Self-Citation and Self-Reference: Credibility and Promotion in Academic Publication

Ken Hyland
Department of English and Communication, City University of Hong Kong, Tat Chee Ave., Kowloon, Hong Kong. E-mail: ken.hyland@cityu.edu.hk

Author self-citation has long been of interest to those working in informetrics for what it reveals about the publishing behavior of individuals and their relationships within academic networks. While this research has produced interesting insights, it typically assumes either that self-citation is a neutral form of reporting not unlike references to others' work or an unsavory kind of academic egotism. By examining self-citation in a wider context of self-mention, however, the phenomenon can be seen as part of a more comprehensive rhetorical strategy for emphasizing a writer's personal contribution to a piece of research and strengthening his or her knowledge claims, research credibility, and wider standing in the discipline. These meanings are not easily revealed through quantitative bibliometric methods and require careful text analyses and discourse-based interviews with academics. In this paper I explore the use of self-citation and authorial mention in a corpus of 240 research articles and 800 abstracts in eight disciplines. Through an analysis of these texts and interviews with expert informants I show how self-mention is used and the ways these uses reflect both the promotional strategies of individuals and the epistemological practices of their disciplines.

Introduction

Citation analysis, the area of informetrics which deals with the relationships between texts and between texts and writer productivity, emphasizes that scientific papers are embedded in a literature and that writers are linked into wider social networks. It thus draws attention to the role that publication plays as the institutionalized system which both creates knowledge and distributes rewards, underlining the importance of reputation to academic endeavour. The need to have one's work recognized and cited by others is, in fact, an increasingly valued commodity in today's fiercely competitive academic world. Rivals seek to better each other in the quality and significance of their work and in the esteem in which they are held by their professional colleagues, not least because this is a major factor in obtaining awards and grants and in gaining appointments, tenure and promotion.

The use of self-citations is a major way in which writers can seek to rhetorically construct their professional credibility. Bibliometric indicators have been used to explore self-citation patterns since the early pioneering work of Garfield (1979), but such measures essentially provide information about reading patterns and say little about how writers seek to promote their reputations in their writing. There are very few articles which include no self-citations at all and studies have shown that authors tend to cite their own work more heavily than that of others (Tagliacozzo, 1977; White, 2001). This is particularly so when the authors have a long history of engagement in an area (Pichappan & Sarasvady, 2001), who are seeking to publish outside their specialist field (Cronin & Shaw, 2002), or who are themselves heavily cited (Phelan, 1999). While some regard excessive self-citation as a dubious form of self-aggrandizement (Lawani, 1982), much of this research typically sees no difference between the motivation for self-citation and other-citation, simply tying current work to earlier relevant work (Bonzi & Snyder, 1991; Tagliacozzo, 1977).

In this article I take a different stance and argue that self-citation is more usefully seen in the wider context of authorial self-mention. The paper also differs methodologically from most citation studies. Instead of employing quantitative analyses of questionnaire or ISI data, I follow a discourse analytic approach, exploring how writers actually used self-citation and self-mention in 240 research articles and 800 article abstracts in eight disciplines. While sociolinguistic approaches have not played a major role in information science, detailed study of writers' linguistic choices can reveal important aspects of knowledge making and the patterns which characterize disciplinary relationships. The ways and extent to which academics refer to themselves and their work offers important insights into the assumptions they hold about their role in the research process and to the epistemological and social preferences of their disciplines

Received April 26, 2002; accepted August 29, 2002

(eg., Bazerman, 1988). I begin with a brief outline of the issue of personal promotion in academic writing, then go on to discuss its main realizations, examining patterns of exclusive first person pronouns and self-citation.

Publication, Reputation and Self-mention

Communication is the principal mechanism for creating knowledge and establishing reputation. A paper is judged as a contribution to a particular field by an audience of colleagues who can potentially make use of it. If editors, referees and journal readers regard it as original and significant, allow it to be published, cite it in their own work, and develop it further, then the writer receives the reward of recognition and career success.

Some years ago Hagstrom (1965) likened this process to a form of barter, where the recognition that motivates individual academics is exchanged for a contribution of information. Latour and Woolgar (1979), in a well-known variant of this market metaphor, and echoing Bourdieu's (1991) notion of symbolic value, see academics as engaged in converting different kinds of 'credit' in a cycle of moves designed to maximize their credibility. A successful publication may help a researcher gain credit which can be converted into a research grant to finance equipment and recruit colleagues, this in turn generates more data which can be converted to arguments, fresh publications, and so on. Credibility thus helps academics to progress through the cycle:

> For example, a successful investment might mean that people phone him, his abstracts are accepted, others show interest in his work, he is believed more easily and listened to with greater attention, he is offered better positions, his assays work well, data flow more reliably and form a more credible picture. (Latour & Woolgar, 1979: 204)

Both views see academic success as largely measured by recognition and, in turn, the process of acquiring recognition as dependent on the capacity to produce papers valued by one's colleagues.

While the approval of peers and the institutional recognition of one's discipline are significant motivating forces, reputation is hard-won. With institutional competition now governmentally sanctioned in many countries through regular research assessment exercises and the publication of university league tables, the need to publish and gain visibility is a major professional imperative. In terms of academic communications, this has resulted in the massive growth of rapid publication 'scientific letters' journals in the more fast moving sciences (Hyland, 2000), for instance, and to the increasing packaging of information to highlight novelty and newsworthiness in titles and abstracts and the frequent relegation of methods sections to the back of articles.

Self-citation is a rhetorical consequence of this growing competitiveness, affecting an author's visibility among colleagues and profile in the citation indices upon which his or her career might depend. Several researchers have noted the impact of this practice. White (2001) for instance, found that self-citation exceeded citations to others and represented "the core of the core" of citation identity of each of eight leading figures in information science. Extending White's study, Cronin and Shaw (2002) also show self-referencing to be an important component of scholars' academic identities, comprising the dominant form of recitation among their case study subjects. Phelan (1999) found that only two of the 56 most highly cited authors in the field of education did not cite themselves over a twelve year period, while 154 of the 280 citations (55%) received by one author were the result of self-citation. Peritz and Bar-Ilan (2001) point out that five papers published in *Scientometrics* in both 1990 and 2000 contained over 50% of self-citations and noted that about 30% of the papers in both years had rates of 20% or more.

Studies consistently show that self-citations account for between 10% and 20% of all citations, depending on field and the stage of development of the area (eg., Rousseau, 1999; Tagliacozzo, 1977). Most observers recognize that self-citation is a significant proportion of the reference network and has distinct characteristics, tending to be more recent and to exhibit a greater frequency of repetition, suggesting both the continuity of the work cited and its significance. It is interesting to note, however, that despite the prominence of self-citation, its extent seems to be unaffected by either the size of the bibliography or the author's productivity, suggesting that other motivational factors are at work.

Another, closely related, consequence of the changes in science has been the threat posed to the established conventions of impersonal reporting. For many, impersonality remains a hallowed concept, a cornerstone of the positivist assumption that academic research is purely empirical and objective, and therefore best presented as if human agency was irrelevant. The avoidance of self-mention is also supported by those who stress the persuasive authority of impersonality, a means of maximizing the writer's credibility by emphasising objectivity and the collective responsibility of academic endeavour (eg., Lachowicz, 1981: 111). "Objectivity" in the expression of ideas can thus mean removing oneself from one's arguments and allowing the research to speak directly to the reader in an unmediated way. For this reason many style manuals and textbooks recommend avoiding personal pronouns in favor of a more anonymous persona.

There is, however, a growing perception among rhetoricians and social theorists that these patterns of impersonality are giving way to more assertively promotional practices, a marketization of oneself and one's paper analogous to the promotion of goods (e.g., Fairclough, 1995). While claims have to be warranted by appropriate support and reference to existing knowledge, writers must also ensure that readers recognize their *individual contribution* and their assertion of *academic priority*, as these are the foundations

TABLE 1. Text corpora used in the study.

Discipline	Research articles		Abstracts	
	Texts	Words	Texts	Words
Sociology	30	224,500	100	14,300
Marketing	30	214,900	100	18,600
Philosophy	30	209,000	100	14,500
Applied Linguistics	30	211,400	100	17,200
Biology	30	143,500	100	20,600
Mechanical Engineering	30	114,700	100	16,000
Electronic Engineering	30	107,700	100	12,700
Physics	30	97,300	100	12,800
Totals	240	1,323,000	800	126,700

of a scholarly reputation. Increasing their visibility to readers by using rhetorical devices to explicitly announce their presence in the text and refer to their earlier work are important ways by which this can be achieved. Consequently, many authorities now view self-mention positively. *The Manual on Scientific Writing* (1993) and the authoritative *Council of Biology Editors Style Manual* (1978: 5), for instance, advise writers to employ the first person.

To summarize, the strategic use of personal reference and self-citation allows writers to emphasize and seek agreement for their own contribution to the field, claiming credit for their work by sending a clear signal that they are strongly behind it. So while impersonality may be institutionally sanctified and self-citation frowned upon, these conventions are constantly transgressed as writers come under pressure to promote their claims and themselves. I will now try to provide an empirical basis for some of these claims.

Procedures and Data

The study is based on an analysis of published articles and abstracts together with interviews with academics. The text corpus (Table 1) comprises 240 research articles, three from each of ten leading journals in eight disciplines, and 800 abstracts from the same journals. It was decided to examine abstracts as well as articles to investigate any rhetorical differences in the two genres. Abstracts are frequently seen as simple distillations of the contents of the main paper with little room for self-reference, but the close scrutiny readers often give them when deciding whether to give the paper further attention means that they provide an opportunity for writers to showcase both their research and their own professional credibility. The disciplines were selected to represent a broad cross-section of academic practice: mechanical engineering (ME), electrical engineering (EE), marketing (Mk), philosophy (Phil), sociology (Soc), applied linguistics (AL), physics (Phy), and microbiology (Bio). The journals were nominated by expert informants as among the leading publications in their fields, and the articles chosen at random from 1997 and 1998 issues. The texts were scanned to produce an electronic corpus of nearly 1.5 million words.

I was interested in the use of two major aspects of self-mention, those of self-citation and self-reference through the use of first person pronouns. The corpus was therefore searched for these expressions using *WordPilot*, a text analysis programme. The search items were the first person pronouns and determiners *I*, *me*, *my*, *we*, *us*, and *our*, cases of authorial self-citation and references to work conducted elsewhere by the same authors, and examples of terms such as *this writer* or *the research team*. Every reference to one of the authors' earlier works was counted as a self-citation, with two or more texts in a single mention tallied separately. All pronouns were examined to ensure they were exclusive first person uses and to determine their function. All forms of *we*, *us* and *our* which referred to participants other than the writers were eliminated.

Interviews were then conducted with two experienced researchers from each of the target disciplines, selected from senior teaching faculty members who were widely published in their fields. The interviews followed a semi-structured format of open-ended interview prompts which focused on the subject's own and others' writing, allowing them to both respond to texts as readers with insider understandings, while also discussing their own writing preferences and practices.

Results: Overall Frequencies and Forms of Self-Reference

The two most striking features of the corpus are the saliency of self-reference and its distributions among the disciplinary samples. Overall, there were 6,689 cases of self-reference in the articles and 459 in the abstracts, roughly fifty per 10,000 words in the former and thirty seven in the latter. This amounts to an average of almost 28 cases in each research paper, 17% of which were self-citations. The abstracts contained only one self citation in total and one self mention every two abstracts. Table 2, which gives the frequencies for both articles and abstracts normalised to a text length of 10,000 words, clearly shows that academic writing is not the faceless, formal prose it is often depicted to be. There are sufficient cases of self-reference to suggest that writers have promotional and interactional purposes, with every article containing at least one first person reference.

The disciplinary figures show broad similarities in the overall use of self-mention in the research papers, although Mechanical Engineers tended to refer to themselves far less frequently than the average, mainly because of fewer self-referential pronouns. More interesting, however, is the fact that almost 70% of all cases of self-reference occurred in the humanities and social science papers (Table 3), with an average of 38 per article, compared with only 17 in science and engineering. It is also interesting to note the significant differences in the use of self-citation and self mention, with 68% of self mentions occurring in the soft knowledge

TABLE 2. Frequency of self-mention in articles and abstracts (per 10,000 words).

Discipline	Research articles			Article abstracts		
	Totals	Citations	Mentions	Totals	Citations	Mentions
Average hard fields	45.7	14.4	31.3	19.1	0.0	19.1
Biology	56.2	22.6	33.6	28.7	0.0	28.7
Physics	49.2	8.7	40.5	18.0	0.0	18.0
Electronic Engineering	49.0	11.9	37.1	17.3	0.0	17.3
Mechanical Engineering	26.5	11.3	15.2	9.4	0.0	9.4
Average soft fields	53.2	5.4	47.8	52.6	0.2	52.4
Marketing	61.3	6.9	54.4	44.1	0.0	44.1
Philosophy	52.7	3.1	49.6	86.9	0.7	86.2
Applied Linguistics	51.8	4.5	47.3	41.2	0.0	41.2
Sociology	47.1	6.8	40.3	42.6	0.0	42.6
Overall	50.6	8.6	42.0	37.0	0.1	36.9

papers and 60% of all self-citation in hard disciplines, patterns which are repeated in the abstracts where the absence of self-citation shows the contrasts more starkly.

These distributions suggest both the importance of authorial presence and its possible relationship to different assumptions and practices of the disciplines. I will explore this possibility below.

Patterns of Self-Citation

Informetric research has noted that few articles contain no self-citations and that authors cite their own work more than others. The present study shows that while only one of the abstracts contained a citation to the author's previous work, self-citation was employed extensively in the research articles. Table 4 shows that about 70% of the articles in the study contained a reference to one of the author's earlier publications. Biologists employed the most self-citations overall with four times the number of cases than physics, although the fact that biology papers are typically up to 60% longer than in the other sciences and are more heavily citational overall meant that the proportion of self citation was no greater than the other sciences. The "cases per paper" columns in this table indicates the dispersal of items, with about a third of all papers containing four or more self-citations. Marketing and biology showed the greatest concentrations of self-citations, each with more than eight papers containing ten or more cases, with one article in each of biology, sociology and applied linguistics reaching thirty!

Table 5 reveals that self-citations comprised 7% of all references in the 240 research articles. Overall, citing one's own prior work is a particularly prominent feature of academic writing in the hard sciences where it made up over 12% of all references, compared with only 4% in the soft fields.

The factors which motivate writers to cite their own work are doubtless varied and complex, involving psychological factors influenced by the individual writer's confidence, experience and self-esteem. Self-report studies have generally attributed a rhetorical innocence to this behavior, with Bonzi and Snyder (1991) noting essentially similar reasons for self and other-citation and Tagliacozzo (1977) stressing the need for authors to connect their current to their prior work. No research occurs in a social vacuum, of course. Explicit reference to prior literature is a substantial indication of a text's embeddedness in the issues which engage the discipline and thus a vital piece in the collaborative construction of new knowledge within a field.

The dependence of arguments in networks of references not only suggests a cumulative and linear progression of knowledge, but acts to locate both writers and their claims within a recognised disciplinary framework. Where such reference is to authors' own prior work then this clearly provides additional support, emphasizing their sustained engagement in a common professional endeavour. Of some importance here is the fact that self-citation is an important means of demonstrating one's disciplinary credentials and standing. It enhances the writer's credibility by locating him or her in a shared intent to resolve a current disciplinary

TABLE 3. Frequency of self-mention per text (%) by field type.

Discipline	Research articles			Article abstracts		
	Totals	Citations	Mentions	Totals	Citations	Mentions
Hard fields	17.6 (31.6)	5.6 (59.1)	12.1 (26.1)	0.3 (25.9)	0.0 (0.0)	0.3 (26.0)
Soft fields	38.1 (68.4)	3.9 (40.9)	34.2 (73.9)	0.8 (74.1)	0.1 (100)	0.8 (74.0)
Overall	27.9 (100)	4.7 (100)	23.2 (100)	0.6 (100)	0.0 (100)	0.6 (100)

TABLE 4. Self-citation by discipline.

Discipline	Totals	Per paper			Cases per paper				
		Max	Min	Av	0	1–3	4–6	7–9	10+
Biology	324	30	0	10.8	2	9	5	4	10
Sociology	153	35	0	5.1	7	14	5	1	4
Marketing	148	17	0	4.9	7	9	3	2	8
Mechanical Engineering	130	11	0	3.7	8	15	4	2	1
Electronic Engineering	128	15	0	4.3	10	13	5	2	0
Applied Linguistics	96	32	0	3.2	13	6	8	1	2
Physics	85	5	0	2.8	7	15	8	0	0
Philosophy	65	3	0	2.2	15	11	4	0	0
Overall	1,159			4.8	29%	38%	18%	5%	10%

problem. In this way, participation in published research is perhaps the strongest demonstration a writer can make of his or her claim to be seen as an important player in a field and to have work taken seriously. Bonzi and Snyder's (1991) respondents mentioned the need to establish their authority in the field as a motivation for self-citation and this was also highlighted in the interviews I conducted with disciplinary informants:

> Everyone has to fit their research into a framework to make sense. I always cite my own work because people are more likely to listen if you are part of that framework. (Soc)
>
> Citing yourself is an important way of showing your familiarity with an issue. It shows you know what you are talking about and have something worth saying. (Bio)

By situating themselves within the literature they cite, writers enhance their authority. This helps to construct a solid disciplinary identity and increases the likelihood that their work will be accepted.

There are, however, substantial differences in the reporting practices of the disciplines. Reference to prior research plays a more visible role in the humanities and social sciences where issues tend to be relatively diverse, range over a wider academic territory, and are more detached from immediately prior developments (Becher, 1989). Writers draw on a literature which often exhibits greater historical and topical dispersion, being less governed by current imperatives and less dependent on a single line of development. This means that references are relatively diffuse and opportunities for self-citation are comparatively fewer than in the hard fields.

In contrast, references in sciences and engineering tend to be more tightly bound to a given research topic. Scientific claims, if accepted, are generally regarded as discoveries which augment an orderly and coherent sequence of accredited facts, new claims assimilate prior claims as each contributes to the incremental completion of a research puzzle. Citations in these fields closely define a specific context and contribute to the sense of linear progression often said to characterise hard knowledge (e.g., Kuhn, 1970). An important feature of such research practices is that scientists tend to participate in highly discrete and specialised areas of research. Scientists are coerced into a niche of expertise by the need to keep abreast of developments in their rapidly moving fields and the heavy investments in procedural capability and technical equipment that hard knowledge production often requires. As one of my informants pointed out, research on particular issues is often conducted at a restricted number of sites and by a limited number of researchers, and this allows writers to draw on their own work to a far greater extent than in soft fields:

> A paper in biology is not just a one off bit of isolated research. Projects tend to be expensive and may take a long time to set up and produce anything important. What we write up probably reports a piece of research that may be going on for years. We are continuously building on what we've done. (Bio)

While these self-reports offer plausible explanations for the different rhetorical practices of the disciplines, we cannot ignore the promotional role of self-mention as a potential factor in citational choices.

Biology is an interesting case in point here. We noted above that molecular biology had by far the greatest number of citations in the corpus and while the reasons for this are unclear, it appears to reflect the distinctive ways that biology pursues and argues problems and understands the scientific endeavor (Chargaff, 1974). Molecular biology is a

TABLE 5. Self-citations as a percentage of all citations.

Discipline	Total	% of all
Hard sciences	667	12.5
Biology	324	11.8
Mechanical Engineering	130	11.6
Electronic Engineering	128	9.3
Physics	85	11.0
Soft sciences	462	4.3
Marketing	148	6.1
Sociology	153	5.6
Applied Linguistics	96	5.0
Philosophy	65	3.9

TABLE 6. Frequency of self-mention per 10,000 words.

Discipline	Research articles				Research abstracts			
	Total	Singular	Plural	Other	Total	Singular	Plural	Other
Hard sciences	31.3	0.1	30.1	1.1	19.1	0.3	18.9	0.0
Physics	40.5	0.1	39.7	0.7	18.0	0.0	18.0	0.0
Electronic Engineering	37.1	0.0	35.8	1.3	17.3	0.0	17.3	0.0
Biology	33.6	0.2	32.3	1.1	28.7	1.0	27.7	0.0
Mechanical Engineering	15.2	0.0	13.9	1.3	9.4	0.0	9.4	0.0
Soft sciences	47.9	22.2	24.7	1.0	52.4	28.3	24.1	0.0
Marketing	54.9	2.3	51.0	1.6	44.1	0.0	44.1	0.0
Philosophy	49.6	47.4	2.2	0.0	86.2	76.5	9.7	0.0
Applied Linguistics	47.3	24.5	21.3	1.5	41.2	22.1	19.1	0.0
Sociology	43.3	16.8	25.4	1.1	42.6	23.8	18.8	0.0
Overall	42.0	14.4	26.6	1.0	36.2	14.6	21.6	0.0

distinctive science in that its methods are more descriptive, relying to a greater extent on "elegant models" than the mathematics of either physics or chemistry (Judson, 1995; Kellenberger, 1989). More importantly, Halloran (1984) has argued that there is also an entrepreneurial spirit in the discipline based on a notion of scientific knowledge as private property, a notion which originated with Watson and Crick's seminal 1953 paper which simultaneously offered a model of DNA and a model of the scientist:

> Both argumentatively and stylistically Watson and Crick put forward a strong proprietary claim to the double helix. What they offer is not *the* structure of DNA or *a* model of DNA, but Watson and Crick's structure or model. (Halloran, 1984: 75)

Francis Crick seems to endorse this ego-centred model of scientific activity in his memoir *What Mad Pursuit* when he says, "Rather than believe that Watson and Crick made the DNA structure, I would rather stress that the structure made Watson and Crick" (Crick, 1990: 76). Clearly authorial mention might contribute to an ethos which emphasises proprietary rights to claims. A rhetorical practice which promotes the individual as well as the idea would play an important role in establishing a researcher's credibility and reputation and may well help explain the proclivity for self citation and, as we shall see, authorial pronouns, in this discipline. In the next section I turn to examine the part played by first person pronouns in the management of self-presentation.

Patterns of Self-Mention in Published Research

A more prominent form of self-mention than referring to one's previous published research is the use of authorial pronouns. This study found that there were substantial contrasts in how they were employed by different disciplines in the corpus. Table 6 shows the distribution of singular (*I, me, my*) and plural (*we, us, our*) pronouns and determiners together with other references to the authors (*this laboratory, the research group*). Once again there is an imbalance between the hard and soft fields, with three quarters of all cases in both the abstracts and articles occurring in the humanities and social science papers. The differences are particularly marked in the abstracts which contained 74% of all cases. Frequencies were particularly high in marketing articles and in philosophy abstracts and relatively rare in the mechanical engineering corpus. The subjective cases (*I* and *we*) comprised over 70% of all pronouns, a result of writers deciding to represent themselves as the initiators of the actions they report.

These distributions again reflect the different ways that the disciplines conduct research and persuade readers to accept their results. Broadly speaking, writers in the hard sciences are seeking to establish empirical uniformities through research activities that involve precise measurement and systematic scrutiny of a limited number of controlled variables. Hard knowledge tends to be universalistic and to be motivated by conceptual issues. Research therefore usually consists of conducting experiments to propose solutions to specific disciplinary problems and typically involves familiar procedures, broadly predictable outcomes, and relatively clear criteria of acceptability (eg., Becher, 1989; Whitley, 1984).

As a result the writer can downplay his or her personal role in the research in order to highlight the phenomena under study, the replicability of research activities, and the generality of the findings. By electing to adopt a less intrusive or personal style, writers can strengthen the objectivity of their interpretations and subordinate their own voice to that of unmediated nature. Such a strategy subtly conveys an empiricist ideology that suggests research outcomes would be the same irrespective of the individual conducting it.

The high proportion of personal pronouns in the humanities and social sciences, on the other hand, suggests a quite different rhetorical stance. The maintenance of an effective degree of personal engagement with one's audience is an extremely valuable strategy when probing connections between entities that are generally more particular, less pre-

cisely measurable, and less clear-cut than in the hard sciences. Because variables are often more heterogeneous and causal connections more tenuous in the soft fields, arguments tend to be more explicitly interpretive and the success of authors in gaining acceptance for their arguments depends to a larger extent on the their ability to invoke an intelligent, credible and engaging persona (Hyland, 2000). The decision to employ a first person pronoun in these fields is related to the desire to present oneself as an informed and reliable colleague, strongly identifying oneself with a particular view to gain credit for one's individual perspective or research decisions:

> Using 'I' emphasizes what you have done. What is yours in any piece of research. I notice it in papers and use it a lot myself. (Soc interview)

The personal pronoun 'I' is very important in philosophy. It not only tells people that it is your own unique point of view, but that you believe what you are saying. It shows your colleagues where you stand in relation to the issues and in relation to where they stand on them. It marks out the differences. (Phil interview)

Self-mention therefore assists authors to make a personal standing in their texts and to demarcate their own work from that of others. It helps them distinguish who they are and what they have to say.

Despite their relative underuse of self-mention however, writers in the hard sciences were not rhetorically invisible and, in particular, made considerable use of plural pronouns in their texts. The papers in the sciences, engineering and marketing fields were overwhelmingly multiple-authored, yet the relatively high use of the plural is only partly explained by these patterns of authorship. The decision to use *we* by writers of single-authored articles is often said to indicate less personal intrusion, but it is not always the self-effacing device it is sometimes thought to be. While the plural meaning may distance the writer from the text, it also claims the right to speak with authority, emphasising the importance that should be given to his or her unique procedural choices or views.

This appears to be predominantly a feature of scientific writing, as the 16 single-authored papers in the hard knowledge corpora yielded only a handful of singular forms but contained 80 plural first person pronouns. In contrast, the 75 single authored papers in the humanities and social sciences included only 8 plural first person forms. Commenting on his understanding of this usage, a professor of physics observed that:

> I suppose we are generally encouraged to keep ourselves in the background in our writing, to give prominence to objective physical events, but of course we are involved in research and using 'we' emphasizes this. It avoids generalities and focuses on specifics without being too aggressively personal. (Phy interview)

In sum, these rhetorical conventions of self-reference contribute to the kind of relationship that the writer establishes with the reader and these rhetorical preferences are at least partly influenced by a disciplinary community's epistemological beliefs and social practices.

How Writers Use Self-Reference

In addition to the frequency of self-reference, the points at which writers choose to make themselves visible in their texts have considerable rhetorical importance, indicating what they are prepared to make commitments to and what they seek to claim credit for. I therefore examined all the abstracts and a sample of ten articles from each discipline to identify the activities with which self-mention was associated. This revealed four main purposes, listed here with some examples from the corpus:

- Stating a goal or outlining the structure of the paper
  In this article *we re-examine* the two-dimensional particle in a box and derive the. . .. (Phy)
  In section 1, *I shall explain* how PDP works. In sections II-IV, *I shall consider* three main types of objections to my thesis. (Phil)
  In this paper, *we clearly demonstrate that* Tax can activate transcription of the CQB promoter through the NF-Y element. (Bio)
- Explaining a procedure
  I also examined the linguistic process of nominalization. (AL)
  We acid-shocked cells in the presence of the nonspecific Ca^{2+} channel inhibitor La^{3+}. (Bio)
  We analysed the effect of the thermal couplings on the properties of an operational amplifier. (EE)
- Stating results or making a claim
  We have demonstrated that MCP can be used to form single- and multiple-helical . . . (ME)
  Likewise, *I have offered evidence* that some critical thinking practices may marginalize. . . (AL)
  We found that more subjects mentioned beneficial and imagery attributes underlying their preference judgment. (Mkt)
- Elaborating an argument
  But *my point here is* that these laws are not enough for a complete vindication of Relevance. (Phil)
  It is in this spirit that *I offer my own contribution* to the debate. *I want to set out* a slightly different approach to those taken in the above articles . . ..(Soc)
  In the course of these measurements, *we noticed that* electrons induced thickness variations on the surface of the films. (Phy)

Table 7 shows that the most frequent use of the first person in the research papers was to explain a procedure, while in all disciplines in the abstracts it was to align writers with their knowledge claims.

The research articles show a considerable use of the first person to present procedures and arguments. In the hard knowledge corpus, and in the more quantitatively focused papers in the soft fields, this typically involved writers setting out the methods they had used. Author prominence here reassures the reader of the writer's professional cre-

TABLE 7. Functions of self-mention (%).

	Total									
	Raw	%	Bio	Phy	EE	ME	Phil	Soc	AL	Mkg
Research articles										
Function										
Explaining a procedure	400	38	57	46	50	49	5	26	39	44
Stating results or claim	273	26	19	19	15	18	30	28	25	26
Elaborating an argument	220	21	15	17	20	14	41	20	25	19
Stating a goal/ structure	158	15	9	18	14	18	24	26	11	11
Totals	1051									
Percent		100	100	100	100	100	100	100	100	100
Research abstracts										
Function										
Stating results or claim	171	37	41	39	33	40	36	33	36	40
Stating a goal/ structure	119	26	18	26	29	25	30	30	25	22
Elaborating an argument	95	21	8	13	5	13	31	20	23	21
Explaining a procedure	73	16	33	22	33	18	3	17	16	17
Totals	458									
Percent		100	100	100	100	100	100	100	100	100

dentials through a familiarity with disciplinary research practices. But in addition to a display of competence, it also highlights the writer's role in a process that is often represented as having no agents at all. By inserting themselves into their research activities, writers are able to inject an element of qualitative judgement that reminds readers that, in other hands, things could have been done differently and that personal choices have been made.

In more theoretically-oriented and discursive articles, the emphasis is less on methods than the careful elaboration of a convincing argument. Explicit self-mention here does not stress personal credibility through procedural competencies but underlines the writer's unique role in constructing a plausible interpretation for a phenomenon, establishing a personal authority based on confidence and command of an argument:

> I'm very much aware that I'm building a façade of authority when I write, I really like to get behind my work and get it out there. Strong. Committed. That's the voice I'm trying to promote, even when I'm uncertain I want to be behind what I say. (Soc interview)

> You have to be seen to believe what you say. That they are your arguments. Its what gives you credibility. It's the whole point. (Phil interview)

Table 7 also shows writers used authorial pronouns when stating the purpose of their papers and outlining its structure. Framing of this kind helped clarify both the direction of the research and the schematic structure of the argument and was particularly frequent in the abstracts, where this information plays an important role. This function is very different from outlining an argument or procedural decisions as it carries little risk of criticism. However, this strategy not only allows writers to clarify the goal and direction of their papers, but also to align themselves with their main position, giving a strong indication of where they stand in relation to the issue under discussion. Once again, this explicitly foregrounds the writer's distinctive contribution and commitment to his or her position.

This explicitly persuasive use of self-mention is most obvious where it is used to summarise a viewpoint or make a knowledge claim. Author pronouns are heavily associated with this function in the research articles in the soft knowledge fields and are prominent in all disciplines in the abstracts. The abstract is particularly important in research writing because, after the title, it is generally the readers' first encounter with a text and the point where they decide whether to read on and give the accompanying paper further attention, or to ignore it. Unlike research articles, where writers seek to gain certification of their claims as legitimate knowledge, abstracts have both a more modest and more urgent purpose: to persuade readers that the article is worth reading. The research and the writer are therefore under close scrutiny in abstracts and, because of this, writers tend to foreground their main claims here. To gain readers' attention and persuade them to read on, writers demonstrate that they have both something new and worthwhile to say, and the professional credibility to address the topic.

Perhaps more than in any other function, the use of self-mention to personally stake a claim suggests the conscious exploitation of a strategy to manage the reader's awareness of the writer's role. By strongly linking themselves to their claims, writers can solicit recognition for both.

> If there are good reasons for a particular interpretation, all the data point the same way to the same conclusion, then I'm happy to pin my colours to the mast. You have to make

sure that what you've done gets noticed so that you to get recognised for it. (Mkt interview)

It's conventional to use these formulas to keep yourself out of the picture. They are just conventional ways of expressing inference. Sometimes though you need to be explicit about what you think, that the contribution is your own. (ME interview)

Once again then, this is not a simple reporting of results or procedures, but an expression of the participants' custody and personal ownership of what they report. It is a rhetorical strategy of promotion.

Conclusions

I have argued that self-citation and personal reference are not just stylistic features of research writing but significant means of promoting a scholarly reputation and gaining professional credit for one's research.

Self-mention is important because it plays a crucial role in mediating the relationship between writers' arguments and their disciplines. The distribution of these features shows that while there are pressures towards self-citation, not all disciplines play by the same rules, sanctioning different degrees of authorial presence. Persuading peers of the value of one's research and building a reputation through publication involves more than simply pressing one's personal contribution to the discipline on readers. It also demands a demonstration of familiarity with the rhetorical conventions and epistemological assumptions of one's discipline. It should also be remembered that these disciplinary conventions are enabling rather than deterministic, and typical patterns of self-mention only provide broad perimeters of choice. But while factors such as seniority, experience, confidence and so on are also likely to influence these decisions, the points at which writers choose to announce their presence in the discourse are those where they are best able to promote themselves and their individual contributions.

Acknowledgment

I am grateful to Ronald Rousseau for his advice and encouragement in writing this paper.

References

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

Becher, T. (1989). Academic tribes and territories: intellectual inquiry and the cultures of disciplines. Milton Keynes, UK: Society for Research into Higher Education and Open University Press.

Bonzi, S., & Snyder, H.W. (1991). Motivations for citation: a comparison of self citation and citation to others. Scientometrics, 21(2), 245–254.

Bourdieu, P. (1991). Language and symbolic power. Oxford: Polity Press.

Chargaff, E. (1974). Building the Tower of Babel. Nature, 248 (April 26), 778.

Council of Biology Editors Style Manual, 4th Ed. (1978). Washington, DC: American Institute of Biological Sciences

Crick, F. (1990). What Mad Pursuit. London: Penguin Books.

Cronin, B., & Shaw, D. (2002). Identity-creators and image-makers: using citation analysis and thick description to put authors in their place. Scientometrics, 54 (1), 31–49.

Fairclough, N. (1995). Critical discourse analysis. Harlow: Longman.

Garfield, E. (1979). Citation indexing: its theory and application in science, technology and humanities. New York: Wiley.

Hagstrom, W.O. (1965). The scientific community. New York: Basic Books.

Halloran, S. (1984). The birth of molecular biology: an essay in the rhetorical criticism of scientific discourse. Rhetoric Review, 3, 70–83.

Hyland, K. (1999). Academic attribution: citation and the construction of disciplinary knowledge. Applied Linguistics, 20(3), 341–367.

Hyland, K. (2000). Disciplinary discourses: social interactions in academic writing. London: Longman.

Judson, H. (1995). The eighth day of creation: the makers of the revolution in biology. Harmondsworth: Penguin Books.

Kellenberger, E. (1989). Origins of molecular biology. Plant Molecular Biology Reporter, 7, 231–234.

Kuhn, T. (1970). The structure of scientific revolutions. 2nd ed. Chicago: University of Chicago Press.

Lachowicz, D. (1981). On the use of the passive voice for objectivity, author responsibility and hedging in EST. Science of Science, 2(6), 105–115.

Latour, B., & Woolgar, S. (1979). Laboratory life: the social construction of scientific facts. Beverly Hills: Sage.

Lawani, S. (1982). On the heterogeneity and classification of author self-citations. Journal of the American Society for Information Science, 33, 281–284.

Manual on scientific writing. (1993). Collingwood, Vic: Tafe Publications.

Peritz, B., & Bar-Ilan, J. (2001). The inside-outside looking of the field of bibliometrics-scientometrics as reflected in references. In Davis, M., & Wilson, C. (Eds). Proceedings of the 8th international conference on scientometrics and informetrics. (pp 511–522) Sydney: BIRG

Phelan, T.J. (1999). A compendium of issues for citation analysis. Scientometrics, 45(1), 117–136.

Pichappan, P., & Sarasvady, S. (2001). The other side of the coin: the intricacies of author self-citations. In Davis, M., & Wilson, C. (eds). Proceedings of the 8th international conference on scientometrics and informetrics. (pp 523–527) Sydney: BIRG

Rousseau, R. (1999). Temporal differences in self-citation rates of scientific journals. Scientometrics, 44(3), 521–531.

Tagliacozzo, R. (1977). Self-citations in scientific literature. Journal of Documentation, 33(4), 265.

White, H. (2001). Authors as citers over time. Journal of the American Society for Information Science and Technology, 52(2), 87–108.

Whitley, R. (1984). The intellectual and social organisation of the sciences. Oxford: Clarendon Press.