results and comparing these to findings by other researchers.

(24) ***Our*** *development emphasizes 2-dimensional arrays. Since* ***we*** *do not build fractional rows or columns, the values must be integers. (CS39)*

(25) *Overall,* ***our*** *computed results agree well with the experimental data, the largest discrepancy being of the order of 5%.* ***Our*** *results are as accurate as Veeramani et al (2007) but not as satisfactory as those of Feng and Michaelidis (2009b). (CS78)*

4.2.5. The researcher – Providing the background and developing arguments

The Researcher sets the stage for the research process by providing background information such as research carried out thus far, the rationale for the chosen approach and the goals of the study undertaken. The role is more prevalent in Literature RAs, referenced by some 60 percent of first person pronouns. More amenable writer-reader interaction through the use of the plural pronouns is important in Literature where the argument must be sustained throughout the article. In fact, occurrences of the plural pronouns *we*, *us* and *our* were the most commonly used pronouns in this role in the Literature subcorpus. In (26), the Researcher leads the discussion with the reader, elaborates and provides evidence to support propositions put forth.

(26) *Before* ***we*** *can make any conjecture,* ***we*** *should step back for a moment and consider the conditions under which* ***we*** *might rightly claim to have found a solution. (LIT50)*

Writers in the corpus also discussed the limitations of their studies in this role. In Computer Science articles, computer scientists display humility and communality by highlighting limitations of their own methods or research as seen in (27). In Literature, the limitations discussed may be attributed to lack of details in the text as shown in (28).

(27) *However,* ***I*** *have not compared GAC-On-X against bounds or range consistency, so can offer no conclusions on the relative merits of different levels of consistency. (CS76)*

(28) *For example, **we** cannot, and therefore, do not gain access to the "tone of fervid veneration [and] religious regard" with which Garth speaks of his vocation (p.250). (LIT58)*

The Researcher in both disciplines employed rhetorical questions and examples to establish expertise or make claims. These provided opportunities for writers to demonstrate knowledge of a topic or justify a differentiated approach to an issue. However, where the first person pronouns are used in declaring new claims as a result of their arguments and justifications in the Researcher role, the role will be considered that of Originator. For example, in (29) below, the first instance of the personal pronoun *I* would be deemed an Originator putting forth a different (and therefore original) perspective, while the Researcher (using *we*) takes over with the explanation and justification of that perspective.

(29) *…what makes it both natural and necessary to ask the question in the first place – is, **I** would suggest, the quaint obscurity of the term 'irreverence' and of its contrary 'reverence'…**We** feel too uncomfortable using 'reverence' in some of its traditional applications because of a certain undemocratic, patriarchal, and superstitious cast that the term seems to have acquired. (LIT2)*

In the extract from a Computer Science paper (30) below, the role behind the pronoun has been coded as the Researcher when making a reference to an external source in explaining the theory under discussion. Whereas in (31), drawn from the same paper, the pronoun fronts a new perspective about polynomials and thus would be considered Originator.

(30) *As in Lankford's approach, **we** get a constraint-solving problem, but which is now in the first order theory of the reals. (CS57)*

(31) *As in Lankford's approach, **we** get a constraint-solving problem, but which is now in the first order theory of the reals. (CS57)*

4.2.6. Greater prominence of opinion holder in literature papers

The Opinion Holder is more pertinent in Literature than Computer Science (see Table 6) since interpretations carry the ideational content in Literature RAs. This role occurred more than twice the number of times in the Literature than the Computer Science subcorpus. Computer scientists use

less of this role as in scientific fields, knowledge previously confirmed by the discourse community takes on the mantle of universal truth and opinion matters less than objective fact (Hyland, 1998).

The use of first person pronouns with verbs such as "believe", "wish", "propose", "prefer" and modals such as "can", "could" and "might" allow for alternative views thus inviting readers to add their voices to the debate (Doncheva-Navrátilová, 2013; Carciu, 2009).

In the Opinion Holder role, apart from offering opinions about previous research or issues in question, writers also evaluated their own work. Though the plural pronouns were most common in portraying a humble demeanour seen in the use of modals and the verb *seem* in (32), the singular possessive pronoun *mine* in the phrase *mine is admittedly a minority view* was used to downplay one's interpretation in (33).

(32) *Still, one may ask whether some of the n factors in Agarwal and Matoušek's higher dimensional bounds could be replaced by polylogarithmic factors.* ***Our*** *method does not seem to yield new results here. (CS74)*

(33) *As* ***I*** *see it, Ennui is an especially good site for just this kind of analysis, although* ***mine*** *is admittedly a minority view: even so historically and theoretically astute a reader of Edgeworth as Seamus Deane holds to the position that Edgeworth's fiction is "not an analysis but a symptom of the colonial problem the country represented." (LIT43)*

While writers may avoid threatening the positive face of disciplinary colleagues, (34) and (35) seem to go against this grain. In (34), the singular first person pronoun and verb *argue* could make for more disagreement. Despite the use of *our* to minimise the visibility and agency of the writer in (35), the noun *inability* and adverb + adjective *very alarming* seem to be critical of the writer.

(34) *Though some readers and critics consider his aesthetic tenets to be ironic - a hasty conclusion,* ***I*** *would argue - one of Wilde's maxims from the preface to The Picture of Dorian Gray (1890) explains the Dwarf's tragic mistake.*[27] *(LIT79)*

(35) *The inability of* ***our*** *most ingenious designers to make even the simplest systems completely foolproof is very alarming. (CS17)*

4.2.7. Originator – linking authors and their claims

In the corpus, the Originator role came to the fore when both Computer Science and Literature writers used self-markers to link themselves with their claims, suggesting to the reader that both the claim and claim-maker were worth noting (Harwood, 2005c).

The most unambiguous form of self-reference, the singular pronoun *I*, was preferred by literary scholars when making claims and declaring their interpretations. Almost half the total number of occurrences of *I* in the Literature subcorpus were concentrated in this role, often accompanied by the verb "argue". This suggests that writers are expected to emerge in their writing to put forth their claims as the credibility of the person behind the claim is of utmost importance in absence of objective fact (Hyland, 2007). In (36), the writer takes ownership of her readings through use of the singular pronouns, but also limit her claims to one possible interpretation.

(36) … *in* ***my*** *readings of Moll Flanders and Roxana,* ***I*** *interpret the figure of the woman as the embodiment of a "purer" or more purely imaginative, version of capitalism... (LIT20)*

The lower occurrence of Originator in Computer Science articles compared to other roles could be due to the focus on methodology where the Explainer role is more pertinent. In Computer Science RAs the role was marked by the exclusive *we* rather than *I* as seen in (37). The writer hedges the use of the exclusive *we* with the adverb "quite" and comparative adjective "simpler", rather than declaring his procedure is "better than" Collani and Sheil's (1989).

(37) *Therefore,* ***we*** *conclude that the above maximization procedure is not only quite efficient, but also simpler to solve than Collani and Sheil's procedure (1989). (CS16)*

Writers in both disciplines also used the less visible *us* and *our* in (38) and (39) to downplay their claims about the wider implications or limit the generalisability of their conclusions. However, these are balanced by "but must always" in (38), and "important implication" in (329) to stress their commitment to their claims.

(38) *Disgrace urges* ***us*** *to see that human rights can never be certain or absolute outside of a purely fictional state, but must always proceed from a tragic*

recognition both of the perplexities of the human condition and of the insurmountably difficult, ethically precarious real-world choices that inescapably must be made. (LIT59)

(39) *An important implication of* ***our*** *results is that there's a randomized polynomial time approximation scheme for the permanent that works for almost every bipartite graph. (CS19)*

6. Conclusion

This study contributes to the scholarship of first person pronouns in academic writing in two ways. Firstly, our findings appear to challenge the generally established view that a hard science features fewer instances of first person pronouns compared to a soft discipline. The frequency of first person pronouns in Computer Science RAs exceeds the number found in the Literature subcorpus by 2.5 times. This finding seems to be a departure from previous studies (e.g. Lafuente Millán, 2010) and shows greater use of first person pronouns in academic writing is not peculiar to the soft disciplines. This reversal of first person pronoun frequencies associated with the hard and soft paradigm calls into question the approach of studies that cluster several disciplines together into 'hard' and 'soft' categories for comparison and analyses of linguistic features, including first person pronouns. Instead, it could be more fruitful to focus on comparisons of single disciplines, one from each of the hard and soft sciences to identify common and dissimilar features across the hard/soft divide.

Another contribution of this study is the addition of the new roles of Researcher and Explainer to the Tang and John (1999) taxonomy, which rendered it an efficient analysis framework for the requirements of the data. The role of Researcher is germane across both hard and soft disciplines in this study and may be used in other disciplinary corpus studies of first person pronouns. Whether RAs contain a specific methodological section, researchers are required to discuss and justify their approach, elaborate arguments, cite references and draw from his or her own knowledge. Similarly, the role of Explainer could also be pertinent in the analysis of writing in other disciplines where experimental or methodological processes are sequentially detailed in RAs.

Apart from contributing to theory and research, at the practice level, our study may guide novices in academic writing for whom the lack of familiarity

with disciplinary conventions is a stumbling block. It is assumed that newcomers will automatically develop target discourse practices. By highlighting linguistic resources available in different disciplines and their rhetorical effects on disciplinary knowledge, our study may help novice researchers and those seeking publication in postgraduate programmes with decisions about when and how to intrude into their texts in alignment with disciplinary conventions.

EAP teachers and instructors could utilise the findings to raise awareness of the continuum of authorial presence and authority to the attention of new writers in the disciplines. This can assist them in thinking about how to modulate the degree of intrusion into their text and its effect on readers (Beerits, 2016). For students who are required to be familiar with academic writing conventions across multiple disciplines could build an inventory of first person pronoun practices and conventions in an informed manner. This paper provides valuable reference material for authors penning guidebooks for academic writing who can cite the findings to illustrate relevance of personalised pronouns to authorial voice and point out that high levels of writer-reader interactivity are not always the domain of softer sciences.

Because each individual discipline has its own particular purposes, practices and norms, our findings may not be generalisable beyond the specific disciplines of Literature and Computer Science. The taxonomy applied is specific to the data examined here and may not be relevant with different sets of data. Though individual preference could have accounted for intradisciplinary variations found in the subcorpora, interviews with the RA writers were beyond the scope of this study. Similarly, preferences for pronoun forms in specific functional roles were not examined in detail here and could be an area for future research.

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Cheung Yin Ling earned her Ph.D. in Linguistics from Purdue University, USA. She is Associate Professor at the National Institute of Education, Nanyang Technological University, Singapore. She specializes in academic writing and writing instruction. She has published in journals such as *System, The Asia-Pacific Education Researcher, and RELC Journal.*

Louwena Lau earned her M.A in Applied Linguistics from National Institute of Education, Nanyang Technological University, Singapore. She specializes in English as a second language writing.

Appendices

APPENDIX A: LIST OF LITERATURE AND COMPUTER SCIENCE JOURNALS

	Literature Journals	Computer Science Journals
1	*College Literature*	*ACM Transactions on Modeling and Computer Simulation*
2	*Contemporary Literature*	*Applicable Algebra in Engineering, Communication and Computing*
3	*Modern Fiction Studies*	*Artificial Intelligence*
4	*Modern Philology*	*Computer Standards & Interfaces*
5	*New Literary History*	*Computers & Chemical Engineering*
6	*PMLA*	*Computers & Electrical Engineering*
7	*Nineteenth Century Literature*	*Computers & Industrial Engineering*
8	*Studies in English Literature*	*IEEE Transactions on Computers*
9	*Studies in Philology*	*IEEE Transactions on Reliability*
10	*The Review of English Studies*	*Journal of the ACM*
11	*Twentieth Century Literature*	*The International Journal for Computation and Mathematics in Electrical and Electronic Engineering*