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Hyland, K. (2006). Disciplinary differences: Language variation in academic discourses. In Hyland, K. & Bondi, M. (Eds.) Academic discourse across disciplines. Frankfurt: Peter Lang. pp 17-45

KEN HYLAND

Disciplinary Differences: Language Variation in Academic Discourses

1. Introduction

Until fairly recently research in academic discourse mainly concerned itself with elaborating what were seen as broad features of the register or describing general regularities of discourse structure. Scientific writing was taken to be the prototypical exemplar of academic discourse and considerable work was invested in describing the ways it represented meanings in an objective and formal way through resources such as lexical density, nominalised style and impersonality. Other writers approached academic texts from a wider angle, seeking to reveal the rhetorical patterning of discourse units such as *problem-solution* or *hypothetical-real* (Hoey 1983) or the ways that functional *Rhetorical-Grammatical* units nested together (Lackstrom / Selinker / Trimble 1973). Academic discourse research therefore largely focused on individual disciplines to exemplify general principles of academic writing.

A more sophisticated appreciation of language variation has emerged over the last decade accompanied, and influenced, by the accelerating interest in the concept of genre since Swales' seminal *Genre Analysis* in 1990. Genre has been an enormously valuable tool in providing a more powerful means of exploring situated language use and allowing us to see texts as stabilized sites of social action. Its

influence, however, has perhaps led us to over-emphasize the resemblances and correspondences between texts rather than their differences. This is because genre helps us to harness the power of generalization: grouping together texts that have important similarities in terms of rhetorical purpose, form and audience, and then exploring how they differ from other text types. While Swales also introduced the idea of discourse community in *Genre Analysis*, and saw the two concepts as mutually defining, it is only in the last few years that they have really been consistently and coherently employed to understand the ways texts vary across communities. In fact, *genre* and *community* together provide a descriptive and explanatory framework of how meanings are socially constructed by considering the forces outside the individual which help guide purposes and shape writing.

In this chapter I want to provide a brief, and no doubt idiosyncratically selective, overview of the research on disciplinary variation, sketching out the key research which has contributed to our current understandings of the ways different disciplines shape their arguments and construct knowledge.

2. Community, discipline and literacy

Disciplines have been seen as institutional conveniences, networks of communication, domains of values and modes of enquiry. Kuhn (1977) identified them according to whether they had clearly established paradigms or were at a looser, pre-paradigm stage; Biglan (1973) and Donald (1990) drew on faculty perceptions and Kolb (1981) on learning style differences to provide categories which distinguished hard from soft and applied from pure knowledge fields; Storer and Parsons (1968) opposed analytical to synthetic fields; and Berliner (2003) distinguished 'hard' and 'easy-to-do' disciplines in terms of the ability to understand, predict and control the phenomena they study. Others, mainly writing from Post-modern positions, have

pronounced that the fragmentation of academic life has resulted in the death of disciplines (e.g. Gilbert 1995).

In applied linguistics a great deal of research has confirmed the distinctiveness of discourses cohering around the concept of *community*. Researchers have become more sensitive to the ways genres are written, used and responded to by individuals acting as members of social groups. This community-based orientation to literacy therefore focuses on the importance of communicating, and learning to communicate, as an *insider* of the community one wishes to engage with. Such ideas as *communicative competence* in applied linguistics, *situated learning* in education, and *social constructionism* in the social sciences have contributed to a view which places community at the heart of writing and speech. Community, in fact, helps us not only to better interpret and understand language use but also to *explain* language variation across different groups.

Essentially, the idea of community draws together a number of key aspects of context that are crucial to the production and interpretation of spoken and written discourse: knowledge of a cultural and interpersonal situation, knowledge of interlocutors, knowledge of the world, and knowledge of texts and conventions for saying things. Emphasis therefore tends to be on what is 'shared' by a community (e.g. Bizzell 1982; Swales 1990), an emphasis which has led to critics viewing the concept as too structuralist, static, and deterministic (e.g. Canagarajah 2002; Prior 1998).

These critiques caution us to bear in mind that while discourse constitutes the community's knowledge and activities, community members rarely comprise a uniform and undifferentiated mass. By adopting a voice associated with a particular field of study writers align themselves with its knowledge-making practices, but this is not the only dimension of discursal alternatives available to them. Every community is composed of individuals with diverse experiences, backgrounds, expertise, commitments, and influence and who differ in how far they subscribe to its various goals and methods, participate in its diverse activities, and identify with its conventions and values. The student neophyte, the laboratory research assistant, the professorial theorist, the industrial applied scientist and the Nobel prize winner interact with and use the same texts and genres for different purposes,

with different questions, and with different degrees of engagement. No less importantly, we are all members of multiple communities and bring these diverse experiences to our participation in each of them. Groupings like gender, social class, religion, race, geographical region are the most obvious of these; but other communities like school, family and the workplace also shape our perceptions and understandings (e.g. Bondi 2004).

Disciplines are, in short, human institutions where actions and understandings are influenced by the personal and biographical, as well as the institutional and sociocultural. They are sites where differences in worldview or language usage intersect as a result of the myriad backgrounds and overlapping memberships of participants. Such critiques and understandings have thus informed our understanding of these differences and sharpened the construct of community so that it is now seen in terms of an individual's engagement in certain discourses and practices, rather than orientations to rules and goals (e.g. Killingsworth 1992; Porter 1992; Swales 1998). Thus our membership of different groups offers us a multiplicity of identities that can be configured and balanced against each other in different ways, but we tend to draw on similar conventions and expectations to realise our participation in any given community.

So, with the idea of *discourse community* we arrive at a more rounded and socially informed theory of texts and contexts. It provides a principled way of understanding how meaning is produced *in interaction* and proves useful in identifying how writers' rhetorical choices depend on purposes, setting and audience (e.g. Bruffee 1986; Starfield 2002). When applied to academic domains, the expression of community in the notion of *discipline* therefore offers researchers a framework for conceptualising the expectations, conventions and practises which influence academic communication and help determine the life chances of thousands of students and academics around the world.

3. Disciplines and the discoursal construction of knowledge

Community is implicated in discourse analytic views of discipline as practitioners are seen to share a common objective in the production and communication of knowledge. Disciplinary communities have been described as *tribes* (Becher 1989), each with its own norms, categorizations, bodies of knowledge, sets of conventions, and modes of inquiry which comprise a recognizable culture (Bartholomae 1986; Hyland 2000). Within each culture individuals acquire a competence in specialized discourses: an ability to organise data and observations into meaningful patterns for readers. Creating such a convincing reader-environment involves deploying disciplinary and genre-specific conventions such that “the published paper is a multilayered hybrid *co-produced* by the authors *and* by members of the audience to which it is directed” (Knorr-Cetina 1981: 106). In other words, writing as a member of a discipline involves textualizing work in a way that colleagues can see as ‘doing biology’ or ‘doing sociology’. Such community constraints on discourse both restrict how something can be said and authorize the writer as someone competent to say it.

Community is joined to the concept of constructivism to offer insights into the ways academic discourse is embedded in the wider processes of argument, affiliation and consensus-making of disciplines. Discourse thus helps to create a disciplinary view of the world. Influenced by a discipline’s social practices and ways of thinking, academic writing involves sets of rhetorical choices employed to galvanise support, express collegiality, resolve difficulties, and avoid disagreement in ways which most closely correspond to the community’s assumptions, methods, and bodies of knowledge. Each community develops its own way of formulating and negotiating knowledge and so defines what it takes knowledge to be. We are more likely to persuade readers of our ideas if we frame our messages in ways which appeal to appropriate community recognised relationships (Hyland 2000, 2002a). These are the epistemic conventions of a discipline, what counts as appropriate evidence and argument, and considerable research is now devoted to elaborating the

considerable differences in these conventions across disciplines. Figure 1 shows the research available on this topic. I now turn to look at some of this research.

<i>Area</i>	<i>Writer</i>	<i>Genre</i>	<i>Feature</i>	<i>Disciplines</i>
<i>Argument</i>				
	Bazerman (1988)	articles	various	3 various
	Bondi (2004)	abstracts	contrastive connectors	history/ economics
	Hartley et al (2004)	articles	readability	3 various
	Hyland (1999c)	articles	citation	8 various
	Hyland (2000)	abstracts	significance claims	8 various
	Hyland (2003)	articles	citation	8 various
	Hyland / Tse (2007)	various	'sub-technical' lexis	8 various
	MacDonald (1994)	articles	grammatical subjects	3 science/hum
	Moore (2002)	textbooks	agents	3 various
	Samraj (2002)	abstracts	significance claims	2 sciences
	Swales (2004)	articles	textual silences	4 various
	Thompson (2000, 2005)	theses	citation	
<i>Moves</i>				
	Braine (1995)	lab reports	Moves	6 engineering
	Bunton (2005)	PhD theses	Moves	Various
	Holmes (1997)	articles	Moves	3 soc sciences
	Hyland (2004a)	acknowledgements	moves	6 various
	Hyland (2000)	abstracts	moves	8 various
	Samraj (2002)	abstracts	moves	2 sciences
<i>Stance</i>				
	Bondi (2005)	abstracts	self-representation	history/ economics
	Bondi / Silver(2004)	articles	self-representation	history/ economics
	Busà (2005)	abstracts	theme	econ/ psychology
	Charles (2003)	theses	this + noun	politics/ materials
	Groom (2005)	reviews/ articles	it <i>adj</i> that	lit. criticism / history
	Hyland (1997)	articles	hedges	6 various
	Hyland (1998a, b)	articles	hedges & boosters	8 various
	Hyland (1999a, 2000)	articles	various	8 various
	Hyland (1999b, 2000)	textbooks	various	6 various

Hyland (2001b)	articles	self mention	8 various
Hyland (2001b, 2003)	articles	self citation	8 various
Hyland / Tse (2005)	abstracts	<i>evaluative that</i>	6 various
Kuo (1999)	articles	self mention	3 sciences
Motta-Roth (1998)	book	evaluation	3 soc sci/
	reviews		science
Parry (1998)	theses	criticism, etc.	various
<i>Engagement</i>			
Hyland(2001a, 2004b)	articles	various	8 various
Hyland (2002a)	articles	directives	8 various
Hyland (2002b)	articles & essays	questions	8 various
Hyland (2005)	articles	various	8 various
Kuo (1999)	articles	reader pronouns	3 sciences
<i>Speech</i>			
Dudley-Evans (1994)	lectures	rhetorical patterns	science/ engineering
Nesi (2001)	lectures	lexical density	various
Poos / Simpson (2002)	lectures	hedging	various
Swales (2004)	PhD defences	crosstalk	3 soc sci/ humanities

Figure 1. Research addressing rhetorical variation across disciplines.

4. Situating arguments in disciplinary conventions

The first main category of difference I want to address concerns research into disciplinary argument forms, and, in particular, the range of features used to construct persuasive discourse across different fields. Bazerman (1988) was one of the first to become interested in how writing functioned in different disciplines and in an early paper compared approaches to knowledge making in Watson and Crick's seminal DNA paper with essays from the sociology of science and literary studies. Bazerman adopts an interpretive approach to individual texts and authors common in literary analysis, rather than a discourse analytic approach, but shows how disciplines mediate reality in different ways. He describes how knowledge creation is related to key epistemological and cultural differences through the

ways that writers draw on disciplinary literature, code knowledge in accepted modes of argument and represent themselves in their texts.

A little later, MacDonald (1994) offered a more linguistically oriented method to reveal knowledge making practices, focusing on the ways that grammatical subjects code disciplinary preference in psychology, history and literature. MacDonald suggests that psychology articles are more likely to foreground research methods and warrants and are more abstract while literature articles are more particularistic and focus least on research methods and warrants.

One important variable in disciplinary knowledge construction is the extent to which knowledge is attributed to individual scholars, schools of thought, conventional wisdom, or is expressed in a non-attributed canonical form. Moore's (2002) analysis of this feature suggests that the discourse of economics textbooks is more akin to that of physics than sociology, with the latter containing far more references to social actors and processes. Moore speculates that this may be due to sociological reasons, the fact that sociology has failed to establish a clear paradigm in terms of the degree of agreement among its members about how the world is seen and how research issues are to be tackled, or to the fact that it has less clearly defined boundaries and relatively uncircumscribed sets of problems to address.

The issue of foregrounding a particular topic is also crucially important in situating research and creating a plausible argument. Topics help mark co-participation in communities of practice, and establishing this kind of community relevance is often strongly conveyed in the abstract or introduction to an article. In science and engineering abstracts, for instance, writers frequently offer their research as a valuable contribution to pressing real-world issues. Constant progress is a central part of the scientific cultures and writers often stress the novelty of their research while engineers emphasize the utility of their research, mainly to the industrial world which relies on it. Writers in marketing, applied linguistics and sociology, in contrast, tend to establish an unresolved disciplinary relevant problem (Hyland 2000). Samraj (2002) found similar differences in a sample of introductions, where Conservation Biologists more strongly promoted

their ideas through real-world centrality claims compared with the more theoretical discipline of Wildlife Behavior.

Writing style is another aspect of disciplinary variation in knowledge creation, and writers have found, perhaps surprisingly, that science texts are more readable than those in the social sciences and arts fields as far as sentence lengths and Flesch scores are concerned (Hartley et al. 2004; Tibbo 1992). There is also considerable variation in writers' choices of sub-technical lexis. Hyland and Tse (2007), for instance, show that so-called universal items from the Academic Word List vary enormously across disciplines in terms of range, frequency, collocation, and meaning, so undermining the assumption that there is a single core vocabulary needed for academic study. More substantially, however, one of the most obvious strategies for situating research within disciplinary expectations is through citation (Hyland 2000; Thompson / Ye 1991). Any text anticipates a reader's response and itself responds to a larger discourse already in progress, so argument incorporates the active role of an addressee and is understood against a background of other viewpoints in prior texts. Citation helps provide an intertextual framework for new work, allowing the writer to construct an effective justification for an argument and demonstrate the novelty of his or her position. By acknowledging previous research, writers are able to display an allegiance to a particular community or orientation, create a rhetorical gap for their research, and establish a credible writer ethos (Swales 1990). Corpus analysis shows, however, that the frequency and use of citations differ according to context, influenced by the ways particular disciplines see the world and carry out research. In a study of 80 research articles in eight disciplines I found that the articles in philosophy, sociology, marketing and applied linguistics together comprised two thirds of all the citations in the corpus, twice as many as the science disciplines, with engineering and physics well below the average (Fig. 2). It was also the case that in addition to the greater frequency of citation in the soft fields, these writers also gave more prominence to the cited author through use of integral structures and by placing authors in subject position (Hyland 1999c).

One reason for these differences is that scientific knowledge tends to be highly specialised and develops in a more linear way than

in the humanities and social sciences, emerging from an existing state of knowledge (Kuhn 1970) as a cumulative process. As a result, scientists participate in relatively discrete areas of study and their research proceeds along well defined paths, so they can presuppose a certain amount of theoretical, background, procedural expertise and technical lexis (Hyland 2000).

<i>Discipline Citations</i>	<i>Av. per paper</i>	<i>per 1000 words</i>	<i>Total</i>
Sociology	104.0	12.5	1040
Marketing	94.9	10.1	949
Philosophy	85.2	10.8	852
Biology	82.7	15.5	827
Applied Linguistics	75.3	10.8	753
Electronic Engineering	42.8	8.4	428
Mechanical Engineering	27.5	7.3	275
Physics	24.8	7.4	248
Totals	67.1	10.7	5372

Figure 2. Citations by discipline (80 research articles).

Citation is therefore a means of integrating new claims into a scaffolding of already accredited facts. References are often sparse and tend to be tightly bound to the particular research topic which helps to closely define a specific context of knowledge and contributes to a sense of linear progression.

This kind of predictability is relatively rare in the humanities and social sciences where new knowledge depends less on a single line of development. The literature is open to greater interpretation, findings are often borrowed from other disciplines, and criteria for establishing claims are less clear-cut. Because readers cannot be assumed to possess the same interpretive knowledge, writers have to elaborate a context through citation.

5. Rhetorical structure

Interest in the rhetorical structure of academic genres has flourished since Swales' (1990) study of article introductions, although it has been slow to inform research into disciplinary variation. At one level, disciplines themselves differ in their key genres which makes cross disciplinary comparisons of move structures a less urgent enterprise. Coffin et al (2003), for instance, identify three different genres as being pivotal to each of three main domains of knowledge: project proposals in the sciences, essays in the humanities, and reports and case studies in the social sciences. But when we do identify a common genre across disciplines, we immediately find a range of structural patterns. An early study in this area was Braine's (1995) analysis of the considerable variation in experimental lab reports across different technical and engineering disciplines. Despite the common genre name, some fields required reports with abstracts and others didn't, some included description of apparatus but not others, some had recommendations, others had a specification of hazards section, or a heading labelled 'theory', and so on. In fact, no two disciplines had experimental report formats that were the same in their move structures.

Such variations have also been found in the emphasis given to particular moves in article abstracts (Hyland 2000; Samraj 2002) and research articles. Holmes (1997), for instance, found articles from the social sciences had a more restricted repertoire of moves with less predictability and less recycling compared with those in the hard sciences. History texts were particularly distinctive, rarely containing a methods section and with long, complex introductions and short discussions compared with papers in political science, sociology and chemical engineering. Holmes observes that "the social sciences, in contrast to the natural sciences, tend towards complexity and elaboration at the beginning of the article rather than at the end" (332). He attributes this variation to the tendency for research in the natural sciences to reflect trends towards greater expense and bureaucratisation as measured by quantitative data, collaborative authorship, external financial support and uniform discourse patterns.

Researchers have recently turned their attention to the structure of student genres. In PhD and masters dissertations, for example, Bunton (2005) shows that the generic structure of the *conclusion* chapter of PhD theses in science and technology tend to be longer and have more sections than those in the humanities and social sciences. The science and technology *conclusions* also concentrated on broader results and claims, gave greater emphasis to future research and referred to practical applications which the writers see being put to immediate use in their field. At the other end of the dissertation, in a study of the acknowledgements in 240 PhD and MA dissertations, Hyland (2004a) found that writers in the soft fields were far more likely to offer a reflection on their experience of research and to accept responsibility for the work (Fig. 3), while writers in the sciences and engineering fields more often thanked individuals and institutions for funding and technical support.

<i>Acknowledging Moves</i>	<i>App Ling</i>	<i>Biology</i>	<i>Total</i>
	<i>Bus Studies</i> <i>Public Admin</i>	<i>Comp Science</i> <i>Elec. Engineering</i>	
1 <i>Reflecting Move</i>	26	13	19
2 <i>Thanking Move</i>			
1 Presenting participants	39	19	28
2 Thanking for academic assistance	100	100	100
3 Thanking for resources	75	59	66
4 Thanking for moral support	77	66	71
3 <i>Announcing Move</i>			
1 Accepting responsibility	11	3	7
2 Dedicating the thesis	4	2	4

Figure 3. Percentage of acknowledgements with each step by discipline.

6. Authorial stance and claim making

In claiming a right to be heard, and to have their work taken seriously, academics and students must display a competence which is, at least

in part, achieved through the individual writer's projection of a shared disciplinary context. That is, writers seek to create a recognisable social world through rhetorical choices which allow them to balance claims for the significance, originality and plausibility of their work against the convictions and expectations of their readers. Part of this involves expressing a textual 'voice' or community recognised personality which, following others, I have called *stance* (Hyland 1999a; 2005): the extent to which individuals intrude to stamp their personal authority onto their arguments or step back and disguise their involvement. This includes *writer-oriented features* such as hedges and boosters, self mention and explicit markers of evaluation and attitude which together reveal the ways writers present themselves and convey their judgements, opinions, evaluations and commitments.

Comparisons show writers in different disciplines representing themselves and their work in different ways, with those in the humanities and social sciences taking far more explicitly involved and personal positions than those in the science and engineering fields (Hyland 2000; 2005). In a series of studies focusing on disciplinary variation in the use of hedges and boosters (Hyland 1997; 1998a; 1998b; 1999b; 2001a; 2004b; Hyland / Tse 2004), attitude markers (Hyland 1999a) and self-mention (Hyland 2001b; 2003) in research papers, for example, I found that the more discursive 'soft' fields of philosophy, sociology, applied linguistics and marketing contained 75% more stance items than the engineering and science papers. Fig. 4 summarises these findings.

<i>Feature</i>	<i>Phil</i>	<i>Soc</i>	<i>AL</i>	<i>Mk</i>	<i>Phy</i>	<i>Bio</i>	<i>ME</i>	<i>EE</i>	<i>Total</i>
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 Mkrs	8.9	7.0	8.6	6.9	3.9	2.9	5.6	5.5	6.4
Boosters	9.75	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

Figure 4. Stance features (per 1,000 words) in 240 research articles.

Other studies have confirmed similar disciplinary variations in stance features. There seems, for example, to be far heavier use of self-

mention in computer science and electronic engineering articles than in physics (Kuo 1999) and different patterns of author representation in history compared with economics articles (Bondi 2005) and abstracts (Bondi / Silver 2004). Research has also noted differences in other academic genres. Motta-Roth (1998) discovered that book reviews in economics are more evaluative than those in linguistics or chemistry and Parry (1998) observes that criticisms are more overt in humanities than science theses, ranging from caustic in philosophy to considerate in history. Busà (2005) notes that the syntactic foregrounding of discourse producers (*the economist, the author, we*) in economics abstracts compared to those from physiology which thematize discourse objects (*study, research*) and reference to human subjects are replaced by objectivized discourse entities (*subjects, patients, groups*) making psychology appear to be a very impersonal discipline. In another study Charles (2003) found greater use of *this + noun* structures to organise the text and construct a stance through encapsulation of prior information in theses on politics than on materials science.

Support for this kind of impersonality in the sciences was also observed in the higher frequencies of *evaluative that* structures, such as *we believe that* and *it is possible that*, in the social sciences in both research article and theses abstracts (Hyland / Tse 2005). This is a powerful construction for expressing evaluative meanings in academic discourse as it allows the writer to thematize the evaluation, making the attitudinal meaning the starting point of the message. By realising attitudinal meaning as a proposition on its own, separate from what is evaluated, this structure turns such evaluations into an explicit statement of opinion with the potential for elaboration and further discussion. Groom (2005) observes similar discipline-specific practices in the use of this structure in research articles and book reviews in History and Literary Criticism.

Finally, in a study of chapters from 56 undergraduate textbooks totalling half a million words (Hyland 1999b; 2000), I found similar distributions of features to the articles and abstracts, with the soft knowledge fields containing more explicit interactional positions and the hard disciplines employing arguments based more on theoretical models and experimental results. Stance features in textbooks

contribute to the ways disciplines frame knowledge for novices, not only in terms of a pedagogic sequencing of content, but in their interactional choices which reveal a perspective of the discipline. In laying out what he or she regards as the principles of the discipline, the writer is also acting as a guide to its argument forms and patterns of reader engagement. In this process stance items help to assist novice readers towards a range of values, ideologies, and practices that will enable them to interpret and employ academic knowledge in institutionally approved ways.

The only stance feature which seems to be more common in the hard knowledge fields is that of self citation (Hyland 2001b; 2003). This made up almost 11% of all references in a large science and engineering corpus of research articles, compared with only 5% in the soft fields, and comprised 60% of all expressions of self-mention across all disciplines (Fig. 5). While no research occurs in a social vacuum, self-citation can help to emphasize the links one has to one's colleagues through an engagement in a common literature and the professional intimacy one shares with a set of current disciplinary problems. Its prominence in the sciences reflects the fact that references here closely define a specific context and contribute to the sense of linear progression which is often said to characterise hard knowledge. As I mentioned earlier, scientists tend to participate in highly discrete and specialised areas of research, largely because of the heavy investments in procedural capability and technical equipment that hard knowledge production often requires. It is also related to the sheer volume of knowledge and its rapid expansion which helps coerce scientists into a niche of expertise from where they can follow defined paths and make precise contributions, allowing them to cite their own work in the area.

<i>Discipline</i>	<i>Citations</i>	<i>Mentions</i>	<i>Totals</i>	<i>Discipline</i>	<i>Citations</i>	<i>Mentions</i>	<i>Totals</i>
Biology	56.2	22.6	33.6	Marketing	61.3	6.9	54.4
Physics	49.2	8.7	40.5	Philosophy	52.7	3.1	49.6
Elec Eng	49.0	11.9	37.1	App Ling	51.8	4.5	47.3
Mech Eng	26.5	11.3	15.2	Sociology	47.1	6.8	40.3
<i>Average</i>	<i>45.7</i>	<i>14.4</i>	<i>31.3</i>	<i>Average</i>	<i>53.2</i>	<i>5.4</i>	<i>47.8</i>

Figure 5. Frequency of self-mention in articles (per 10,000 words).

Overall, these stance patterns coincide with our intuitions that the sciences tend to produce more impersonal, or at least less reader inclusive, texts. More precisely however, they indicate how the resources of language mediate the contexts in which they are used. The presence or absence of the author, however expressed, is a conscious choice by writers to adopt a particular stance and disciplinary-situated authorial identity. In the sciences it is common for writers to downplay their personal role to highlight the phenomena under study, the replicability of research activities, and the generality of the findings. In other words, we find scientists subordinating their own voice to that of unmediated nature. Such a strategy subtly conveys an empiricist ideology that suggests research outcomes would be the same irrespective of the individual conducting it. In the humanities and social sciences, in contrast, personal credibility, and explicitly getting behind arguments and personally intervening to evaluate material and express a point of view, plays a far greater part in creating a convincing discourse, enabling writers to emphasize their own contribution to the field and to seek agreement for it.

7. Engaging with disciplinary audiences

Academic writers have to do more interpersonal work than simply present themselves and their ideas using markers of stance. They must also recognise the presence of their readers. Engagement features allow writers to actively pull readers along with the argument, to focus their attention, recognise their uncertainties, include them as discourse participants, and guide them to interpretations. Based on their previous experiences with texts, writers make predictions about readers' likely reactions to their arguments. They know what they might find persuasive, where they will need help in interpreting the argument, what objections they will raise, and so on. Statements need to anticipate readers' possible objections and engage them in

appropriate ways and so successful academic writing in English incorporates an awareness of audience.

There are two main purposes to writers' uses of engagement strategies (Hyland 2001a; 2004b; 2005):

1. The first acknowledges the need to adequately meet readers' expectations of inclusion and disciplinary solidarity. Here we find readers addressed as participants in an argument with reader pronouns (*you*, inclusive *we*, etc) and interjections.
2. The second purpose involves rhetorically positioning the audience. Here the writer pulls readers into the discourse at critical points, predicting possible objections and guiding them to particular interpretations with questions, directives (mainly obligation modals and imperatives) and explicit references to shared knowledge.

Engagement features have not figured prominently in cross-disciplinary analyses although Swales et al (1998) examined the use of imperatives in articles in ten disciplines and found that they mainly congregated in the more mathematically oriented fields of statistics, geography and linguistics than literary criticism, political science and communication studies. Another study of note is Kuo's (1999) investigation of personal pronouns which found similar distributions of second and third person across three fields, and no cases of first person singular, but far higher uses of first person plural forms in computer science than in electronic engineering and physics.

In a large scale study of engagement features (Hyland 2001a; 2002a; 2002b; 2004b; 2005; Hyland / Tse 2004), I found considerable variations in the use of reader pronouns, questions and directives across disciplines in research articles (Fig. 6).

<i>Feature</i>	<i>Phil</i>	<i>Soc</i>	<i>AL</i>	<i>Mk</i>	<i>Phy</i>	<i>Bio</i>	<i>ME</i>	<i>EE</i>	<i>Total</i>
<i>Total</i>	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
Directives	2.6	1.6	2.0	1.3	2.1	1.3	2.0	2.9	1.9
Questions	1.4	0.7	0.5	0.3	0.1	0.1	0.1	0.0	0.5
Shared know.	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

Figure 6. Engagement features by discipline (per 1,000 words).

The most frequent engagement devices in the corpus were reader pronouns and over 80% of these occurred in the soft discipline papers, particularly in philosophy, where they functioned to appeal to scholarly solidarity, presupposing a set of mutual, discipline-identifying understandings linking the writer and reader. Directives were the only interactive feature which occurred more frequently in the science and engineering papers.

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 (e.g. *note*, *consider*, *see*, etc.) are a potentially risky tactic and, as a result, most directives in the soft fields were textual, directing readers to a reference rather than informing them how they should interpret an argument. The more linear and problem-oriented approach to knowledge construction in the hard knowledge fields, on the other hand, allows arguments to be formulated in a highly standardised code. Articles in the sciences also tend to be much shorter, probably due to editorial efforts to accommodate the rapid growth of knowledge and high submission rates in many sciences. These factors place a premium on succinctness, and directives provide an economy of expression highly valued by space-conscious editors and information-saturated scientists.

8. Disciplinary talk

Because knowledge produced by the academy is cast largely in written language, spoken texts have tended to be neglected until recently when large spoken corpora such as the Michigan Corpus of Academic Spoken English (MICASE) have become available. But while research is now beginning to focus on lectures, seminars, peer discussions (e.g. Anderson / Bamford 2004; Nesi 2003) and other spoken genres of the academy, notably conference presentations (e.g. Ventola et al. 2002), comparative studies have been slow to emerge. A

search of Elsevier's Science Direct database of 60 million article abstracts, for instance, reveals only twelve on spoken academic discourse and no comparative work at all.

An early discipline comparative study of lectures looked at argument structure in highway engineering and plant biology with the former more likely to follow a problem-solution pattern than the latter (Dudley-Evans 1994). In a very different kind of study, Nesi (2001) examined lecture delivery style across 20 disciplines, finding that lectures which were delivered more quickly tended to be less lexically dense than slower lectures, but while the context and the purpose of the lecture influenced delivery style, this was not related to discipline.

Drawing on MICASE data, Swales (2004) has explored the characteristics of several spoken genres with incidental results for those interested in disciplinary differences in spoken interaction. On the basis of admittedly small data, he notes that there was considerably more *crosstalk*, or reference to the dissertation itself, in PhD defences in the humanities than in the social sciences with almost none in Science and engineering fields. These figures suggest questioning which focused closely on specific parts of the text rather than its fundamental issues or wider implications. Swales speculates that humanities departments may be more 'text conscious' than their counterparts elsewhere in the academy, although he also notes that scientists and engineers are often "much more picky about words and phrases than their humanities colleagues" (2004: 271).

Also working with the MICASE corpus, Poos and Simpson (2002) found disciplinary variations in uses of 'sort of/sorta' and 'kind of/kinda'. While these and other hedges have been particularly associated with women's speech in the past, their frequency appears to be more of a disciplinary effect: less common in science and more common in the humanities. One intriguing explanation for this phenomenon might be that in science technical terms tend to be fixed, while in the humanities and social sciences conceptual and technical vocabulary tends to be more fluid and more negotiated. Hence, the higher frequency of these two prototypical hedge words could reflect both a greater tendency toward negotiation of meaning as well as lexical search time on the part of interlocutors in the 'softer' areas.

The paucity of comparative studies of academic speech means that the jury is still out on the extent and nature of disciplinary variation in this mode. Clearly PhD defences, conference papers and lectures lack the polished and multiply revised considerations of the written products upon which conceptions of disciplinary differences have been based. Preliminary studies suggest much greater homogeneity in oral performance with variation in visual supports rather than the ways they are discussed (Rowley-Jolivet 2002) and humour being dependent on participants rather than their disciplines (Swales 2004). More research is needed in this area of academic discourse.

9. A brief discussion

While disciplinary variation in spoken genres remains to be confirmed, it is clear that in written modes writers in different fields represent themselves, their work and their readers in very different ways. Writers in the humanities and social sciences appear to take far more explicitly involved and personal positions than those in the science and engineering fields and typically focus less on methods and warrants, refer more to social actors and processes, claim significance in different ways and employ more citations. As I noted at the beginning of this chapter, the reason for this is that the resources of language mediate their contexts, working to construe the characteristic structures of knowledge domains and argument forms of the disciplines that create them.

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. The soft-knowledge domains, in contrast, are more interpretative and less abstract, producing discourses which often recast knowledge as sympathetic understanding, promoting tolerance in readers through an ethical rather than cognitive progression (Dillon 1991; Hyland 2000). There is, moreover, less control of variables and greater possibilities for diverse outcomes, so writers must spell out their evaluations and work harder to establish an understanding with readers.

These broad ontological representations have real rhetorical effects. They allow, for instance, the sciences to emphasise demonstrable generalisations rather than interpreting individuals, so greater burden is placed on research practices and the methods, procedures and equipment used. New knowledge is accepted on the basis of empirical demonstration, and science writing reinforces this by highlighting a gap in knowledge, presenting a hypothesis related to this gap, and then conducting experiments and presenting findings to support the hypothesis. In soft areas however, the context often has to be elaborated anew, its more diverse components reconstructed for a less cohesive readership. Writers are far less able to rely on general understandings and on the acceptance of proven quantitative methods to establish their claims and this increases the need for more explicit evaluation and engagement. Personal credibility, and explicitly getting behind arguments, plays a far greater part in creating a convincing discourse for these writers.

The suggestion that 'hard' knowledge is cumulative and tightly structured not only allows for succinct communication, but also contributes to the apparently 'strong' claims of the sciences. The degree to which the background to a problem and the appropriate methods for its investigation can be taken for granted means there are relatively clear criteria for establishing or refuting claims and this is reflected in writers' deployment of evidential markers. While writers in all disciplines used hedges in the evaluation of their statements, they are considerably more frequent in the soft disciplines, perhaps indicating less assurance about what colleagues can be safely assumed

to accept. The use of a highly formalised reporting system also allows writers in the hard disciplines to minimise their presence in their texts. In the soft disciplines where what counts as adequate explanation is less assured, interpretative variation increases and writers must rely to a greater extent on a personal projection into the text, through greater use of interpersonal features to invoke an intelligent reader and a credible, collegial writer.

Clearly we have to recognize the potentially tremendous diversity of disciplines. They contain Nobel prize winners as well as lab assistants, theorists as well as popularisers, and Chomskians as well as Functionalists. Like all human institutions, they comprise competing groups and discourses, marginalised ideas, contested theories, peripheral contributors, and drop-in members. In the end, disciplines are neither monolithic nor unitary, but loose collectives of specialisms with diverse views, procedures and values, inhabited by individuals with assorted experiences, interests, and influence. Communities are often pluralities characterized by competing perspectives, but they accommodate disagreement and allow sub-groups and individuals to innovate within the margins of its practices in ways that do not weaken its ability to engage in common actions. So, for all the homogeneity within disciplines which the research discussed here points to, they leave space for individuality and divergence, providing sites for engagement and debate where disagreement can occur.

10. Conclusions

This picture of varied discourses also has important implications for teachers and students of academic English. A considerable collection of survey results show that the writing tasks students have to do at university are specific to discipline. In the humanities and social sciences, for example, analysing and synthesising multiple sources is important, while in science and technology, activity-based skills such

as describing procedures, defining objects, and planning solutions are required (Casanave / Hubbard 1992). In post-graduate programmes engineers give priority to describing charts, while business studies faculty require students to compare ideas and take a position (Bridgeman / Carlson 1984). In undergraduate classes, questionnaire data suggests that lab reports are common in chemistry, program documentation in computer science, and article surveys in maths (Wallace 1995). Ethnographic case studies of individual students and courses reinforce this picture, revealing marked diversities of task and texts in different fields (e.g. Candlin / Plum 1999). The discourse research outlined in this chapter thus underlines the variation of communicative practices over which students must gain control to be successful in their studies.

This brief tour through the literature on disciplinary variation in academic writing shows that effective academic communication depends on rhetorical decisions about writers' and speakers' deployment of community-sensitive linguistic resources to represent themselves, their positions and their readers. Academics do not act in a social vacuum and knowledge is not constructed outside particular communities of practice. Such communities exist in virtue of a shared set of assumptions and routines about how to collectively deal with and represent their experiences. The ways language is used on particular occasions, however, is not wholly determined by these assumptions, but a disciplinary voice can only be achieved through a process of participating in such communities and connecting with these socially determined and approved beliefs and value positions. In this way, independent creativity is shaped by accountability to shared practices.

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