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An interview-based study of the functions of citations in academic writing across two disciplines

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Abstract

This paper is an emic, interview-based study of computer scientists' and sociologists' accounts of the functions of citations in their writing. Twelve informants took part in the research, commenting upon their citations in one of their own articles. Informants were not provided with functional checklists, and were free to ascribe as many functions to each citation as they wished. Eleven citation functions are identified and described, and evidence of inter- and intra-disciplinary similarities and differences is provided. While the computer scientists used citations to direct their audience to further reading more often, the sociologists' texts featured more cases of critical citations. The type of paper informants were writing (e.g. theoretical/empirical), the anticipated audience, and the publication outlet resulted in intra-disciplinary differences. Over half of the citations in both fields were said to have more than one function. The insights and implications of the study are discussed.

Keywords: Citation analysis; Academic writing; Scholarly communication; Disciplinary differences

1. Introduction

Citation analysis has interested information scientists, sociologists of science, and applied linguists (for useful overviews, see Bornmann and Daniel, 2008; Nicolaisen, 2007; Small, 1982; White, 2004). While there have been many studies investigating citation function and citer motivation, the methods and instruments employed by these studies have been criticized. Traditionally, citations have been studied using content/context analysis, whereby the analyst determines the function/motivation on the basis of the surrounding text. However, these methods are limited because citation functions and motivations may not be apparent simply by studying the text. This is partly because effective analysis sometimes requires specialist knowledge in the discipline of the texts being studied. It is also because, as Cronin (1984, 2005) has argued persuasively, citation is a private and subjective process, and motivations/functions cannot straightforwardly be read off by the textual analyst, however specialized his/her knowledge. Furthermore, both methods tend to impose preconceived motivations on informants which derive from the literature and/or from the researcher's intuitions rather than from the citers themselves (e.g. Borgman and Furner, 2002).

Although it is true that more recently informants *have* been consulted about their citing behaviour (e.g. Bonzi and Snyder, 1991; Brooks, 1985, 1986; Cano, 1989; Case and Higgins, 2000; Liu, 1993; Shadish et al., 1995; Snyder and Bonzi, 1998; Vinkler, 1987), as White and Wang (1997) point out, this body of research also suffers from obvious

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methodological weaknesses. Once again, these studies presented informants with ready-made checklists which they were encouraged to equate with their own citation functions and motivations. While some of these studies take account of informants' ad lib explanations, such input is minimal. Consider, for instance, Shadish et al.'s (1995) research. Even though the researchers obtained some of the categories contained in their checklists by means of interviews with researchers, these same informants were not included in their actual study. Consider also Brooks' (1985) instrument, whose rating scale features seven motivations selected "arbitrarily" from the literature (p. 225). While Brooks gave his 26 informants the opportunity to nominate their own motivations, just two did so. Although this could indicate that the motivations Brooks provided were on the mark, it is also possible that his informants chose those ready-made motivations which they judged to be closest to (but did not exactly correspond with) their *actual* motivations. Indeed, Shadish et al. (1995) are aware of the need to allow informants to provide their own accounts of citation functions, aptly concluding:

> "...even though we conducted in-depth interviews with a few colleagues to discover features of their citation practices at the start of this study, we may have closed off this discovery process too early. If we had interviewed more colleagues, or colleagues in other settings and departments, we might have encountered quite different perceptions of the meanings of citations. And in using a closed-ended impersonal questionnaire, we probably did not encourage our respondents to go beyond this format in educating us about their practices. So we might still be able to learn much about citation practices by returning to more open-ended, discovery-oriented methods." (p. 494)

In common with Wang and White's studies, then (Wang and White, 1999; White and Wang, 1997; also Wang and Soergel, 1998), the present study provided authors with no categories or checklists at all, eliciting citation functions by means of extended semi-structured interviews which focused on a recent publication by the informant. Authors were free to ascribe as few or as many citation functions to any reference[1] they wished: given that researchers like Brooks (1985, 1986) have shown that citers' motivations may be complex, it would seem sensible not to debar authors from identifying multiple citation motivations and functions. This study is therefore intended to be an emic account of citation functions, an attempt to "uncover the unseen" (see Cronin, 2005:75), since "the concern is to catch the subjective meanings placed on situations by participants" (Cohen et al., 2000:139) rather than by the interviewer. It features extended interview extracts with the aim of providing the reader with a detailed explication of citing functions. It also breaks these functions down into more subtle sub-classifications. In addition, anonymized extracts from the informants' texts accompany the interview data, so the reader can better appreciate both the context in which the citations occur and the informants' accounts.[2] This work differs from Shadish et al. (1995), Case and Higgins (2000), and Wang and White's studies, in that it focuses on two disciplines, computer science and sociology, rather than one. Two disciplines were compared and contrasted because previous studies of citation, discussed below, have provided evidence of disciplinary differences which I wanted to explore further. Hence two contrasting disciplines ("hard" and "soft" in Becher and Trowler's (2001) terms) were chosen. Findings indicate inter- and intra-disciplinary differences with regard to (i) how specific citation functions are used; and (ii) the most frequent citation functions. While the small number of informants involved in this study preclude me from making confident claims about the generalizability of the (in)frequency of these citation functions across these two disciplines as a whole, I compare and contrast the findings reported here with earlier work, and close by evaluating the strengths and weaknesses of the interview-based approach to citation analysis, and identifying directions for further research.

2. Other citation studies

As Small (1982) points out, while there are a number of citer motivation/function schemes, these have a considerable amount in common. Small (1982) shows how the schemes he compared, including Chubin and Moitra (1975), Cole (1975), Frost (1979), Lipetz (1965), Moravcsik and Murugesan (1975), Murugesan and Moravcsik (1978), Oppenheim and Renn (1978), and Spiegel-Rösing (1977), all feature some type of "use" category, "when the citing author...employs some aspect of the cited work" (p. 300), such as Lipetz's (1965) "used" category, or

[1] The terms 'citation' and 'reference' are used interchangeably throughout.

[2] In contrast, Frost (1979) features invented examples, rather than extracts from the texts she analyzed in her dataset.

Oppenheim and Renn's (1978) ''use of equation, methodology'' category. Those citations which the citing author ''improves, modifies, or extends'', like Moravcsik and Murugesan's (1975) evolutionary type, are a subclass of this ''use'' category. Similarly, most schemes feature categories in which sources are reviewed, compared, and/or contrasted (e.g. Frost's (1979) ''state of present research''; Oppenheim and Renn's (1978) ''information or data for comparison''). While the supporting/substantiating category was only introduced once researchers began to look at citations in the humanities and social sciences (e.g. Spiegel-Rösing's (1977) ''substantiates statement or assumption''), more recent classifications (e.g. Bonzi and Snyder, 1991; Vinkler, 1987) which focus on the sciences have also included it. Finally, all the schemes feature negative citation. In some of the schemes (e.g. Cole, 1975; Moravcsik and Murugesan, 1975), this merely consists of a single category, whereas others (e.g. Chubin and Moitra, 1975) distinguish between full and partial negation.[3]

By comparing the relative frequencies of citation functions the schemes have in common, Small (1982) is able to demonstrate that there is evidence of inter-disciplinary variation. So while fully 60% of Moravcsik and Murugesan's (1975) physics citations fall into the ''applied/used'' category, only 1% of Frost's German literary criticism citations do so. Hence it would appear this function is far more frequent in the sciences than in the humanities. More recent citation studies continue to find evidence of inter-disciplinary variation, including Brooks (1985), Charles (2006), Peritz (1983), and Thompson (2001). There also exists evidence of intra-disciplinary citation variation. Chubin and Moitra (1975) claim that intra-disciplinary differences can be accounted for by considering the type of paper (in their case, letters versus full-length physics articles). Other studies which identify intra-disciplinary variation include Moravcsik and Murugesan's (1978) study of physics journal articles, and in this case the variation is put down to the journals' different geographical locations and audiences.

The remainder of this section focuses exclusively on those studies which take authors' interview data into account, given its relevance to the present research. Most notably, Wang and White's innovative interview-based studies of citing behaviour are pertinent here (Wang and White, 1999; White and Wang, 1997; also Wang and Soergel, 1998). These studies attempt to account for agricultural economists' referencing by keeping track of informants' selection, reading, and (non-)citing of source material over a period of three years in which they were preparing, conducting, and finally writing up their research. While these studies are primarily concerned with informants' *reasons* for citing, rather than the *functions* the citations effect, several functions (called ''contributions'' by White and Wang, 1997) emerge from the accounts. These functions include identifying the originator of a concept/theory/approach; acknowledging others' methods, frameworks, concepts, or definitions which the citers use; suggesting or justifying an idea, often that the research focus is worthwhile; supporting the citer's discussion/findings; and alerting readers to sources. Additionally, informants mentioned 28 criteria potentially affecting their citing decisions. These criteria included the depth at which the source treated the topic, the audience a source was aimed at, the quality of the source, how easy/difficult the source would be for readers to access, the recency of the source, whether the authors of the source were known to the author (for instance, when the author was in the citer's department), and, particularly where potential self-citations were concerned, whether the source would ''support [the citer's] own appearance of expertise'' (White and Wang, 1997:150). In line with Brooks (1985, 1986), Wang and White (1999) found evidence for complex decisions; that is, White and Wang found that writers commonly focused on a number of criteria—between 3 and 13—when accounting for their citing decisions during interview. White and Wang (1997) also focused on individual informants' metalevel documentation concerns which reflected authors' ''general set of guidelines'' they applied when citing. Different authors had different priorities, and one of the distinctions noted by White and Wang was the authors' identification with the ''researcher'' or ''teacher'' role. Those identifying with the former ''limit their citations only to materials playing a substantial role in their own work''; while those identifying with the latter ''document broadly, leading [readers] to related materials'' (p. 144).

Mention should also be made of recent pieces of work by Hyland (1999, 2003) and Rock (2005). As part of his primarily textually focused investigations of disciplinary differences in academic writing, Hyland has looked at citation and self-citation. In his earlier study, Hyland (1999) analyzed citations in a corpus of 80 research articles from eight disciplines, and triangulated his textual analysis by interviewing ''one experienced and well-published researcher from each discipline. . .about his or her own citation behaviours and their thoughts on disciplinary

[3] It is also worth noting that more recent discourse analytic research focusing on academic criticism (Salager-Meyer, 1999) similarly distinguishes between 'strong' and 'weak' forms of negation.

practices'' (p. 345).[4] Part of Hyland's analysis focuses on reporting verbs used when citing, and he notes that only the humanities and social science articles in his corpus contained reporting verbs characterizing the source as unreliable (e.g. *fail*, *overlook*, *exaggerate*, or *ignore*). This is attributed to the ''more disputational style of argument'' (p. 362) found in the soft knowledge fields. His philosophy informant explains why citing is needed when engaging in such disputation:

> ''Citing allows you to debate with others, the questions have been around a long time, but you hope you are bringing something new to it. You are keeping the conversation going, adding something they haven't considered.'' (p. 358)

Hyland's sociology informant also confirms that citations allow authors to ''locat[e] one's thesis in a particular intellectual milieu'' (Cronin, 2005:143):

> ''I've aligned myself with a particular camp and tend to cite people from there. Partly because I've been influenced by those ideas and partly because I want them to read my work. It's a kind of code, showing where I am on the spectrum. Where I stand.'' (p. 359)

Rock (2005) also included interview data in his study of criminologists' views of citation. Citing recent literature, according to some informants, helps persuade the readership of the citer's competence:

> ''. . .if you're trying to show that you are writing something that's credible and authoritative. . .including new references suggests to the reader you're keeping yourself on top of your field.'' (p. 482)

Some informants made clear that citations which acknowledged others' ideas helped protect them against accusations of plagiarism and dishonesty:

> ''I'm driven more by the fear that I won't attribute, that I'll appear to be plagiarising, stealing ideas and so on. . .''. (p. 481)

And some informants talked about the ''patronage'' of citation, in that they cite to promote less powerful associates whose profiles need raising:

> ''I suppose what I've done sometimes is. . .cite Master's dissertations or. . .things where somebody's done some really interesting work, and I. . .see that as a way of promoting them. . .[where] perhaps they're not exposed or well known about.'' (p. 489)

3. Methodology and procedure

Since an emic approach necessitates seeing citation through the informants' eyes in order to provide ''insider accounts'', the obvious choice of instrument is the qualitative interview. However, two obvious reliability issues associated with interviews concern informants' recall error and lack of awareness (see Patton, 2002). That is, we need to minimize the risk that informants will say their citations perform certain functions when the reality is quite different. We also need to minimize the risk that informants may simply not be sufficiently aware of how they cite to be capable of providing a detailed account. Rather than discuss citation functions generally, then, the solution lies in getting writers to do so while referring to one of their own texts, which they re-read and reconsider throughout the interview, a method labelled the discourse-based interview approach (Odell et al., 1983) by applied linguist writing researchers. I had used this approach in an earlier study of academic writers' pronoun use (Harwood, 2006, 2007), and adopted a similar procedure here.

Potential informants from the computing and sociology departments of a British university were chosen at random and contacted via email to ask whether they would be willing to participate in the study. Those who responded positively were then asked for a paper or electronic copy of a recent journal article or book chapter they had published.[5] The study was limited to six informants from each department, identified as CS1–6 in the case of the computer scientists and SOC1–6 in the case of the sociologists. I read informants' texts carefully in advance of the

[4] These interviewees did *not*, however, include any writers of the texts which comprised Hyland's corpus.

[5] I requested a recent article in an attempt to lessen the problems of informant recall (see Vinkler, 1987). This issue is discussed later on.

interview, highlighting all the citations. During interview, the informants were asked to explain what function(s) each citation had.[6] Given the semi-structured format, both interviewer and interviewee were free to develop the ongoing conversation (see Holstein and Gubrium, 1995; Kvale, 1996), meaning that I was able to ask the informants about issues connected with their citation patterns which struck me as potentially significant, either as I read their texts in advance or as a result of their responses during our discussion. So for instance, upon reading some of the sociologists' texts which used Harvard System conventions, I noticed that occasionally sources' first names as well as family names were used. In contrast, some of the computer scientists could have avoided naming sources entirely because they were using the footnote system, and yet did not always do so. In other cases, I noticed authors had explicitly evaluated their source, with one of the informants describing two papers he cited as ''admirable''. I also noticed some authors used imperatives like ''see'', ''but see'', and abbreviations like ''e.g.'' and ''c.f.'' before citations. The semi-structured format also meant that I was free to probe and prompt where I felt further clarification or explanations were in order. All of this enabled me to collect richer, more substantive data.

During the analysis I read through the interview transcripts, summarizing the informants' views, grouping these summaries and describing them more precisely under headings. The data was then re-examined in its entirety and coded. During coding, the citation functions and definitions were revised and renamed to truly reflect the nature of informants' comments more precisely. This modified list was then used to code the entire dataset a second time. Harwood (2008) and Harwood (in press-b) report further results.

4. Findings

4.1. Qualitative analysis

Eleven citation functions were identified as a result of the interviews, and the terminology used to describe each function is derived from the informants' words rather than from the researcher. Interview extracts and excerpts from informants' texts are reproduced, and examples of multifunctional citations are also included. The majority of the analysis is devoted to the most frequent functions.

(1) SIGNPOSTING

Signposting citations direct readers to other sources. They do so for three main reasons, namely (i) to help/interest less informed readers; (ii) to keep the argument on track; and (iii) to save space. Extracts from each group are discussed below.

(A) Helping and interesting less informed readers

(i) Introductory reading

Signposting references allow authors to address different audiences with varying amounts of specialist knowledge. Because CS6's text will be appearing in an edited book rather than a journal, he anticipates that part of the audience will require signposts to ''general reading'', citations which would not have been included if he had been writing a journal article. He writes: ''Exactly what led to this. . .is still the focus of much debate, but climatic conditions are accepted as at least one of the major factors [reference]'', and explains:

(1) . . .this [reference] was one of those attempts to address the general audience. . .This is more like the kind of book I tell my students to read in the beginning, it's general reading to become more interested, know about the main questions in the area.[7]

(ii) Making methodology accessible

Informants were aware that their less knowledgeable readers required signposts to introductory sources in order to grasp methodological processes. In the extract below, we are discussing CS5's passage

[6] Not all informants accounted for all of the citations in their texts, however, in spite of prompting. This issue is discussed later.

[7] Repetitions and hesitations have been removed from the transcripts. Dots (. . .) indicate part of the dialogue has been omitted, and square brackets indicate that I have added information for the sake of clarity. Textual excerpts are anonymized by substituting letters like x, y, and z for salient information which would make identifying the author easier.

''In the first method, AR coefficients were computed using X's method [3 references]'', where X, the originator, only wrote one of the three sources cited:

(2) X [who authored reference 1] actually came up with the method in '58. But the way that he described I guess very few people would be able to understand, it was too mathematical. . .. So these two authors [of references 2 and 3]. . .actually give better descriptions about the equations and how to go about using the equations. So the actual reference is [1] but it's difficult to follow [1], so I'm giving more references so that others can understand by following reference [2] and [3]. . ..

(B) Keeping the argument on track

(i) Avoiding tangential details, definitions, and methodological explanations

CS4 explains the function of the citation in the next extract as ''helping keep the argument clear'' as regards the explication of method. Signposting keeps things concise and ensures the reader is not sidetracked by peripheral concerns:

(3) . . .I want to refer to some technique [by citing] and to say this is how we do it. . .If you want to know how the technique works, you gotta go back and read it up [in the cited reference], because this [i.e. CS4's article] is not the place [to do so].

(ii) Avoiding detailed discussion of earlier work

In his article, SOC4 looks back over 40 years of research in a particular area of sociology, revisiting and reworking the data from several of his earlier studies. Hence he includes the following passage:

(4) A discussion of the effects of x. . .suggested that the social divisions were likely to widen [reference].

SOC4 reports that ''I've had to summarize briefly, if they [the readers] want to know more they've got to go to the original''. Hence signposting citations of this type enable writers to keep their focus clear while summarizing principal findings.

(C) Saving space

(i) Equations and algorithms

CS2 talks about saving space in relation to deriving equations. By writing ''The derivation of [equation] (4) is described by [reference]'', he has saved ''several pages'' of space, because the self-citation he signposts readers to contains full details of the derivation in question:

(5) The original papers referred to there went through this derivation. . .[which] took several pages in the original paper. And we don't want to spend several pages just repeating that derivation here. So it's basically a way of saying I'm going to give you a brief description now. . .. If you want the full details they're there. . ..

(ii) Complex issues

SOC4 talks about a very important anthropological concept at the start of his article, signposting the audience to another source for more details (''X's essay. . .was first published in [year] and the debate. . .has raged strongly within the discipline over the following thirty years [reference]''). SOC4 explains his intentions as follows:

(6) . . .having raised a complex issue, I don't have to go into huge detail which I don't have time to do or space to do. . .So the strategy is to raise it, to get the concept out of the box. . ., and then shut the box, cos it could go on for ever, by saying 'If you want to know more about this, read [reference]'.

(2) SUPPORTING

Supporting citations help authors justify (i) the topic of their research; (ii) the method/methodology employed; and/or (iii) the authors' claims.

(A) Justifying the topic of research

CS5 talks about how his citations "give examples of what people have done" from the literature. These citations help CS5 argue that the topic of his research is attracting the interest of the community ("the volume and pace of. . .research have grown tremendously over the years [reference 1,2]"), underscoring the newsworthiness of his contribution.

Similarly, CS3's citations to other literature justify the topic of research, but in this case by helping to create a research space (Swales, 1990), underlining that no one else in the field has carried out an equivalent study:

(7) The idea of automatically acquiring domain models from documents is not new.. . .However, this research has so far not focused on the use of x but on y or z, e.g. [3 references].

The citations reveal a gap which CS3 proceeds to fill.

(B) Justifying the method and methodology employed

Supporting citations can be deployed if authors anticipate readers' and/or reviewers' objections to the handling of methodological issues. In the following extract, for instance, CS3 is describing how he conducted his experiment:

(8) There were 8 cases in which users did not submit any answer. . .. In those cases we added a 60 s penalty to the 10 min as suggested by [reference] in a similar evaluation task.

He explains:

(9) . . .I adopted somebody else's methods for this particular purpose and said this is what we're doing, and this is what they've done in a similar experiment. . .

(C) Justifying claims

(i) Rallying evidence

Before we begin to examine his text, SOC2 conceptualizes citations as means of support, talking about how they help him "rally the evidence", bringing "authoritative strength to what I'm saying". Similarly, once we begin discussing his article, SOC2 talks about how certain citations "nail and close down" a point. His comments on the following extract are a typical example:

(10) For the victimized individual, there are arguably distinct psychological and emotional harms, which have been captured in a limited literature (cf. [references 1, 2, 3]). . ..

(11) . . .there I rallied all of the literature that I found that made the point, or provided some research evidence. . ..

There is also a sense, then, in which the cumulative supporting citations help to make the case more persuasive.

(ii) Citing evidence to support a controversial claim

Authors were aware that supporting citations were particularly necessary to buttress controversial claims. In CS6's case, for instance, this support involved citing a body of research evidence stretching back over three decades:

(12) The exact manner in which X interact with Y. . .has yet to be fully understood although the concept is by no means new [references 1, 2].

As CS6 makes clear, the age of the supporting sources adds weight to his argument:

(13) . . .it's still a debatable idea. . .And I did make a point to mention two pieces of work that are fairly old. . ., '68 and '76, because these were the first two experimental pieces of evidence supporting the idea. . .So giving support here. . .And the point [of] this reference [is] to say that we have evidence as far back as 30 years. . ..

(3) CREDIT

Credit citations acknowledged authors' debt to others for ideas or methods. While this debt was sometimes expressed in terms of ''paying respect'' to the sources, at other times informants foreground a ''self-defence'' motivation, the citation making clear they, the citer, are not claiming to be the originator of the citee's concept. The role of adjectives which help positively evaluate credit citations is also briefly discussed.

(A) Writer debt

Citing for SOC2 is connected with ''paying due respect to the originators of ideas'':

(14) And also to point out that I wasn't claiming that that was my own idea. So to have some sort of modesty and humility there I think to it, also.

SOC5 also cites to acknowledge seminal contributions to her field. However, what is interesting about her credit citations is that she does not wholeheartedly agree with her source: she feels her own method is an improvement on earlier methods, but that at the same time, ''in the interests of fairness'', she must mention this earlier work, since ''for the time it was very influential and important'':

(15) . . .he's the only person who has done work in this area. And I'm going to say what I do is an improvement on it, but I also want to acknowledge that he's really created this field as far as it does exist.

The next extract comes from computing, and confers credit on another author for an experimental procedure, rather than for their arguments. It was noticeable that the computer scientists speak less of ''respect''; their motivations are more often described in instrumental terms. Hence CS3 merely relates how he ''adopted'' the source's ''sensible idea''. He writes:

(16) The assignment of subjects to tasks was based on the. . .matrix displayed in Table 1. This table contains x as proposed in [reference].

and he explains:

(17) . . .the table that you see there is adopted from [reference]. So [I] just say it seems to be a sensible idea so I adopt that.

(B) Credit and self-defence

SOC1 develops a concept put forward by one of the founding fathers of sociology which has been largely overlooked. However, he acknowledges that two other researchers have also written about this concept. SOC1 wishes to ''be honest'' and to credit these other researchers' efforts, while the citations also ensure he is not attacked by reviewers for failing to acknowledge the work of others:

(18) . . .to show that it wasn't me that discovered this, it was actually [name of source]. And to give [name of source] his due for discovering this overlooked thing. . ..And there's then a footnote to someone else. . .who again claims to have discovered in X this overlooked thing. . .I'm not just making a claim that it's me, cos that would be wrong. And the reviewer could pick up on that, say 'well hang on, someone else did this. . .'. So it's saying that whilst this is an original argument to be made in [SOC1's sub-field], I haven't just magicked it out of thin air, there's a kind of pedigree to it. . .it's setting out the provenance of the position. . ..

SOC3 also conceptualizes her credit references in self-defensive terms when she makes clear that she believes that when researchers are writing on any area, ''there's almost a sort of checklist'' of people who need to be credited. Researchers try to ensure all of the seminal figures in the field get a mention, in order to protect themselves from ''looking silly''.

(C) Credit and evaluative adjectives

Unsurprisingly, adjectives sometimes positively evaluate credit citations. Hence CS1 evaluates one of his sources as ''seminal''. Similarly, SOC4 describes two sources as ''admirable''. The first is a review article (''A good place to begin...is the admirable paper by [reference]..., which must serve as a landmark in structuring the scholarship of recent years''). SOC4 makes it clear that his praise is sincere, since his source's task in drawing all the relevant research together, and doing so fairly, was formidable. Similarly, the second source (''see the admirable discussion in [reference]'') is ''well-balanced, fair-minded, and honest''. SOC4 says that both citations constitute ''pats on the back'' to the writers concerned.

(4) POSITION

Position citations allowed authors to (i) identify representatives and exemplars of different viewpoints; (ii) explicate researchers' standpoints in detail; and (iii) trace the development of a researcher's/field's thinking over time.

(A) Exemplars of positions

Position citations help authors provide illustrative examples of different views. SOC2 calls such citations, including those in the extract below, ''dip samples'':

(19) [The debate] is now polarized between the advocates (cf. reference 1, 2) and the opponents (cf. reference 3) of legislation.

Similarly, SOC2 explains that he uses direct quotes from sources ''to provide a perfect exemplar of that kind of sentiment'' (''Opponents of x raise the prospect of the ''slippery-slope''...[reference 1]''.). These citations and direct quotes are ''representatives and vivid examples of a particular line of argument''.

Position citations can also be used when writers want to specify what they understand by a particular term, when various researchers define this term in different ways. Here is SOC3 using another researcher's conceptualization to distinguish the parameters of her discussion:

(20) [The term x] has many sites of usage, here it is intended in a limited way for its relevance to y only, where it is understood to refer to activities which...[reference].

And CS1 reports that his article is attempting to ''get to the bottom'' of what a particular term means; hence he begins by citing various researchers' (contradictory) understandings of the same concept.

(B) Detailed explication of positions and results

SOC1's article is focused on engaging with the arguments in two key sources. Unsurprisingly, then, a considerable amount of time is spent explicating the positions of these sources in depth. Direct and indirect citations help accomplish this:

(21) ...the most robust account is detailed in [reference 1's] account.... They argue that there are [10-line direct quotation follows] Their particular definition of x builds on [reference 2's] argument....

SOC1 says that he ''is working through'' and ''setting out'' reference 1's argument. Whereas SOC2's examples discussed above merely *encapsulated* positions, then, SOC1 proceeds to explicate the arguments of key sources in detail. In contrast, some of the computer scientists' position citations refer to equations. Hence the focus is on other researchers' *results*, rather than their *arguments*.

(C) Tracing positions over time

(i) Tracing origins of ideas

The first part of SOC1's article is ''a kind of potted history of various positions''. Starting with those researchers first associated with an idea (or whose ideas helped shape later formulations), SOC1 cites broadly chronologically, summarizing each researcher's position, and thus tracing the origins of an idea and charting its development:

(22) The origins of the x perspective lie in nineteenth-century Europe. . ., and was most famously associated with [reference 1, orig. pub. 18xx]. . .. In twentieth century American social science, x was replaced by y through the work of. . ..

(ii) Story of the development of the discipline's thinking

Whereas SOC1's position citations are associated with tracing the development of specific arguments, SOC4 traces the development of an entire sub-field of sociology, since he is reviewing and re-evaluating the last 40 years' work in the field. For instance, he writes:

(23) By 1994 the consensus appeared to be that. . .[reference 1]

and:

(24) The key issues of the 1970s were power, stratification and inequality. [references 1,2] explored the nature of x and y and this helped to bring those concerned with z into the contemporary mainstream issues of sociology. . ..

SOC4 therefore fittingly describes these kind of citations as ''story references'':

(25) So those references are telling a story, they're story references. This is what was happening. This person said this, this person said that.

(iii) Development in source's position

Position citations can also be used to show how a researcher's thinking has developed as s/he has co-authored with others. SOC1 writes about one of his key sources as follows:

(26) X has refined his position in collaboration with Y [reference 1] by bringing this thinking. . .into closer harmony with. . ..Whatever the merits of this more recent work, it is clear that it has moved in a 'managerialist' direction. . ..

(5) ENGAGING

Engaging citations appear when authors are in critical dialogue with their sources. This criticality can be more or less marked: a 'mild' engaging citation may appear when authors simply argue that an otherwise excellent source suffers from a minor flaw; the harsher type identifies a more serious flaw, or may even baldly state that the source is wrong. Since most engaging citations also summarize the source's position, the examples discussed here are multifunctional.

(A) Praising but then identifying problems with the source

While SOC1 argues that there are problems with some of the arguments in his two key sources, he makes clear that their work is seminal, using adjectives like ''influential'' and ''sophisticated'' to evaluate them. Despite this engagement, then, he explains that the sources are more than ''straw targets''. SOC1 first cites one of these sources in his abstract:

(27) Although [this paper] acknowledges that [reference's] synthesis. . .remains the most sophisticated discussion of x, it identifies a number of difficulties in their influential work.

Many instances of engaging citations are then found in the body of SOC1's article, including those in the following extract:

(28) . . .[Name of source's] attempt at synthesis is to be welcomed, as it involves moving from a one- to two-dimensional thinking on x. . .. However, their central argument rests upon the assumption that. . .[reference]. The problem with such a characterization is that. . ..

Again, the criticism is tempered with (sincere) praise, as SOC1 makes clear.

(B) Identifying inconsistencies in source's position

SOC6 critiques one of his (Marxist) sources by pointing out that, given this researcher's ideology, property is accorded a surprisingly low profile in this researcher's analysis. SOC6 writes:

(29) It is striking that [name of source] also downplays the significance of these propertied x situations. . .[see reference]. As [name of source] notes, ''When I refer to the y. . ., I am, by and large, referring to relatively small employers, not the wealthy owners. . ..'' [reference].

He agrees with my checking questions that this extract ''helps you develop your critique'', and that it is ''using the source's own words to damn him''.

6. BUILDING

Building citations are found when authors use sources' methods or ideas as foundations which they then develop further.

(A) Building by citing own work or that of others

CS3 explains the function of the frequent self-citations in his paper by saying that the body of his work is ''incremental'', and that readers need to be provided with details of where they can find ''what comes before''. He agrees with my checking question that the present study is ''building upon the foundations'' of this earlier work. And CS2 makes clear that authors can build upon others' work as well as their own: his citations show he is

(30) . . .building on the work of others, and making sure that it's apparent that your work is connected with the work of others. . .But also to be able to demonstrate that you're building up a connected body of your own work. So you're making reference. . .to work that you've done already.

Here, then, is an example of a building self-citation by CS2 and his co-author. As will be seen, these citations are multifunctional, in that they also signpost less knowledgeable readers to the relevant work:

(31) Of the. . .methods introduced by the authors in [self-citation 1], the most successful was. . .. In [self-citation 2], a different approach. . .was proposed. . .. Recent work has shown. . .. In this paper, we describe. . ..

CS2 explains:

(32) . . .we invented these methods. And whenever we write papers about them, we feel that there is a certain need, because some of the community is not yet aware of them, to say this is a new concept, and it was introduced here. And in that sense, lay some kind of a foundation for going on to talk about some development of the method here. . .So we quite often write an abstract like this just to familiarize people with the idea that something that they may not have come across before has been in existence for some time. And it gives them obviously the possibility to go away and get papers that they might need to fill in the background here. . ..Each of these papers as they come out in sequence is building on what's gone before. . .So it's been building up as a body of work over about 10 years now.

(7) TYING

Tying citations aligned authors with (i) other sources' methods/methodology; (ii) specific schools of thought/ disciplinary traditions; or (iii) debates on specific issues. The first extract discussed is multifunctional.

(A) Tying in with others' method and methodology

CS2 talks of how he aligns his research with other work in terms of methodology adopted. This alignment means that the citations also serve as means of support, helping him anticipate and forestall possible questions or even attacks by readers. He writes:

(33) . . .in the case of x, the initial approximation. . .was scaled by the method of [reference 1] before y was performed. The line-searches employed in all the algorithms were based upon. . .and were required to produce a point. . .satisfying the following standard stability conditions (see [reference 2], for example). . ..

He says of this part of his article that:

(34) . . .we're back to tying it again into the existing body of work. And these are four examples, standard techniques or standard conditions that are accepted by the community. So both [reference 1] and [reference 2] refer to things that are well-known in the community and essentially nobody would quibble about. But it's necessary to say so, otherwise somebody will come back and say 'well hang on, I don't like your results because you've probably done it this way, when everybody else does it that way'. So at least you're demonstrating that you're going along with the standard way of doing things, and you're not open to that criticism then.

(B) Tying in with schools of thought

SOC5's first two citations are to a very eminent researcher who takes a certain approach to the field, and she sees her citations of this figure as significant, as signals that she is aligning herself with this approach, and helping to ''locate her work within a particular tradition''.

(C) Tying in with specific debates

SOC6 says that some of his citations serve to ''locate his argument in other debates'' which are broader than the immediate issue under discussion. Hence the citations in the extract below help him connect his arguments with a debate which the discipline is currently picking up on:

(35) Critics of x see this weakening. . .as associated with the rise of new sources of social difference. . .It is better seen, however, as reflecting what [reference 1] refers to as a growing 'individualisation'. . ..

The citation to reference 1 allows SOC6 to

(36) . . .connec[t] this argument. . .with these wider arguments to show that the conclusions that I'm hoping to draw here also have relevance to these other debates. . .

(8) ADVERTISING

Advertising citations alerted readers either to the author's earlier work, or to the work of others.

(A) Alerting readers to one's own work

SOC1 uses the advertising metaphor unbidden in connection with his article. The article was intended ''as a way of drawing attention'' to a book SOC1 had published, ''to advertise that it exists''. Hence a footnote at the end of the opening sentence of the article reads: ''This paper distils and develops some of the. . .arguments in my book on x [reference]''.

Like SOC1, CS6 uses the advertising metaphor unbidden to account for his self-citing. His comments also vividly show how he is aware citations can function multifunctionally, and that these effects can be accomplished consciously by the writer. In this case the citation alerts the audience to CS6's previous work and signposts them to a potentially helpful source, as well as crediting co-workers and the institution which supplied the equipment and made the research possible:

(37) As part of this research a joint effort [2 references] took place at [name of university] a few years ago. Some modifications have been made since then. . .. In the next few sections of this chapter, both the original research conducted at. . ., and the improvements made on it will be discussed.

CS6 says:

(38) This is for a number of reasons. One, advertising. Second, to show where they [readers] can find more technical details about what's going to be discussed right now. . ..Third, it is to make sure that I give credit to the people with whom I was working at that time, because all of these experiments were done in [name of university]. And without them I wouldn't have been able to do it. Because where I was at that time we didn't have the equipment to do it. . ..That's why I also mention the university afterwards. So this has many purposes here. More details, a bit of advertising for myself, and also to give credit to the university in particular. Acknowledgement, let's put it that way.

(B) Advertising others' work

I asked CS2 to explain why he names himself and his co-author on several occasions (e.g. ''The derivation. . .is described by [names of authors, 2 references]'') despite his article appearing in a journal which uses the footnote system, meaning that the authors' names could have been omitted (e.g. ''The derivation is described in [1].''). CS2 says that despite not being keen ''on blowing my own trumpet'', he feels the need to name his co-author in an attempt to provide him with exposure:

(39) [M]y co-author here needs all the publicity that he can get. Because of situations like promotion where he is, he needs to get publications, he needs to get recognized in the community. So for that reason, I do reference his work as much as possible.

The last example considered here by CS5 is somewhat different, since it alerts readers to a dataset designed by others. Like CS2, CS5 named specific researchers despite writing for journals which used the footnote system. When I asked him about this, a desire to advertise the source was involved. Since the source comes from a different discipline, CS5 anticipates his audience will be unaware of it. CS5 explains his experimental procedure, writing that subjects are exposed to ''pictures of objects chosen from the [researchers' names] picture set [reference]'':

(40) . . .the reason for me for doing this is that it's very uncommon to find this [reference]. . ..So I'm just trying to actually bring it out more, offer to make it more common [laughs]. . .[T]he [researchers'] pictures. . ., perhaps I might be the first one actually to bring it into the technical kind of work. So the technical readers won't be familiar with it.

(9) FUTURE

These citations served to establish future research plans.

(A) Mapping out future work planned by writer

Commenting on the extract below, CS2 makes clear that citations can establish ''first rights'' to future work which will develop his research. However, in this case, CS2 was also more concerned with forestalling imagined criticism from referees. He writes at the end of the article:

(41) Further work will examine the effect of x on other. . .methods. . .(such as the 'y' method *B* described by the authors in [reference 1]) and investigate the use of z. . ..

and comments on this extract as follows:

(42) . . .if somebody was aware of our body of work, then they would be able to say 'well why don't you do what you've just suggested here in this context as well?' So in a sense what we're doing is establishing first rights to this area now by saying 'well the next stage is to take what we've done here and to move into this area', not so that anybody else can't do it, but simply making referees and other people aware of the fact that we're conscious of these connections, and that we propose to follow them up in due course.

(10) COMPETENCE

Competence citations helped underscore writers' expertise by displaying (i) knowledge of their field; and (ii) their ability to conduct research.

(A) Displaying knowledge of the literature

Citing key articles by big hitters can help writers display their knowledge of the literature, underscoring their command and competence of the area. CS2 explains three equations which cite their originators as follows:

(43) . . .that is a well-respected paper in the community, both of their names are very well-known. . ..So in that sense I suppose if I was totally honest, it's saying. . ., 'I'm familiar with the work here as I ought to be, because this is such an important paper in the area.'

Similarly, SOC1 makes clear that tracing the origins of ideas back to their (ancient) sources helps him show he knows the literature well, and is a mark of ''your credentials to speak'' on the topic in question.

(B) Displaying ability to conduct future research

In the last part of his article, CS3 talks about future research he plans to conduct. The citations which flag up what other investigations have focused on in the area obviously help highlight gaps in the research for CS3 to fill, but also help him display his disciplinary competence through his knowledge of the literature. He writes:

(44) . . .we can see our approach as a particular application of x. x is based on identifying the options and preferences of similar users. . .(e.g. [reference 1. . ., reference 2]). Y has been proposed for using similar past queries to automatically expand new queries, e.g. [reference 3] and [reference 4]. . ..

CS3 explains that this paragraph

(45) . . .is really to show that we know what's going on in the area. So to say what we will do next. There are people who have done things like that before, [references 1–4]. . ., because what we are proposing is work in an area which is different to what we've done already, and this is just to set the context of saying this is this research area, so this is what's going on in this research area and slightly different community of people. . ., and we know what's going on there.

(11) TOPICAL

Topical citations allowed writers to show they and their research were concerned with state-of-the-art issues. SOC1 makes several mentions during his interview of topicality. For instance, he talks about how one of his citations helps show a particular perspective on a debate is ''alive and kicking''. He describes ''the classic example of this approach'', published in the 1950s. He then talks about ''a more recent example'', citing a paper from the 1990s which appeared after the key text from 1989 his article is engaged with:

(46) . . .what I wanted to show, was not just that this was what X was saying 50-odd years ago, but also to show how this is also a fairly current example. This was published in 1992, it's also published after [SOC1's key source]. . .[T]his perspective is still topical, it's still alive and kicking. . .And it was published after the thing that I'm setting up as the great, as the grand synthesis [i.e. the key 1989 source]. So there are still people working in this. . ..

Table 1
Most frequent citation functions across each discipline (number of occurrences)

COMP	SOC
1. SIGNPOSTING (117)	1. POSITION (390)
2. POSITION (112)	2. ENGAGING (146)
3. SUPPORTING (91)	3. SUPPORTING (129)
4. CREDIT (68)	4. CREDIT (78)
5. = BUILDING (30)	5. BUILDING (54)
TYING	
7. ADVERTISING (21)	6. SIGNPOSTING (31)
8. COMPETENCE (6)	7. TYING (21)
9. ENGAGING (4)	8. ADVERTISING (10)
10. FUTURE (1)	9. = COMPETENCE (6)
	TOPICAL
11. TOPICAL (0)	11. FUTURE (0)

4.2. Quantitative analysis

While we cannot make confident generalizations about citation functions in the two disciplines from such a small sample of writing, a brief consideration of quantitative aspects of the data reveals some marked inter- and intra-disciplinary similarities and differences which future analysts may wish to explore further. Table 1 shows that three functions, position, supporting, and credit, are relatively frequent across both disciplines, although the engaging function is far more frequent in the sociology texts, while the signposting function is far more frequent in the computing texts. Full details of the (in)frequency of citation functions across each text[8] are provided in Tables 2 and 3, while Table 4 presents salient information in a more compact form, showing the top four citation functions in each text. Interviewees in both disciplines reported that over half of the citations had more than one function. Details can be found in Tables 5 and 6.

5. Discussion and conclusions

5.1. Comparison of results to earlier studies

It is noticeable that the functions the informants identify sit well with the functions identified by previous citation studies, despite some terminological differences.[9] A number of the early studies reviewed by Small (1982) include supporting citations. These studies' ''use'' category, where the citing author ''employs some aspect of the cited work'' (Small, 1982:300), is similar to the present study's credit function. Those citations which Small classed as improving, modifying, or extending are similar to my informants' building function; his reviewing, comparing, and/or contrasting category is similar to my position function; and my informants' engaging function is close to Small's negation category. Similarly, Frost's (1979) ''refer to further reading'' is close to the signposting function. More recent studies also reflect my informants' categories. Hence Shadish et al.'s (1995) most frequent category is supporting an assertion, followed by the function of ''documenting the source of a method or design feature used'' (similar to my credit function) (p. 481). And Case and Higgins' (2000) top two categories, reviewing prior work in the area and concept markers, are close to my position citations. Despite this relative accord with those studies whose methodology I have criticized, however, I argue below that interview-based studies of this type provide a number of insights previous studies do not.

While it should be stressed once more that my small sample size means that it would be unwise to make any firm generalizations about citation functions in these disciplines as a whole, in general, the relative frequencies of the various citation functions reported here also sit comfortably with earlier studies. Consider, for instance, Frost's (1979) results for German literary criticism, which feature relatively high percentages of citations which (i) review the present state of research (22%), (ii) support statements or claims (22%), and (iii) refer to further reading (16%). While (i) is

[8] Unlike the other informants, CS5 discussed two of his articles during interview.
[9] Recall that the terminology used to describe each functional category derived from the informants rather than from the researcher in the present study.

Table 2
Number of occurrences of each citation function in the computer scientists' texts

	Total no. of citations informants discussed	Total no. of citation functions	Signposting	Position	Supporting	Credit	Building	Tying	Advertising	Competence	Engaging	Future	Topical
CS1	54	103	26	34	13	10	16	0	0	0	0	0	0
CS2	25	53	9	6	9	6	8	8	3	1	0	1	0
CS3	57	108	32	21	27	5	2	12	4	5	0	0	0
CS4	35	46	22	3	5	14	0	2	0	0	0	0	0
CS5													
Paper A	22	28	6	6	11	4	1	0	0	0	0	0	0
Paper B	21	37	1	14	8	4	1	1	8	0	0	0	0
Total	43	65	7	20	19	8	2	1	8	0	0	0	0
CS6	50	111	21	28	18	25	2	7	6	0	4	0	0
Total	264	486	117	112	91	68	30	30	21	6	4	1	0

Table 3
Number of occurrences of each citation function in the sociologists' texts

	Total no. of citations informants discussed	Total no. of citations (%)	Position	Engaging	Supporting	Credit	Building	Signposting	Tying	Advertising	Competence	Topical	Future
SOC1	145	322	104	69	48	37	49	3	0	5	4	3	0
SOC2	31	41	18	4	11	5	0	2	2	0	0	0	0
SOC3	16	25	8	2	1	6	0	2	3	2	0	0	0
SOC4	120	179	114	45	4	4	0	8	3	0	0	0	0
SOC5	38	78	20	4	21	16	0	3	9	2	2	1	0
SOC6	146	228	126	22	44	10	5	13	4	1	0	2	0
Total	496	873	390	146	129	78	54	31	21	10	6	6	0

Table 4
Most frequent citation functions in each text

	CS1	CS2	CS3	CS4	CS5	CS6
Less frequent ↓	POS	SIGN & SUPPORT	SIGN	SIGN	POS	POS
	SIGN		SUPPORT	CREDIT	SUPPORT	CREDIT
	BUILD	BUILD & TYING	POS	SUPPORT	ADVERT & CREDIT	SIGN
	SUPPORT		TYING	POS		SUPPORT
	SOC1	**SOC2**	**SOC3**	**SOC4**	**SOC5**	**SOC6**
Less frequent ↓	POS	POS	POS	POS	SUPPORT	POS
	ENG	SUPPORT	CREDIT	ENG	POS	SUPPORT
	BUILD	CREDIT	TYING	SIGN	CREDIT	ENG
	SUPPORT	ENG	ENG & SIGN & ADVERT	CREDIT & SUPPORT	TYING	SIGN

classified as a type of position citation in the present study, it features heavily in certain sociology texts, notably SOC1, SOC4, and SOC6's pieces. Furthermore, (ii) and (iii), that is, supporting and signposting citations for our purposes, feature heavily in both sociology and computing. Other researchers, such as Spiegel-Rösing (1977) and Cole (1975), also found a high proportion of citations performed a supporting role in humanities/social science texts.

Over half of all the citations discussed by informants were attributed more than one function. To paraphrase Brooks, then, the study provides evidence that citation *functions*, as well as motivations, are complex. Furthermore, the results lend weight to the current consensus that neither the reward not the rhetorical view of citations can provide us with a complete account (e.g. Cronin, 2005): that is, while citations acknowledge intellectual indebtedness on the one hand (e.g. by means of the credit function), they also seek to persuade and promote on the other (e.g. by means of the supporting and advertising functions).

5.2. *Signposting and didacticism*

It will be recalled that informants identified one of the functions of signposting citations as helping less informed readers, and a number of researchers have also suggested that citation can perform a pedagogic role. In Brooks (1985),

Table 5
Frequency of multifunctional citations in the computer scientists' texts

	Total multifunctional citations informants discussed	Multifunctional citations as a % of total number of citations discussed by informant	2 functions	3 functions	4 functions	5 functions
CS1	31	57.4	20	8	3	0
CS2	16	64	8	7	1	0
CS3	35	61.4	19	16	0	0
CS4	10	28.6	9	1	0	0
CS5						
Paper A	7	31.8	7	0	0	0
Paper B	15	71.4	14	1	0	0
Total	22	51.2	21	1	0	0
CS6	34	68	16	12	3	3
	Total: 148	Average: 55.1	93	45	7	3

Table 6
Frequency of multifunctional citations in the sociologists' texts

	Total multifunctional citations informants discussed	Multifunctional citations as a % of total number of citations discussed by informant	2 functions	3 functions	4 functions	5 functions
SOC1	94	64.8	34	36	22	2
SOC2	10	32.3	9	1	0	0
SOC3	7	43.8	6	1	0	0
SOC4	57	47.5	56	1	0	0
SOC5	29	76.3	18	11	0	0
SOC6	76	52.1	72	4	0	0
	Total: 273	Average: 52.8	195	54	22	2

for instance, an informant from the field of education described 51 of 71 of his references as having a ''didactic purpose'' (p. 228). Similarly, Brooks (1986) argues that citations can have a ''service'' motive, ''whereby an author is. . .furnishing the reader with background information'' (p. 36). And some of White and Wang's (1997) informants were said to cite ''broadly, leading to related materials, thus assuming a researcher/teacher role'' (p. 144).

5.3. Negational citations

While most studies of citation find only occasional negative references—Chubin and Moitra (1975), for instance, finding only 5% of citations in their dataset partially negational, and none to be wholly negational—the present study found that, while there were few instances of engaging citations in computing, there were many more in sociology. This is not necessarily at odds with findings such as Chubin and Moitra's, who were concerned with physics articles. It seems likely that social sciences/humanities disciplines will feature a higher proportion of engaging citations because of their more discursive, disputational nature (cf. Becher and Trowler, 2001; Hyland, 2000; Whitley, 2000 on disciplinary differences), and it is worth recalling that Frost's (1979) study of a humanities field, German literary research, reported a higher proportion of negative citations than Chubin and Moitra. In the same vein, Hyland (1999) found in his analysis of the reporting verbs used when citing that only humanities and social science authors used reporting verbs which characterized their sources as unreliable, i.e. reporting verbs such as *fail*, *overlook*, *exaggerate*, or *ignore*.

It is also worth noting that some of my informants stressed how their criticisms of sources were not unequivocal, and that they were also intent on elaborating the strengths of the sources' arguments as well as their weaknesses. This brings to mind Brooks' (1986) finding that many of the negational citations in his dataset were preceded by ''positive credit''; and MacRoberts and MacRoberts' (1984) claim that criticisms are often ''toned down'' (p. 91). However, MacRoberts and MacRoberts believe that this toning down constitutes author ''dissembling'', whereas my informants claim they *genuinely* wished to acknowledge the sources' strengths, despite the fact they had reservations about this work. It could be argued that interview informants are unlikely to be transparent about (unsavoury) motivations; alternatively, MacRoberts and MacRoberts are being overly cynical, and authors' praise preceding their criticisms should (sometimes) be taken at face value.

5.4. Disciplinary differences

In line with a growing number of researchers (Brooks, 1985; Charles, 2006; Hyland, 1999; Peritz, 1983; Thompson, 2001), this study provides further evidence that citation functions and motivations are likely to vary from discipline to discipline. The computing texts featured more frequent signposting citations, while the sociologists used the engaging function much more often. The computer scientists tended to account for their credit citations in less instrumental terms, and mainly spoke of adopting and adapting other researchers' methods. None of this is very surprising, given that we are becoming increasingly aware of the many inter-disciplinary differences which manifest themselves in academic discourse (see Becher and Trowler, 2001; Cole, 1983; Hyland, 2000; Whitley, 2000). For instance, the sociology informants in Becher and Trowler (2001) spoke of the importance of 'refutation and reformulation, in their discipline (p. 31), while Cole (1983) claims that there is substantially less of a knowledge consensus in the social sciences than in the sciences.

Perhaps more intriguingly, however, in line with other work (Becher, 1990; Harwood, 2006; Palmer and Cragin, 2008; Pinch, 1990), this study also provides evidence for *intra*-disciplinary differences in citing. Two possible reasons for these differences concern the type of text the author is writing—note the contrast in citation patterns between SOC1's theoretical discussion and SOC5's quantitative empirical piece—and the publication outlet—note CS6's remarks about how he would have cited fewer introductory, signposting sources if he had been writing a journal article rather than a book chapter. As long ago as 1975, Chubin and Moitra found evidence that intra-disciplinary difference in citation behaviour could be accounted for by considering the type of paper being written, their study contrasting letters and full length articles in physics (and see also Murugesan and Moravcsik, 1978; Vinkler, 1987 for more intra-disciplinary differences). Further, since unlike other citer studies (e.g. Peritz, 1983; Vinkler, 1987), the present study did not exclude ''special publications'', like SOC4's survey and re-evaluation of decades of research, it is reasonable to anticipate there will be intra-disciplinary variation in citation patterns when comparing, say, SOC4's text and SOC5's quantitative empirical study.

As Cronin (1984) pointed out some time ago, individuals' citation habits are not standardized (see also Cronin and Shaw, 2002). More recently, White (2001) showed that eight authors from the same discipline, Information Science, each had distinctive styles. Thus, one other factor potentially affecting intra-disciplinary variation in citation use relates to an author's citing style, and their beliefs about (in)appropriate citation. My interview-based study of a small number of political scientists' beliefs about (in)appropriate use of personal pronouns (*I* and *we*) and impersonal constructions like the passive (Harwood, 2006) found that these beliefs help explain the large amount of pronominal variation in the authors' texts. In the same way, the views of informants here about (in)appropriate citation potentially shed light on their usage. As Borgman and Furner (2002) argue, researchers are increasingly recognizing citing behaviour to be ''individual and subjective'', ''complex and multidimensional'', and ''dynamic and situational'' (p. 20). The importance of factoring these beliefs into any account of citing behaviour means it is particularly important for the analyst to question authors.[10]

5.5. Strengths and weaknesses of the interview-based approach to citation studies

Interviews allow the analyst to sidestep one of the major problems with relying on content/context analysis: that the citation function may still not be apparent after reading the citer's text. Consider how Frost (1979) describes her attempt to identify those citations which were intended to direct readers to further reading:

> ''In the application of this category, I looked for explicit statements by the authors that the works were intended as further reading. Example: ''Brown has provided extensive documentation for this theory. For further information, see his book *Medieval Lyric and the Latin Tradition*...''.'' (p. 409)

As she concedes, however, at times it is *not* apparent from the context that such a function is intended, with the result that the analyst must resort to guesswork. Because an interview-based approach collects data about citing authors' purposes and intentions, functions can be identified regardless of whether there is any explicit indication of rhetorical purpose in the text. Similarly, the second main weakness of content/context analysis is overcome: the need for specialised knowledge. Even analysts like Murugesan and Moravcsik (1978), who are experts in the discipline they are studying, concede that citation classification can be a ''hard task'' (p. 142). The task will be still harder for the citation analyst who is not a specialist in the discipline his/her datasets are taken from. And a lack of specialist knowledge is especially likely if the analyst wishes to undertake a study of texts in more than one discipline, as was the case for the present study. Interviews enable authors to explain their citation functions in terms the non-specialist interviewer can understand. In addition, the semi-structured interview format allows interviewers to prompt and probe in order to encourage informants to make their explanations more explicit.

The current approach obviously suffers, as do all interview-based studies, from the problem of informant recall (see, for instance, Chubin and Moitra's (1975) critique of interview-based studies). Indeed, the recall issue is particularly relevant here given that the texts informants discussed had been written some considerable time before the interviews took place. This is where White and Wang's longitudinal approach seems particularly apt, although such an approach is difficult to implement, not least because of the necessity of interviewing informants while (or shortly after)

[10] For those educators who are looking to teach student writers how to cite effectively, such inter- and intra-disciplinary differences makes this a challenging task. In Harwood (in press-a) I describe how this might be done.

they are writing. However, the discourse-based interview format I used at least results in informants discussing citations in a specific text, rather than their citing patterns in general, and obliges them to re-read their writing. This should go some way towards discouraging unreflexive responses.

Another charge commonly levelled at interview-based studies is that there is a risk interviewees' responses will be ''self-serving'', and that they will be unwilling to admit to less savoury citation functions (see Chubin and Moitra, 1975). However, it was noticeable that some of my informants *did* speak freely about wanting to ''advertise'' their own work and that of others: recall CS2's preoccupation with making his co-researcher's name prominent, and CS6's desire to ''advertise'' his former institution. Hence this study provides some evidence that my informants' citation patterns are influenced by what Vinkler (1987) calls ''connectional'' motivations, despite this study focusing on citer functions rather than the selection of sources.

A final weakness associated with interview-based studies which is not easily sidestepped is that some informants may be more willing and/or able to introspect than others: hence while CS6, for instance, carefully accounted for every single citation in his fairly lengthy text, others tended to account for their citations in ''clumps'' ('This citation is doing X. . .And so are all the others on that page'). While the additional questions I had prepared enabled me to ask these informants to re-examine certain citations and provide fuller accounts in places, it remains the case that different informants' accounts are likely to be uneven and more or less considered in places. This can probably be attributed in part to the time and effort such an exercise requires: introspecting about citations is no small thing, especially when one is not used to doing so.[11] Neither is there an obvious way to lessen the burden for interviewees: providing informants with lists of functions would save much time and effort, but this is an approach I have criticized throughout. Hence, while a skilled interviewer is likely to elicit more substantial data than an unskilled one, future researchers will wish to restrict themselves to those informants who are highly reflexive. The problem is, of course, that the interviewer is unlikely to find out just how reflexive informants are until the interview begins.

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[11] Indeed, both CS5 and SOC2 reported that they had been citing 'automatically', without considering the functions being effected.

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