10 DISCIPLINES AND DISCOURSES: SOCIAL INTERACTIONS IN THE CONSTRUCTION OF KNOWLEDGE

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The view that academic writing is persuasive is now widely accepted. Exactly how this is achieved, however, is more contentious, and raises a number of important issues, not least of which are those concerning the relationship between reality and accounts of it, the efficacy of logical induction, and the role of social communities in constructing knowledge. These topics have been debated for years in epistemology and the sociology of science, and in the past decade applied linguists have also entered the fray.

Corpus linguists have been particularly active in emphasising the importance of rhetoric in academic persuasion, and, in this chapter, I bring my own small contribution to the discussion. In particular, I look at what differences in disciplinary discourses tell us about the ways academic knowledge is socially constructed, focusing on interpersonal features of language. I am interested in what this tells us about writers' ideas of appropriate writer-reader relationships and how this, in turn, contributes to knowledge-making in the disciplines (Hyland & Bondi, 2006).

ACADEMIC DISCOURSE AND SCIENTIFIC EXPLANATION

I want to begin with a few words about academic persuasion. Academic discourse is a privileged form of argument in the modern world, offering a model of rationality and detached reasoning. It is seen to depend on the demonstration

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of absolute truth, empirical evidence or flawless logic, representing what Lemke (1995) refers to as the discourse of "Truth" (p. 178). It provides an objective description of what the natural and human world is actually like, and this, in turn, serves to distinguish it from the socially contingent. We see this form of persuasion as a guarantee of reliable knowledge, and we invest it with cultural authority, free of the cynicism with which we view the partisan rhetoric of politics and commerce.

This view is most strongly represented by the natural sciences. The label "scientific" confers reliability on a method and prestige on its users. It implies all that is most objective and empirically verifiable about academic knowledge. As a result, it has been imitated by other areas of human inquiry that are often considered softer and more rhetorical in their forms of argument. Underlying this realist model is the idea that knowledge is built on experiment, induction, replication, and falsifiability. Scientific papers are seen as persuasive because they communicate truths which emerge from our direct access to the external world. The text is merely the channel through which scientists report observable facts. This is, in fact, probably why writing is marginalized in universities as it is just seen as reporting more important things that go on elsewhere.

But scientific methods provide less reliable bases for proof than commonly supposed. Although we rely on induction in our everyday lives—believing that the bus we take to work will pass by at 8 a.m. tomorrow if it has passed at 8 a.m. every day for the past week—it has been criticized by philosophers of science. They argue that induction offers probabilities rather than proof, and by moving from observations of instances to general statements about unobserved cases, scientists introduce uncertainty. Nor is the widely accepted alternative, Popper's 'Falsification' model, which puts theories through experimental testing and replaces those that are defective with more verifiable ones, any more reliable. It is simply not possible to conclusively falsify a hypothesis because the observations that form the basis for the falsification must be expressed in the language of some theory, and so will only be as reliable as that theory.

The problem for scientific knowledge, then, is that interpretation always depends on the assumptions scientists bring to the problem (e.g., Kuhn, 1970). That is, all reporting occurs within a pragmatic context and in relation to a theory which fits observation and data in meaningful patterns, so there is no secure observational base upon which any theories can be tested. As the Nobel physicist Hawking (1993) notes, "a theory may describe a range of observations, but beyond that it makes no sense to ask if it corresponds to reality, because we do not know what reality is independent of a theory" (p. 44).

In other words, there is always going to be at least one interpretation for research data and the fact that we can have these competing explanations shifts

attention to the ways that academics argue their claims. We have to look for proof in the textual practices for producing agreement.

SOCIAL PRACTICES AND DISCIPLINARY CONVENTIONS

Because writers can only guide readers to a particular interpretation rather than demonstrate proof, readers always have the option of refuting their interpretations. At the heart of academic persuasion, then, are writers' attempts to anticipate possible negative reactions to their claims. To do this, they must display familiarity with the persuasive practices of their disciplines, encoding ideas, employing warrants, and framing arguments in ways that their potential audience will find most convincing. They also have to convey their credibility by establishing a professionally acceptable persona and an appropriate attitude, both to their readers and their arguments. In sum, persuasion in academic articles, as in other areas of professional life, involves the use of language to relate independent beliefs to shared experience. Writers galvanise support, express collegiality, resolve difficulties, and negotiate disagreement through patterns of rhetorical choices which connect their texts with their disciplinary cultures.

Persuasion, then, is accomplished with language. But it is language that demonstrates legitimacy. Writers must recognize and make choices from the rhetorical options available in their fields to appeal to readers from within the boundaries of their disciplines.

RESEARCH METHOD AND CORPUS

Academic corpora have begun to offer some useful insights into the ways this is done. I will report a series of investigations I have conducted over the last decade into the role of interaction in academic persuasion using a corpus of 240 research articles and interviews with academics. The corpus was compiled to represent a broad cross-section of academic practice and comprises 30 research papers from each of eight disciplines in the sciences, engineering, social sciences, and humanities, and a total of 1.4 million words (Table 1). The journals were nominated by discipline informants for being among the leading publications in their fields, and the articles were chosen at random from current issues. The corpus has been used to study a range of features including citations (Hyland, 2001a), directives (Hyland, 2002a), questions (Hyland, 2002b), authorial pronouns (Hyland, 2002c), and engagement features (Hyland, 2001b).

Table 1. Text Corpora.

Disciplines	Texts	Words	Disciplines	Texts	Words
Molecular Biology	30	143, 500	Sociology	30	224, 500
Mechanical Eng	30	114, 700	Philosophy	30	209, 000
Electronic Eng	30	107, 700	Marketing	30	214, 900
Magnetic Physics	30	97, 300	Applied Linguistics	30	211, 400
'Hard' fields	120	463, 200	'Soft' fields	120	859, 800

The value of a corpus is that it gives us information about the frequency of items and how they are used. This information points to systematic preferences in the ways members of different disciplines use language in their arguments. These preferences, in turn, tell us something about how writers see their readers and their disciplines.

The texts were searched for specific features seen as initiating writer-reader interactions using a commercial text analysis programme. A list of 320 potentially productive search items was compiled based on previous research into interactive features (e.g., Biber & Finegan, 1989; Bondi, 1999; Hyland, 2000, 2005), from grammars (Biber, Johansson, Leech, Conrad, & Finegan, 1999; Halliday, 1994), and from the most frequently occurring items in the articles themselves. All cases were examined to ensure they functioned as interactional markers and a sample was double-checked by a colleague working independently. The interviews were conducted with experienced researchers/writers from the target disciplines using a semi-structured format. These employed open-ended interview prompts that focused on subjects' own and others' writing, but allowed them to raise other relevant issues. Subjects could therefore respond to texts with insider community understandings of rhetorical effectiveness, while also discussing their own discoursal preferences and practices.

INTERACTIONS IN ACADEMIC WRITING

My argument is that academics do not just produce texts that plausibly represent an external reality. They are not just talking about garlic proteins, stress fractures or brains in vats. Instead, they use language to acknowledge, construct and negotiate social relations. The notion of interaction, and especially the ways

writers convey their personal feelings and assessments, has become a heavily populated area of research in recent years. This research has been conducted under various labels, including "evaluation" (Hunston & Thompson, 2000), "intensity" (Labov, 1984), "affect" (Ochs, 1989), "evidentiality" (Chafe & Nichols, 1986), "hedging" (Hyland, 1998), and "stance" (Biber & Finegan, 1989). The expression of evaluation and stance in academic research writing has been especially productive (e.g., Bondi, 1999; Hyland, 2005).

Interaction in academic writing essentially involves "positioning", or adopting a point of view in relation to both the issues discussed in the text and to others who hold points of view on those issues. In persuading readers of their claims, writers must display a competence as disciplinary insiders, which is, at least in part, achieved through a writer-reader dialogue which situates both their research and themselves, establishing relationships between people, and between people and ideas. Writers therefore seek to project a shared professional context which only partly depends on domain knowledge, as meanings are ultimately produced in the interaction between writers and readers in specific social circumstances. In other words, claims for the significance and originality of research have to be balanced against the convictions and expectations of readers, taking into account their likely objections, background knowledge, rhetorical expectations and processing needs. All this is done within the broad constraints of disciplinary discourses.

STANCE AND ENGAGEMENT

I suggest that interactions are accomplished in academic writing by making choices from the interpersonal systems of stance and engagement. Stance refers to the writer's textual "voice" or community recognised personality, an attitudinal, writer-oriented function which concerns the ways writers present themselves and convey their judgements, opinions, and commitments. Engagement, on the other hand, is more of an alignment function, concerning the ways that writers rhetorically recognise the presence of their readers to actively pull them along with the argument, include them as discourse participants, and guide them to interpretations (Hyland, 2001a). Together they recognise that statements need to both present the writer and his or her ideas as well as anticipate readers' possible objections and alternative positions, incorporating an appropriate awareness of self and audience.

Stance and engagement are two sides of the same coin, and, because they both contribute to the interpersonal dimension of discourse, there are overlaps between them. Discrete categories inevitably conceal the fact that forms often

perform more than one function at once because, in developing their arguments, writers are simultaneously trying to set out a claim, comment on its truth, establish solidarity and represent their credibility. In addition, the marking of stance and engagement is a highly contextual matter as writers can employ evaluations through a shared attitude towards particular methods or theoretical orientations which may be opaque to the analyst. Nor is it always marked by words at all: a writer's decision not to draw an obvious conclusion from an argument, for example, may be read by peers as a significant absence (Swales, 2004). The present study is restricted to grammatical devices that express stance and engagement, identifying predominant meanings to compare the rhetorical patterns in different discourse communities. The key resources by which these interactional macro-functions are realised are summarised in Figure 1.

Together these resources have a dialogic purpose in that they refer to, anticipate, or otherwise take up the actual or anticipated voices and positions of potential readers (Bakhtin, 1986). Distinguishing between these two dimensions is a useful starting point from which to explore how interaction and persuasion is achieved in academic discourse and what these can tell us of the assumptions and practices of different disciplines.

STANCE AND WRITER-ORIENTED INTERACTION

Stance concerns *writer-oriented features* of interaction and conveys different kinds of personal feelings and assessments, including attitudes that a writer has about particular information, how certain they are about its veracity, how they obtained access to it, and what perspective they are taking to it and to the reader. It conveys three broad meanings:

- *Evidentiality,* or the writer's expressed commitment to the reliability of propositions and their potential impact on readers;
- *Affect,* or personal and professional attitudes towards what is said;

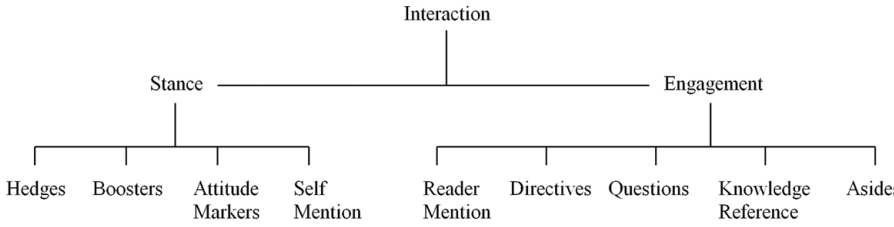

Figure 1. Resources for expressions of stance and engagement.

- *Presence,* or how far writers choose to project themselves into a text

Briefly, it is comprised of *hedges, boosters, attitude markers,* and *self mention*.

Hedges are devices which withhold complete commitment to a proposition, allowing information to be presented as an opinion rather than fact (Hyland, 1998). They imply that a claim is based on plausible reasoning rather than certain knowledge and so both indicate the degree of confidence it might be wise to attribute to a claim while allowing writers to open a discursive space for readers to dispute interpretations. This is an example from biology:

> (1) There are several possible reasons for this: (1) pressures increase upon freezing and thus may force bubbles back into solution at the time of thaw; (2) since xylem water is degassed by freezing there is a tendency for bubbles to redissolve at the time of thaw; and (3) xylem water may flow in advance of ice formation and could refill some of the previously embolized vessels. (Bio)

Boosters (like, definitely, sure, prove, etc.), on the other hand, allow writers to express certainty in what they say and to mark involvement with the topic and solidarity with readers. While they restrict opportunities for alternative voices, they also often stress shared information and group membership as we tend to get behind those ideas which have a good chance of being accepted. Like hedges, they often occur in clusters, underlining the writer's conviction in an argument:

> (2) Of course, I do not contend that there are no historical contingencies. On the contrary, the role of contingencies should be stressed. On this point, we must definitely stop following Hegel's intuitions. Nobody can foretell that tomorrow totalitarian regimes will not reappear and eventually spread over the planet. (Soc)

Attitude markers indicate the writer's affective attitude to propositions, conveying surprise, agreement, importance, frustration, and so on, rather than commitment. This is affect, not epistemology. This allows writers to both take a stand and align themselves with disciplinary value positions. Attitude is most explicitly signalled by attitude verbs, sentence adverbs, and adjectives, and this marking of attitude in academic writing allows writers to both take a stand and align themselves with disciplinary-oriented value positions. This example is from Applied Linguistics:

> (3) Certainly, I find it remarkable that even as proficient a non-native user as Yao should have introduced such an unexpected, subtle and self-evaluative question about her writing into the discussion. (AL)

Self mention refers to the use of first person pronouns and possessive adjectives to present information (Hyland, 2001b). Presenting a discoursal self is central to the writing process (Ivanic, 1998), and we cannot avoid projecting an impression of ourselves and how we stand in relation to our arguments, discipline, and readers. The presence or absence of explicit author reference is a conscious choice by writers to adopt a particular stance and disciplinary-situated authorial identity.

> (4) Our investigation of writing at the local government office comprised an analysis of the norms and attitudes of each individual. We asked the different employees about their norms concerning a good text and a good writer. We also asked them about their attitudes toward writing at work. What we found interesting about this context, however, is the degree of uniformity of their norms and attitudes. (Soc)

ENGAGEMENT AND READER-ORIENTED INTERACTION

Unlike stance, the ways writers bring readers into the discourse has been relatively neglected in the literature. Engagement seeks to build a connection with readers to both stress solidarity and position them by anticipating possible objections and guiding their thinking. Based on their previous experiences with texts, writers make predictions about how readers are likely to react to their arguments and craft their texts to explicitly address them at certain points (Hyland, 2001a). Engagement markers include reader pronouns, personal asides, references to sharedness, directives, and questions.

Reader pronouns offer the most explicit ways of bringing readers into a discourse, but we almost never find "you" in academic writing, perhaps because it implies a separation between writer and reader, rather than seeking connections. Instead there is enormous emphasis on binding the two together through the use of inclusive "we." There are several reasons for using this form, but, most centrally, it identifies the reader as someone who shares similar interests or ways of seeing to the writer as a member of the same discipline. At the same time as expressing peer solidarity, however, it also anticipates reader objections, presum-

ing mutual understandings while weaving the potential point of view of the reader into the argument.

> (5) In carrying out such a "meta-analysis", moreover, we should try to minimize the possibilities of self-authorization of our own pragmatic theories. (AL)
>
> If we acknowledge folk psychology's value-anchoring role we can see the moral importance of greater representational complexity. (Phil)

Directives are mainly expressed through imperatives and obligation modals and they direct readers to engage in three main kinds of activity:

- textual acts: direct readers to another part of the text or to another text (*see Smith, 1999; refer to table 3,* etc.)
- physical acts direct readers how to carry out some action in the real-world (e.g., *open the valve, heat the mixture*).
- cognitive acts instruct readers how to interpret an argument, explicitly positioning readers by encouraging them to *note, concede* or *consider* some argument or claim in the text.

Personal asides allow writers to address readers directly by briefly interrupting the argument to offer a comment on what has been said. By turning to the reader in mid-flow, writers can initiate a brief dialogue that adds more to the writer-reader relationship than to propositional development:

> (6) And - as I believe many TESOL professionals will readily acknowledge - critical thinking has now begun to make its mark, particularly in the area of L2 composition. (AL)
>
> He above all provoked the mistrust of academics, both because of his trenchant opinions (often, it is true, insufficiently thought out) and his political opinions. (Soc)

Appeals to shared knowledge are explicit signals asking readers to recognise something as familiar or accepted. These constructions of solidarity ask readers to identify with particular views and in so doing construct readers by assigning to them a role in creating the argument, acknowledging their contribution while moving the focus of the discourse away from the writer to shape the role of the reader:

> (7) Tillage as a form of soil disturbance is well known to disrupt hyphal networks and reduce colonization by arbuscular mycorrhizas. (Bio)
>
> Obviously, such unsymmetric process geometry would cause the unbalanced rolling. (Mech Eng)

Questions are a key strategy of dialogic involvement, inviting participation, encouraging curiosity and leading readers to the writer's viewpoint (Hyland, 2002b). Questions perform a range of functions in academic writing and can have a different authoritative impact from the naïve puzzlement of limited knowledge to the confident anticipation of reaching an answer. In all cases, though, they invite direct collusion because they address the reader as someone with an interest in the issue the question raises and the good sense to follow the writer's response to it:

> (8) Why did impoverished and almost defenseless shantytowns emerge as the center of resistance to authoritarian rule? Why did shantytown residents risk arrest, torture, and even death to fight a regime they seemed to have so little chance of defeating? Why did protests center in some shantytowns, but not others? (Soc)

Table 2. Stance and Engagement features in the research articles.

Stance	**Items per 1000 words**	**% of total**	**Engagement**	**Items per 1000 words**	**% of total**
Hedges	14.5	46.6	Reader pronouns	2.9	49.1
Attitude markers	6.4	205.	Directives	1.9	32.3
Boosters	5.8	19.2	Questions	0.5	8.5
Self mention	4.2	13.7	Shared knowledge references	0.5	8.2
			Asides	0.1	1.9
Totals	30.9	100		5.9	100

Now, in making choices from these systems of stance and engagement the writer is involved in a process of audience evaluation. So texts tell us something about how writers see their readers and therefore how language is related to specific institutional contexts.

DISCIPLINARY VARIATIONS IN STANCE AND ENGAGEMENT

Overall there were about 200 stance and engagement features in each paper, about one every 28 words. Table 2 shows that stance markers were about five times more common than engagement, and hedges dominated the frequencies. Questions, knowledge references and aside were less common.

We can get an idea of the significance of these frequencies by comparing them with other common features. Biber and colleagues (1999), for instance, record 18.5 cases per thousand words for passive voice constructions and 20 per thousand words for past tense verbs in a large corpus of academic writing. So these are major items in academic writing which do not always get the attention they deserve in EAP courses. More interesting, however, are the disciplinary distributions. Table 3 shows the density of features in each discipline normalised to a text length of 1,000 words. As can be seen, the more discursive 'soft' fields of philosophy, marketing, sociology and applied linguistics contained the highest proportion of interactional markers with some 75% more items than the engineering and science papers.

It is clear that writers in different disciplines represent themselves, their work and their readers in different ways, with those in the humanities and social sciences taking far more explicitly involved and personal positions than those in the sciences and engineering (Hyland & Bondi, 2006). In broad terms, rhetorical practices are inextricably related to the purposes of the disciplines. Natural scientists tend to see their goal as producing public knowledge able to withstand the rigours of falsifiability and developed through relatively steady cumulative growth (Becher, 1989). The fact that this research often occupies considerable investments in money, training, equipment, and expertise means it is frequently concentrated at a few sites and commits scientists to involvement in specific research areas for many years. Problems, therefore, emerge in an established context so that readers are often familiar with prior texts and research, and that the novelty and significance of contributions can be easily recognised.

Readers are often familiar with prior texts and research, and so a strong interpersonal element is not so necessary in the sciences. Writers are able to rely more on shared background and proven methods. The people who read those

papers are often working on the same things and are familiar with the earlier work. They have a good idea about the procedures used, whether they have been properly applied, and what results mean. This helps reinforce a view of science as an impersonal, inductive enterprise and allows scientists to see themselves as discovering truth rather than constructing it.

The soft-knowledge domains, in contrast, produce discourses which often recast knowledge as sympathetic understanding, promoting tolerance in readers through an ethical rather than cognitive progression (Hyland, 2000). They have to spell things out, and work harder to establish their credibility and to create an understanding with readers. Personal credibility, getting behind your arguments, plays an important part in creating a convincing discourse in the humanities and social sciences.

Table 3. Stance and engagement features by discipline (per 1,000 words).

Feature	**Phil**	**Soc**	**AL**	**Mk**	**Phy**	**Bio**	**ME**	**EE**	**Total**
Stance	42.8	31.1	37.2	39.5	25.0	23.8	19.8	21.6	30.9
Hedges	18.5	14.7	18.0	20.0	9.6	13.6	8.2	9.6	14.5
Attitude markers	8.9	7.0	8.6	6.9	3.9	2.9	5.6	5.5	6.4
Boosters	9.7	5.1	6.2	7.1	6.0	3.9	5.0	3.2	5.8
Self mention	5.7	4.3	4.4	5.5	5.5	3.4	1.0	3.3	4.2
Engage-ment	16.3	5.1	5.0	3.2	4.9	1.6	2.8	4.3	5.9
Reader ref	11.0	2.3	1.9	1.1	2.1	0.1	0.5	1.0	2.9
Direc-tives	2.6	1.6	2.0	1.3	2.1	1.3	2.0	2.9	1.9
Ques-tions	1.4	0.7	0.5	0.3	0.1	0.1	0.1	0.0	0.5
Shared knowl-edge ref	1.0	0.4	0.6	0.4	0.5	0.1	0.3	0.4	0.5
Asides	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.1
Totals	59.1	36.2	42.2	42.7	29.9	25.4	22.6	25.9	36.8

AUTHORIAL INVOLVEMENT IN KNOWLEDGE CONSTRUCTION

Now I will turn to look at what this model tells us about knowledge construction in the research article corpus, examining stance first.

Both hedges and boosters are more common in the humanities and social science papers with about 2½ times as many devices overall and hedges particularly strongly represented. This is mainly because the soft-knowledge fields are typically more interpretative and less abstract than the hard sciences and their forms of argument rely more on a dialogic engagement and more explicit recognition of alternative voices. Research is influenced far more by contextual factors, there is less control of variables, more diversity of research outcomes, and generally fewer unequivocal bases for accepting claims. Writers in the soft fields cannot, therefore, report their research with the same confidence of shared assumptions. They must rely far more on focusing readers on the claim-making negotiations of the discourse community, the arguments themselves, rather than relatively unmediated real-world phenomena. This means that arguments have to be expressed more cautiously by using more hedges:

> (9) Wilson leaves us disappointed, it seems to me, in the sense that his theory is far from being general. (Soc)

> We tentatively suggest that The Sun's minimalist style creates an impression of working-class language, or restricted code. (AL)

The fact that methods and results are more open to question also means that writers in the social sciences and humanities also work harder to establish the significance of their work against alternative interpretations. In particular, they restrict possible alternative voices by using boosters. Two comments from informants typify this view:

> It's often a good idea to present ideas confidently so that people take you seriously. 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. It's what gives you credibility. It's the whole point. (Phil interview)

This kind of commitment is evident in these extracts:

> (9) It is certainly true that many arguments involve multiple premises. (Phil)

> This particular result is undoubtedly attributable to the impending incorporation of Hong Kong into the People's Republic of China. (Mk)

In the hard sciences, positivist epistemologies mean that the authority of the individual gets subordinated to the authority of the text and facts are meant to 'speak for themselves' (Hyland, 2005). Writers often disguise their interpretative responsibilities behind linguistic objectivity. The less frequent use of hedges and boosters is one way of minimising the researcher's role, as is the preference for modals over cognitive verbs, such as think, believe and suspect. Modals can more easily combine with inanimate subjects to downplay the person making the evaluation. So instead of

> (10) I think this would be a mistake. (Soc)

> we suspect that the type of product used in this study may have contributed to the result (Mkt), we tend to find:

> (11) The theory given above simply provided some insight into the various mechanisms that might or might not yield a polarimetric effect. (Phy)

> For V. trifidum, ANOVA showed a significant increase from L to L' and FI, which could be interpreted as reflecting the dynamics of fungal colonization. (Bio)

> The deviations at high frequencies may have been caused by the noise measurements ... (EE)

Two scientist informants commented on this kind of use:

> Of course, I make decisions about the findings I have, but

> it is more convincing to tie them closely to the results. (Phy interview)

> You have to relate what you say to your colleagues and we don't encourage people to go out and nail their colours to the mast as maybe they don't get it published. (Bio interview)

Self mentions are also less common in the sciences for similar reasons, as writers often downplay their personal role to suggest that results would be the same whoever conducted the research. They are concerned with generalisations rather than individuals and with strengthening the objectivity of their interpretations. By subordinating their own voice to that of nature, they put greater burden on the methods, procedures, and equipment used. As this biologist told me,

> I feel a paper is stronger if we are allowed to see what was done without "we did this" and "we think that." Of course we know there are researchers there, making interpretations and so on, but this is just assumed. It's part of the background. I'm looking for something interesting in the study and it shouldn't really matter who did what in any case. (Bio interview)

In contrast, in the humanities and social sciences the strategic use of self-mention allows writers to strongly identify with a particular argument and to gain credit for an individual viewpoint. Through first person they can claim authority by expressing their convictions, emphasizing their contribution to the field, and seeking recognition for their work (Hyland, 2001b; Kuo, 1999). It sends a clear indication to the reader of the perspective from which statements should be interpreted, distinguishing the writer's own work from that of others. It is not surprising therefore that some 69% of all cases of self-mention were in the humanities and social science papers, with an average of 38 per article, compared with only 17 per paper in science and engineering. Successful communication in the soft fields depends far more on the author's ability to invoke a real writer in the text. Personal reference is thus a clear indication of the perspective from which a statement should be interpreted, enabling writers to emphasize their own contribution to the field and to seek agreement for it.

> (12) I argue that their treatment is superficial because, despite appearances, it relies solely on a sociological, as opposed to an ethical, orientation to develop a response. (Soc)

> I bring to bear on the problem my own experience. This experience contains ideas derived from reading I have done which might be relevant to my puzzlement as well as my personal contacts with teaching contexts. (AL)

So, in the humanities and social sciences, self-mention can help construct an intelligent, credible, and engaging colleague by presenting an authorial self, reflecting an appropriate degree of confidence and authority:

> 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)

PARTICIPANT RELATIONSHIPS AND INTERPERSONAL ENGAGEMENT

In addition to creating an impression of authority and credibility through stance choices, writers also highlight or downplay the presence of their readers in the text through the use of engagement devices. As we saw in Table 3, engagement devices were far less frequent than stance items, but showed similar variation across disciplines.

Reader pronouns were the most frequent engagement items in the corpus and over 80% of these occurred in the soft disciplines where they appealed to scholarly solidarity. Here writers emphasised mutual, discipline-identifying understandings linking writer and reader:

> (13) Adopting a reflexive and continuously critical approach towards ourselves and our sociological practices is especially necessary because our profession is an all-embracing calling that penetrates our self and collective identities, and serves for many of us as a functional equivalent of ideology or civil-religion. (Soc)

Claiming communality is important to writers in the discursive fields, as several of my informants noted:

> I suppose "we" helps to finesse a positive response—we are all in this together kind of thing. I use it to signal that I am on the same wavelength, drawing on the same assumptions and asking the same questions. (Mkt Interview)

> It helps to locate you in a network. It shows that you are just doing and thinking what they might do and think. Or what you would like them to, anyway. (Soc interview)

But these pronouns claim authority as well as collegiality. They not only appeal to disciplinary solidarity but address readers from a position of confidence, taking on their potential point of view to guide them through an argument and towards a preferred interpretation, as can be seen here:

> (14) Now that we have a plausible theory of depiction, we should be able to answer the question of what static images depict. But this turns out to be not at all a straightforward matter. We seem, in fact, to be faced with a dilemma. Suppose we say that static images can depict movement. This brings us into conflict with Currie's account. (Phil)

> Although we lack knowledge about a definitive biological function for the transcripts from the 93D locus, their sequences provide us with an ideal system to identify a specific transcriptionally active site in embryonic nuclei. (Bio)

Several of my informants were well aware of this more Machiavellian purpose:

> Part of what you are doing in writing a paper is getting your readers onside, not just getting down a list of facts, but showing that you have similar interests and concerns. That you are looking at issues in much the same way they would, not spelling everything out, but following the same procedures and asking the questions they might have. (Bio interview)

> I often use 'we' to include readers. I suppose it brings out something of the collective endeavour, what we all know and want

> to accomplish. I've never thought of it as a strategy, but I suppose I am trying to lead readers along with me. (ME interview)

Questions. There was an even greater disciplinary imbalance with the use of questions, which we almost exclusively find in the soft fields. But over 80% of questions in the corpus were rhetorical, presenting an opinion as an interrogative, but often answering the question immediately, simultaneously opening and closing the dialogue to present a claim:

> (15) Does the Brain-in-a-vat thereby succeed in including the relation in which it stands to its environment "the delusive relation"? There are, I think, compelling reasons to say that it does not. (Phil)

> What do these two have in common, one might ask? The answer is that they share the same politics. (AL)

The fact that they reach out to readers was seen as a distraction by my science informants:

> Questions are quite rare in my field I think. You might find them in textbooks I suppose, but generally we don't use them. They seem rather intrusive, don't they? Too personal. We generally prefer not to be too intrusive. (ME interview)

> I am looking for the results in a paper, and to see if the method was sound. I am looking for relevance and that kind of dressing is irrelevant. People don't ask questions as it would be seen as irrelevant. And condescending probably. (EE)

In contrast, the soft knowledge writers saw them as an important way of relating to readers:

> In my field that's all there are, questions. Putting the main issues in the form of questions is a way of presenting my argument clearly and showing them I am on the same wavelength as them. (Phil interview)

> Often I structure the argument by putting the problems that they might ask. (Mkt interview)

Finally, *directives* were the only interactive feature which occurred more frequently in the science and engineering papers than in the humanities and social sciences. Generally, explicit engagement is a feature of the soft disciplines, where writers are less able to rely on the explanatory value of accepted procedures, but directives are a potentially risky tactic as they instruct readers to act or see things in a certain way. As a result, most directives in the soft fields were textual, directing readers to a reference or table rather than telling them how they should interpret an argument.

> See Steuer 1983 for a discussion of other contingencies' effects. (Mkt)

> Look at Table 2 again for examples of behavioristic variables. (Mkt)

> For transcription conventions refer to the Appendix. (AL)

Two of my respondents noted this in their interviews:

> I am very conscious of using words like 'must' and 'consider' and so on and use them for a purpose. I want to say 'Right, stop here. This is important and I want you to take notice of it'. So I suppose I am trying to take control of the reader and getting them to see things my way. (Soc interview)

> I am aware of the effect that an imperative can have so I tend to use the more gentle ones. I don't want to bang them over the head with an argument I want them to reflect on what I'm saying. I use 'consider' and 'let's look at this' rather than something stronger. (AL interview)

Argument in the hard knowledge fields, in contrast, is formulated in a highly standardised code. Succinctness is valued by both editors and scientists themselves and directives allow writers to cut directly to the heart of matters. This helps explain why cognitive directives, potentially the most threatening type, were overwhelmingly predominant in the natural science corpus. These explicitly position readers by leading them through an argument or emphasising what they should attend to:

> (17) Consider a sequence of batches in an optimal schedule.

> (EE)
>
> A distinction must be made between cytogenetic and molecular resolution. (Bio)
>
> What has to be recognised is that these issues ... (ME)

This facilitates succinctness and an economy of expression highly valued by space-conscious editors and information-saturated scientists, as several informants noted:

> I rarely give a lot of attention to the dressing, I look for the meat—the findings—and if the argument is sound. If someone wants to save me time in getting there then that is fine. No, I'm not worried about imperatives leading me through it. (EE interview)
>
> I'm very conscious of how I write and I am happy to use an imperative if it puts my idea over clearly. Often we are trying to work to word limits anyway, squeezing fairly complex arguments into a tight space. (ME interview)

CONCLUSIONS

These different features, taken together, are important ways of situating academic arguments in the interactions of members of disciplinary communities. Induction and falsification are not proofs. Because we do not have direct access to the world and our understandings can only be mediated by a theory to interpret it, knowledge has to be seen as a rhetorical construct. I hope to have shown that effective academic writing depends on interactions and I have suggested a model which attempts to show how writers deploy linguistic resources to represent themselves, their positions, and their readers. These resources represent relatively conventional ways of making meaning and so elucidate a context for interpretation, showing how writers and readers make connections, through texts, to their disciplinary cultures.

In other words, discourse conventions are persuasive because they carry the epistemological and social beliefs of community members. The regularities I have highlighted are influenced by the types of inquiry and understandings of different knowledge domains. Reference to the writer or the reader sends a clear

signal of membership. It textually constructs both the writer and the reader as people with similar understandings and goals. This not only helps writers persuade their colleagues of their claims, but puts writing at the heart of knowledge creation and teaching. It also helps us to understand something about disciplinary communities and the ways they construct knowledge.

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