Interaction in two journalistic genres: a study of interactional metadiscourse

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The study of interactive features of language has been a very productive source of insights into written discourse in recent years, revealing the ways that writers engage with readers to successfully persuade them of a particular viewpoint in a range of different genres and contexts. While a variety of approaches have illuminated our understanding of these features, the concept of interactional metadiscourse has been particularly valuable in revealing how writers project themselves into their discourse to signal their understandings of their material and their audience. In this paper we draw on Hyland's (2005a) model of metadiscourse to explore some of the ways that interaction contributes to the success of two journalistic genres: popular science and opinion articles. Examining 200 popular science and 200 opinion texts, we show that despite the broadly similar audience and sources of these genres, authors structure their interactions very differently, contributing to the rhetorical distinctiveness of these genres. The paper not only offers a detailed account of interactional metadiscourse in these genres, but illustrates how interpersonal connections are accomplished for particular persuasive purposes in everyday public texts.

Keywords: interactional metadiscourse, popular science, opinion texts, engagement features, boosters, attitude markers

1.   Introduction

The ability to establish an appropriate relationship with readers is a key element of successful written interaction. Writers must not only have a good grasp of their topic, and often a creative turn of phrase, but also a good idea of their audience – what they are likely to know about the subject, what they do not know and how they might react to what one has to say. Such audience assessments are relatively straightforward in contexts where we are familiar with our interactants, such as in our workplaces (e.g. Connor and Upton 2004) or academic disciplines (Hyland 2001), but become trickier when communicating with a large, diverse and unknown audience, such as the wider public. In this paper we explore this complexity by examining the rhetorical choices facing writers in two journalistic genres: popular science and newspaper opinion pieces. Drawing on Hyland's interpersonal model of metadiscourse (Hyland 2005a; Hyland and Tse 2004), we seek to identify the typical interactional features of these two genres in order to reveal something of their characteristic patterns of reader engagement and rhetorical persuasion.

2.   Popular science and opinion pieces

These two genres are familiar aspects of the publishing landscape, appearing in newspapers, magazines and, very often, in book form. Both are written for non-specialist readers, both are widely available in various print formats and both are recognized genres which seek to inform and persuade a mass audience. While neither is a core journalistic genre, each is nevertheless representative of a form of reportage which bridges professional realms of political, social or scientific discourses and the interests and understandings of general readers. Both can be seen, therefore, as having the broad purpose of informing and convincing an audience of non-experts of particular claims about the world. Yet these claims are, of course, presented in very different ways, with writers not only employing different forms of argument, but also drawing on different interactional resources to engage readers in very different ways.

Popular science is often written by scientists as well as journalists and aimed at audiences without a professional need for information about science but who want to keep abreast of developments. It links the cutting-edge professional scientific research literature and the domain of popular social and cultural discourse. The public's thirst for popular science continues to increase (Pellechia 1997), with many daily newspapers carrying regular columns on science and bookshop shelves prominently displaying magazines such as *New Scientist* and *Scientific American*. In fact, the public gets most of its information about science from the popular science press and it has a potentially important role in shaping people's views of academic research. Rhetorically, the genre is essentially expository, designed to recast scientific information with an eye for the interests, beliefs and preoccupations of a lay readership, but it is also persuasive, seeking to convince the reader both of the importance of the content and a wider ideology of scientific progress (Hyland 2010; Myers 2003).

Opinion texts, on the other hand, are more overtly persuasive. Their purpose is to convince readers of the importance and interest of a topic and to recruit them into the writer's perspective on it. Like the discourses of popular science, this is a ubiquitous genre in the popular press and also one which seeks to contribute to wider debates concerning events on the world, with the potential to influence readers understandings and attitudes. Opinion pieces are a common genre in editorials, where the opinions tend represent institutional perspectives, and in journalistic commentaries, which encode the views of a single individual (Wang 2008). Like popular science articles they similarly re-present intricate and often highly technical arguments to include those whom these debates often overlook. They also parallel popular science articles by seeking to both inform a general readership while shaping how it might see issues of potential importance to their lives.

Despite these similarities, the two genres differ in their patterns of reader engagement. Interactionally, popular science authors engage their readers as intelligent outsiders who can be persuaded of the significance of findings through a tone of

factual authority and personal engagement. This, then, is a discourse related to academic science, but stripped of its more forbidding rhetorical features. While attempting to wield the authority of science, both scientific facts and the argument forms of professional science are transformed in the process (Hyland 2010; Kim and Thompson 2010). Opinion pieces take a more personal interactional position, adopting a clear perspective towards both their topics and their readers by establishing a stance early on in the piece and supporting this with a range of warrants for their opinions. What is key to opinion texts is the writer's explicitly subjective attitude and open judgments of the issues (e.g. Wang 2008). Here the writer constructs a textual voice with the status and authority to evaluate and opine on particular issues of the day, engaging with and seeking to overcome alternative viewpoints.

It is clear that, to be successful, the writers of both genres need to correctly identify their audience for practical purposes and engage with them in ways they will find familiar and convincing. In refashioning more exalted and complex discourses from the worlds of science and socio-political debate, authors draw on different linguistic resources to address their topics and their readers. Analysis of these different resources might therefore help shed light on these two familiar genres and on the interactional practices they employ. In what follows we explore the ways writers take a view towards their material and readers, drawing on the resources of interactional metadiscourse.

3. Understanding interaction

There are a number of methodological tools which have been used to explore interactional features of texts. Concepts such as *evaluation* (Thompson and Hunston 2000), *attitude* (Halliday 1994), *epistemic modality* (Hyland 1998), *appraisal* (Martin 2000; Martin and White 2005) and *stance* (Biber and Finegan 1989; Hyland and Sancho Guinda 2012) have all informed research into interpersonal aspects of writing. The notion of *metadiscourse* is one of the more enduring and comprehensive models of interpersonality. Making its first appearance in Applied Linguistics about thirty

years ago (Vande Kopple 1985), metadiscourse has maintained a steady interest among scholars ever since. This is despite different definitions and interpretations of the object of study, with some observers wishing to restrict its scope to aspects of inter-sentential connectivity and discourse framing (e.g. Mauranen 1993; Ädel 2006). While this 'reflexive' model has the advantage of restricting the identification of features to clearly text-internal functions, it lacks the breadth to describe the span of interactional features of discourse and fails to capture the essentially interpersonal nature of discourse.

The interactional approach to metadiscourse, on the other hand, offers a framework for analysing the linguistic resources of intersubjective positioning in discourse, encompassing meanings which have elsewhere been treated under headings such as modality, evidentiality, hedging and concession (e.g. Coates 1983; Chafe and Nichols 1986; Markkanen and Schröder 1997). Seeking to link texts writers and readers, the idea of metadiscourse brings together a set of lexico-grammatically diverse features on the discourse semantic grounds that they all provide the means for speakers or writers to take a stance towards the various points of view or social positionings being referenced by the text and thereby to position themselves with respect to the other social subjects who hold those positions. We have chosen to use Hyland's interpersonal model of metadiscourse (Hyland 2005a; Hyland and Tse 2004) in this study as we believe it offers the most developed and comprehensive approach to interaction in written discourse. In particular, the sub-category of 'interactional metadiscourse' (IMD) helps reveal the way that textual voices engage with other points of view in the text by expressing a stance and recognizing readers' potential response to that stance.

IMD includes an array of features which help relate a text to its context by enabling the writer to control the level of personality in a text and establish a suitable relationship to his or her data, arguments and audience. It comprises the following explicit text features:

- *Hedges* mark the writer's reluctance to present propositional information categorically, while opening up the space for dialogic alternatives.

- *Boosters* express certainty and emphasise the force of propositions, closing down the space for such alternation.

- *Attitude markers* express the writer's appraisal of propositional information, conveying surprise, obligation, agreement, importance, and so on.

- *Engagement markers* explicitly address readers, either by selectively focusing their attention or by including them as participants in the text through second person pronouns, imperatives, question forms and asides (Hyland 2001).

- *Self-mentions* suggest the extent of author presence in terms of first person pronouns and possessives, representing the writer's decision to stand behind assertions or to avoid such commitments.

The typology has emerged from continued research into the interpersonal functionality of discourse to determine how language construes social roles and relationships and how it operates rhetorically to influence beliefs, attitudes, expectations and modes of interrelating.

Together, then, these features offer a means of understanding the ways that writers manage interaction by intruding and commenting on their message – how they express solidarity, anticipate objections and respond to an imagined dialogue with others (Hyland 2005a: 50). At the same time as they mark intimacy, express attitude and communicate commitments, moreover, these features simultaneously provide information about how the writer understands the context and the beliefs and attitudes he or she is ascribing to readers. IMD can therefore help explicate how different kinds of texts work as interaction. Yet while numerous studies have employed metadiscourse as an analytical tool, most have focused on academic writing (e.g. Hyland 2005b; Gillaerts and Van de Velde 2010). In this paper we shift attention to two familiar non-academic public genres: popular science and opinion texts. We describe our corpus and methodology below, then go on to analyze the texts.

4.   Corpora and methods

Each corpora comprises 200 articles collected randomly from four leading magazines by taking every third article from 2012 issues. The popular science corpus was taken from *Scientific American*, *American Scientist*, *New Scientist* and *Science Magazine* while the corpus of opinion texts are from columns in *The Guardian*, *The Daily Telegraph*, *The Los Angeles Times* and *The New York Times*. Table 1 shows the distribution of the corpora.

Table 1. The texts

Popular science corpus				Opinion text corpus			
Source	Texts	Words	Words per text	Source	Texts	Words	Words per text
Scientific American	50	119,989	2,400	*Guardian*	50	38,463	769
American Scientist	50	171,884	3,438	*Telegraph*	50	48,423	968
New Scientist	50	27,420	548	*LA Times*	50	36,340	727
Science Magazine	50	30,961	619	*NY Times*	50	35,338	707
Totals	200	350,254	1,751	Totals	200	158,564	793

Given the highly contextual nature of metadiscourse and the fact that a particular form can serve either propositional or metadiscoursal functions, a sample of five texts from each genre was initially coded manually to identify potential metadiscourse signals and to secure rate agreement. We then compared these lists with those from previous studies of metadiscourse and stance (Hyland 2001, 2005a, 2005b; Hyland and Tse 2004) and compiled a composite list. We then computer searched the two corpora for these explicit features using the software *PowerGrep*. Having completed this quantitative collection of potential candidates, we then ensured they were performing an interactional function by concordancing each example. All decisions were then cross-checked by both authors independently to ensure cases were actually examples of metadiscourse, producing a

high inter-rate agreement of kappa 0.8. The figures were then normed to occurrences per 1,000 words to facilitate comparison across corpora of different sizes. We will now discuss the overall interactional patterns and compare the use of features in the two genres.

5.   Patterns of interaction

Our analysis of the corpus suggests the extent of interaction in the two genres with over 10,000 cases overall and about 26.5 per text. Table 2 shows the overall relative frequencies.

Table 2. Interactional metadiscourse in the two corpora (per 1,000 words)

Category	Popular science	Opinion	Totals
Engagement features	4.7	12.6	17.3
Self-mentions	4.5	6.7	11.2
Hedges	4.8	5.9	10.7
Boosters	1.5	3.0	4.5
Attitude markers	1.1	1.8	2.9
Totals	16.7	30.0	46.7

As can be seen, there were nearly twice as many interactional features in the opinion texts, reflecting the higher level of explicit interaction in that genre. The result of chi-square test ($p<0.01$) indicates that the uses of interactional metadiscourse differ significantly in the two genres. This difference is particularly marked in the greater use of engagement features, boosters, and self-mentions, indicating opinion writers' attempts to both express a clear personal stance to their views and to closely align with readers. Here writers are aware of potential opposition to their views and make greater efforts to explicitly acknowledge and connect to others, recognising the presence of their readers and seeking to close down alternative interpretations. We will now discuss each feature in turn.

5.1   *Engagement markers*

Engagement resources represent the most frequent interpersonal features overall and comprise 42% of devices in the opinion texts. These encompass an array of diverse, audience-oriented features which seek to address the reader directly, most commonly realized through explicit mention of readers (inclusive 'we', 'you', 'your', 'our'), imperatives directed to the reader ('consider this'), modals of necessity and obligation ('you should note'), questions, appeals to shared knowledge and personal asides. This is an extremely heterogeneous array of features, but they all allow writers to explicitly recognize the presence of the reader and overtly bring him or her into the text (Hyland 2005a, 2005b). As can be seen in Table 3, shared knowledge and personal asides are rare in popular science and opinion texts, reflecting the looser bonds of 'community' in public discourse, so we will focus on the three other features.

Table 3. Frequency of engagement features in the two corpora (per 1,000 words)

Engagement features	Popular science	Opinion texts
Inclusive-*we*	2.7	7.5
You	0.4	1.1
Questions	1.1	2.9
Directives	0.5	0.8
Personal asides	0	0.1
Shared knowledge	0	0.2
Totals	4.7	12.6

References to the reader through personal pronouns is a complex and much discussed topic in the literature (e.g. Wales 1996; Kuo 1999), but interpersonally they have been seen as constructing a relationship with readers (Kim 2009) and helping to evoke the other's involvement in textual interaction (Proctor and Su 2011). 'You' and inclusive

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'we' represent some two thirds of the total engagement features in the two corpora (66% in the popular science corpus and 68% in opinions). However, despite these similar proportions, reader-mentions are far more frequent in the opinion corpus (8.6 per 1,000 words) compared with those in popular science (3.1 per 1,000 words). 'You', in particular, is a highly interactive feature which grabs the reader's attention and invites a direct involvement in the unfolding argument. Something of the interpersonal bluntness of this form can be seen in these examples:

(1) Living organisms were distinguished by the fact that they were spontaneous and unpredictable. If *you* saw something move without being obviously pushed or pulled, *you* could be pretty sure it was alive. (*American Scientist*)

(2) This is the part of education reform nobody told *you* about. *You* heard about accountability, and choice, and innovation. (*New York Times*)

The interactionality of the text is enhanced by this feature, directly engaging with what Thompson and Thetela (1995) call the "reader-in-text" to initiate a pseudo dialogue between the writer and the reader.

However, despite the high interactivity value of the direct reader-mention form 'you', almost 90% of all forms were indirect, realized by inclusive *we* (Harwood 2007). While the second person pronoun is extremely engaging, it also sets up a division between the writer and reader (you *vs* me rather than you *and* me) which might help explain this preference for 'we' (Hyland 2005a). Writers tend to use 'we' and its corresponding forms to construct common ground and establish solidarity between the writer and reader, thus contributing to the persuasive character of the texts. As Hyland (2001: 560) points out, 'we' can be used to reach out to readers and guide them through an argument, indicating what should be attended to and leading them towards a preferred interpretation. These examples illustrate the reader-friendliness and rhetorical finesse involved:

(3) Today *we* have computers. On the other hand, *our* universe is far larger

and more intricate than Newton's. Now the solar system is merely a speck in a spiral galaxy of several hundred billion stars. *Our* galaxy drifts among billions of others, which form clusters and superclusters and a whole hierarchy of structures extending as far as the eye (and the telescope) can see. (*American Scientist*)

(4) What none of *us* seem willing to do, however, is restrict *our* reliance upon the technology: already, it is too powerful a national addiction. In just 15 years, it has hooked *us* as irrevocably as the smoking habit did *our* forefathers. (*The Daily Telegraph*)

The greater use of inclusive forms in the opinion texts points to the greater interactivity of this genre and underlines writers' more concerted efforts to get their readers onside with their arguments.

The next most frequent engagement features in the two corpora were questions. These are the strategy of dialogic involvement par excellence, working to create rapport and intimacy among participants (Hyland 2002a), and, overall, they were twice as frequent in opinion texts (2.9 per 1,000 words compared with 1.1 in popular science). Questions are persuasive because they invite direct collusion, addressing the reader as an intelligent interactant with an interest in the issue raised by the question and the good sense to follow the writer's response to it.

Questions in both genres were overwhelmingly rhetorical in that they were almost immediately followed by a response, or an implied response. These often occur at the very beginning of a text to both orient readers to the topic and to elicit their interest. Here are typical examples:

(5) What do recently retired scientists do for six weeks on a tiny Caribbean island? My husband and I are fortunate enough to have a holiday home on Little Cayman, where we spend our time swimming, snorkeling, gardening

and walking. (*American Scientist*)

(6) If we can't predict who will become a good programmer, can we at least certify who already is one? Would it help if software developers were required to undergo some sort of certification? Could such a program be developed for software engineers? And would it actually make anything better? (*American Scientist*)

Interestingly, a quarter of all questions in the opinion texts were minimal questions. These are almost conversational in their brevity and as a result seek to establish a high degree of intimacy with the reader:

(7) Negligent, moronic parents? Spick-spot! Telly in the four-year-old's bedroom? Just a spoonful of sugar should sort that out. Homes without books, conversation or kindness? I know, let's have a tea party on the ceiling! (*The Daily Telegraph*)

(8) Silly? Maybe, but this is how intimidation and score-settling are meted out, and players accept the fact and know how to work within its framework. (*The New York Times*)

These not only function to quickly attract readers and draw them into the text, but they do this by establishing a relationship of equality between writer and readers. This is an attempt to create rapport and demonstrate that the writer is someone much like the reader, a person who can both converse on an equal footing while understanding the reader's point of view.

The third kind of engagement feature worth mentioning in these texts is directives. These are words like 'imagine', 'note' and 'consider' which function performatively and are used in the imperative with the reader as the (implied) subject to encourage the reader to act in a certain way. They therefore help to govern the relationship between participants and, in some circumstances, may be seen as face-threatening. There are, however, varying degrees of imposition created in using these devices as steering readers

to another part of the text ('see below' or 'refer to the diagram') to better understand an argument is less threatening than instructing them to perform some action in the real world ('listen carefully to the news tonight' or 'fill a large glass with salt water'). Most threatening, however, are those directives which attempt to guide readers through a line of reasoning or encourage readers to understand a point in a certain way (Hyland 2002b). These limit readers' freedom of action by requiring them to surrender a certain amount of independence and so, for this reason, the total number of directives in our samples is not large (0.5 per 1,000 words in popular science and 0.8 in opinion texts). Their use, however, reveals interesting differences between the two corpora.

The popular science articles employed a relatively limited range of directives, principally 'consider', 'suppose', 'imagine' and 'think', cognitive imperatives which attempt to move the reader through the discourse and facilitate his or her comprehension of its propositional content. They function to "take readers efficiently from one state of knowledge, at whatever level, to another, higher or superior state" (Calsamiglia 2003: 142), assisting the writer to not only establish a connection with the reader, but a particular kind of connection, one which is supportive and guiding rather than hectoring or domineering. Directives thus present propositions in ways which might be more cognitively accessible to the reader, establishing connections and making links to better facilitate understanding (Hyland 2010). Directives such as 'consider' and 'suppose' encourage the reader to make imaginative leaps and form mental images of something that is not present:

> (9) *Consider* the truly three-dimensional problem of determining the minimum area contained by the six edges of a tetrahedral framework. (*American Scientist*)
>
> (10) *Imagine* the insights that wild-animal researchers could glean from CheetahCams, KoalaCams, SeagullCams, SnailCams, PenguinCams, VampireBatCams. (*Scientific American*)

Placing these items in initial clause position calls on the reader's attention, involving

the reader by exerting a cognitive prominence and assisting him or her to process the ideas effectively.

In opinion texts we find a much greater range of directives with some, such as 'consider', 'think' and 'remember', acting to facilitate cognitive processing as discussed above, and others, like 'ask', 'try', 'call', 'come' and 'take', directing readers to more physical actions. These are powerful rhetorical devices which arrest the reader and demand attention and response. They do not just assist the reader with processing arguments and ideas, but engage the reader through a call for immediate action:

> (11) It's a tough world out there. *Ask* the talking pineapple. (*New York Times*)
>
> (12) *Try* telling that to Karen Matthews, just released from jail after serving four years for staging the fake kidnapping of her daughter, Shannon. (*Daily Telegraph*)

5.2   Self-mention

Self-mentions are the second most frequent interactional device overall in the corpora, although they occur about 50% more frequently in the opinion articles. This is unsurprising as first-person pronouns (and their corresponding adjectives) contribute to a clear authorial stance and personal commitment to statements by referring explicitly to the writer in the text.

Nor is it altogether surprising that the realizations of self-mentions differ across the corpora, with far more occurrences in the more explicitly dialogic opinion pieces. These texts were also, moreover, dominated by the more personal singular form 'I' (7.9 per 1,000 words compared with just 0.4 per 1,000 in the popular science articles). These frequencies testify to the importance writers attach to an unambiguous attribution of their viewpoints in this genre so that their position can be seen as a clear expression of personal views. These examples are typical:

> (13) *I* love independent bookstores – the feel, the smell, the randomness.

Without the indies, much of America would be even more of a cultural desert. Thus, *I* was predisposed to believe that Amazon and e-books would drive small stores and paper books to the grave. (*New York Times*)

(14) Now let *me* make this clear. *I* too regard friendship as one of the great mainstays of a good life – as do most decent people, *I* suppose – but what *I* am describing here is something different. (*The Daily Telegraph*)

In contrast to the opinion texts, the popular science articles present information not as personal judgments, but as the conclusions of research actors who have arrived at their claims as the result of cutting-edge scientific research. They therefore borrow from science research articles in adopting a pseudo-objectivity in presenting research work and embellish this presentation with first person quotes from the actors themselves. Instances of self-mention do not, therefore, tend to refer to the author of the text but to the practicing scientists themselves:

(15) The other option is that the extra bit of a neutrino is no more than noise in the data, says astrophysicist David Spergel of Princeton University. "One of the things I've been watching since the relatively early WMAP days is this evidence for extra neutrino species," he says. "One thing I would note is that, as the data improves, the best fit is heading closer and closer to the standard model." (*New Scientist*)

(16) "We found that, overall, organic yields are considerably lower than conventional yields," explains McGill's Verena Seufert, lead author of the study to be published in Nature on April 26. (*Scientific American*)

Science is brought to life by showing results to be the work of real actors rather than faceless scientists and the fact that these quotes are given on behalf of teams often means that self-mentions are realized by plural forms, with 'we' occurring 2.4 times per 1,000 words compared with 0.9 in the opinion articles.

5.3   *Hedges and boosters*

Hedges and boosters adjust the writer's commitment and certainty towards statements. Hedges have been widely discussed as a means of reducing the writer's complete commitment to a proposition, indicating subjectivity and incorporating the reader's potential opposition (e.g. Hyland 1998; Myers 1989). Boosters, on the other hand, indicate the writer's certainty toward the propositions in a text, explicitly marking arguments with a confident voice. In other words, hedges open up the space for dialogic alternatives and boosters suppress it (White 2003). Together they are among the most important means of interacting with readers and negotiating meaning in many forms of written discourse.

Hedges are expressed by modal verbs of possibility ('might', 'may', 'should'), lexical epistemic verbs ('suggest', 'appear', 'claim'), epistemic adjectives and adverbs ('likely', 'possible', 'definite', 'always'), vague quantifiers ('some', 'most', 'approximately') and various rhetorical strategies used to frame statements ('viewed like this', 'I don't know whether...'). Actual forms differ very little across the two genres, as can be seen in Table 4.

Table 4. Most common hedges by frequency

Genre	Most frequent forms		
	Adverb	Verb	Modal
Popular science	about, perhaps, probably, almost, sometimes, generally, presumably, largely, apparently, around, seemingly, often	suggest, seem, appear, tend to, argue, suspect, assume	might, could, may
Opinion texts	perhaps, almost, probably, maybe, sometimes, about, apparently, largely, generally, possibly, often, mainly	seem, argue, suggest, suspect, assume, appear suppose	may, might, could

In the popular science papers hedges are largely used to highlight uncertainty where information cannot be verified or empirically confirmed. They therefore attempt to

mirror the cautious, tentative style of professional science, a stance which helps to lend the texts a veneer of academic validity, as can be seen here:

(17) The giant NCLDV viruses *probably* have an ancient evolutionary history, but they are among the newest things on the scene for virologists. (*American Scientist*)

(18) Seeing the same excess gamma-ray signal elsewhere in the sky, such as from dwarf galaxies, would *probably* make the dark matter interpretation a paradigm instead of a curiosity. (*New Scientist*)

Perhaps anticipating a relative lack of knowledge about these issues among readers, writers do not use hedges here to engage with dialogic alternatives. Rather than offering the reader space to come to his or her own conclusions, hedges mark the writer's genuine uncertainty about propositional truths, conveying something of what it means to be on the cutting edge of scientific exploration.

Among the most common hedges in these popular science texts are 'about' and 'suggest', both of which also figure prominently in academic scientific writing (Hyland 1998). 'About' typically co-occurs with numerical data and is used when writers are uncertain about exact frequencies or quantities, while 'suggest' presents a cautious assessment of possibilities and a spurious academic tone:

(19) Movements of bees in and out of the hives were delayed by *about* 5 hours. When the team dosed hives at night, the anesthetic did not produce any delays in mRNA cycles. (*Science Magazine*)

(20) Computer simulations *suggest* that the answer may be yes. But observations of extrasolar systems will provide the ultimate test. (*American Scientist*)

In the opinion texts, on the other hand, we see a more overtly rhetorical use of hedges which seek to reduce the imposition of a statement on the reader. By softening the argument and allowing readers to come to their own conclusions about the efficacy of the proposition, the author is able to project a voice of reasonableness and perhaps more effectively maneuver readers into agreement. These two examples suggest something of this strategy:

(21) Given how little we know about how to test college students, the voluntary approach is *probably* best for now. (*New York Times*)

(22) *Perhaps* it's a foul thought, but barring people from jobs is the first step to witch-hunting in Britain. (*The Guardian*)

In opinion texts the most frequent lexical verb hedge is 'seem'. Unlike 'suggest', which seeks to draw conclusions from evidence or arguments, writers use 'seem' in the opinion pieces to indicate their own judgment. This is a more subjective and personal statement, conveying an impression of authorial flexibility, as these examples illustrate:

(23) We *seem* to have arrived at a farcical situation in which good mothers who want to take care of their children have to go out to work because they can't afford to stay home. (*The Daily Telegraph*)

(24) The players in Sacramento *seem* to believe they are in a familiar, so somewhat comfortable, predicament: A deadline looms, but budget brinkmanship is keeping them from reaching a deal. (*Los Angeles Times*)

While less frequent overall than hedges in both genres, boosters are nevertheless a common means of achieving rhetorical ends. The process of transforming academic research into popular accounts, for example, involves removing doubts and upgrading the significance of claims to emphasize their uniqueness, rarity or originality (Hyland

2010). Tentativeness is often replaced by unmitigated assertions or boosted claims which help increase the impact and significance of the story, as here:

> (25) *In fact*, driver and walker are likely to differ in many ways other than their mode of travel. (*American Scientist*)
>
> (26) *Certainly* the next few years will bring an explosion of disease-gene mapping. (*American Scientist)*
>
> (27) Williams *clearly* has faith in this mechanism. It has placed the flywheel directly behind its drivers' heads. (*New Scientist*)

In opinion pieces writers are seeking to offer as strong support as they can for their arguments so boosters, while not used extensively in either corpus, are twice as common (per 1,000 words) in the opinion corpus as they are in the popular science texts. Here we find writers getting behind their arguments to strengthen their position and leave readers in no doubt of their stance:

> (28) Colleges today are *certainly* less demanding. (*New York Times*)
>
> (29) One reason is *undoubtedly* the low-key professionalism essential to the neutrality that enables the ICRC to work. (*The Guardian*)

But while such categorical assertions leave little room for a reader's objections, boosters can also be seen as engaging readers and establishing rapport by marking involvement with the text and solidarity with an audience (Hyland 2005a: 52-53). These examples offer a sense of how boosters can create reader alignment in this way:

> (30) It is *true* that this by-election was skewed by its unusual origins in the expenses scandal. (*The Daily Telegraph*)
>
> (31) *Surely* the only way out of this conflict is for everyone to accept that all swearing is fine - that no word is offensive, only sentiments are. (*The*

Guardian)

(32) The new program would, *of course*, trim the bottom lines of some corporations, but it would not create enormous job losses, as some critics are suggesting. (*New York Times*)

Despite their limited occurrences, boosters are expressed in a remarkable variety of ways with 'indeed', 'clearly', 'really', 'always'. 'Indeed' is the most frequent form in both corpora:

(33) *Indeed*, the requirement that scientists obtain grants to support their research and salaries, coupled with funders' accountability to the public for its investment in science, puts intense strain on the system. (*American Scientist*)

(34) *Indeed*, America today increasingly looks like the society that the political scientist Mancur Olson wrote about in his 1982 classic "The Rise and Decline of Nations." (*New York Times*)

We also found a surprising use of the word 'yes' used as a booster in the opinion texts. This simultaneously acts as a booster and a marker of attitude, aligning with readers by sharing their surprise at the accompanying statement:

(35) In just four years' time, our state debt will be 40 per cent – *yes*, forty per cent – higher than it is today. (*The Daily Telegraph*)

(36) The catastrophe in New Orleans didn't do it. *Yes*, that was an infrastructure tragedy. (*New York Times*)

(37) And, *yes*, the presence is predominantly white, middle class and university educated – as are the writers of these books. (*The Guardian*)

5.4   *Marking attitude*

While hedges and boosters are closely related to the writer's epistemic stance, signaling the probability of truth or otherwise of a statement, we also find expressions of affective attitudes in these texts. Attitude is essentially concerned with feelings, including reactions to events, judgments of behavior and evaluation of things (Martin and White 2005). Attitude markers, or what Nash (1992) refers to as 'evaluatives', thus indicate the writer's affective position, usually conveying surprise, agreement, importance, obligation, frustration, and so on (Hyland 2005a, 2005b). Dueñas (2010: 51) observes that "[t]he inclusion of attitudinal markers can contribute to displaying an appropriate stance, indicating the writer's judgments, views, and opinions, which need to be expressed in accordance with the value system of the particular community they address". While the writers of opinion texts and popular science are communicating with a close-knit group of like-minded members, they can nevertheless forge links with their readers by signaling their assumptions of shared cultural responses to the materials they present.

While the expression of overt attitude is relatively uncommon in these texts, it is realized by 170 different forms. Given that the central purpose of the opinion articles is to convey the writer's stance on a topic and to recruit the reader into agreement with that stance, it is not surprising that we find a greater frequency, range and diversity of functions of attitude markers in the opinion pieces. This diversity not only conveys a range of responses to the material, but also serves to lend stylistic variation to the texts. The most frequent forms are shown in Table 5.

Table 5. Most frequent attitude markers in the two corpora

Popular science		Opinion texts	
important(ly)	93	important(ly)	35
surprising(ly)	47	unfortunately	15
interesting	32	dramatically	11
remarkable(ly)	31	surprising	10
unfortunately	29	remarkably	8

unusual	25	interesting	7
essential	21	wrong	7
dramatic	17	unfortunate	6
dramatically	17	worse	6
fortunately	17	appalling	5
amazing(ly)	12	appropriate	5
exciting/excited	11	depressing	5

As we can see, markers in opinion texts most commonly ascribe *affective* attitudes, indicating the writer's positive and negative feelings towards material, and are often at the extreme end of the scale. Markers such as 'shocking', 'amazing', 'astonishing', 'wrong' and 'depressing' help convey a colourful array of options for writers as they seek to create a bond with readers and secure their agreement with their arguments. Such strong expressions of attitude insinuate a shared response to situations, implying agreement on understanding the world and bringing readers around to the author's uncontroversial conclusions:

> (38) With so many kids needing homes, it is *shocking* that a growing number of states now prohibit unmarried couples -- gay and straight -- from adopting or serving as foster parents. (*Los Angeles Times*)
>
> (39) In addition, such sci-fi crafts would get *embarrassingly* bad mileage. The energy required to reach even the nearest stars in a decade or less with a very modest-size starship (say, the tonnage of the 17th-century Mayflower) equals the total energy consumed in the United States last year. (*New York Times*)
>
> (40) If intelligence were deeply encoded in our genes, that would lead to the *depressing* conclusion that neither schooling nor antipoverty programs can accomplish much. (*The Guardian*)

This is not to say that the popular science articles are devoid of attitude. The popularizations are littered with attitude markers, indicating the writer's responses to material, pointing out what is important and encouraging readers to engage with the topic. Unlike their role in the opinion pieces, however, these

choices tend to express what Martin and White (2005) refer to as 'appreciation', which involves evaluations of semiotic and natural phenomena according to the ways they are valued in a given field. These were predominantly importance and surprise. Markers such as 'important', 'remarkable', and 'essential' underlined the significance of the reported research findings while 'surprising', 'interesting', and 'intriguing' helped to underlie their novelty, echoing Hyland's (2010) findings that novelty dominates the persuasive appeals in these texts. Writers use these novelty-laden attitude markers to attract the reader's attention and agreement:

(41) The results were *intriguing*. The researchers found that after only a 10-minute delay, the volunteers could remember all types of scenarios equally well. (*Scientific American*)

(42) THE next generation of plug-in hybrid cars could recharge in minutes, *thanks to* a new type of battery. (*New Scientist*)

Moreover, these items did not just signal the writer's attitudes and values but helped to impart an informal tone and underline the accessibility of the material. In fact, the attitudes were often not the writer's at all, but those which the interested lay reader might be expected to hold. They aligned the writer's attitudes with those of readers:

(43) But you may be thinking (as I implied earlier) that this is a very old-fashioned view of the English elite. Indeed it is. And it is quite *bizarre* that we should find ourselves faced with a reincarnation of it in the 21st century. (*The Daily Telegraph*)

(44) The wretched economy has made the prospect of homelessness, or at least of a life-disrupting move, *frighteningly* close for too many people, both renters and homeowners. (*Los Angeles Times*)

(45) It is *strange*, too, that the people resisting this change – social conservatives and devout Christians – are those who should most approve of

its twin aims: to sign up more young souls for the Church, and to encourage

cohabiting couples to tie the knot. (*The Daily Telegraph*)

Attitude therefore both "reworks feelings as propositions about the value of things –

what they are worth or not" (Martin and White 2005: 45) – but also engages readers by

attributing attitudes to them, or at least insinuating that they will have the same

response to the material on the basis of a community-endorsed common sense.

6.   Discussion and conclusions

Our study has revealed some key rhetorical differences in the construction of

persuasion in these two journalistic genres, popular science and opinion pieces,

suggesting how writers vary their choices regarding the frequencies, forms and uses of

interactional metadiscourse to achieve specific rhetorical goals. We have seen that

journalistic practices intrude into popular articles through emphatic claims about

findings, through reporting the voices of scientists in the first person, and

through the expression of personal attitude. We have also found that opinion

texts use a full array of interactional metadiscourse features and generally use

more of them. Table 6 summarizes our findings.

Table 6. Summary of interactional uses

Feature	Popular science	Opinion texts
Engagement markers	Inclusive-'we' used to stress shared interest and involvement with topic	Heavy use of reader pronouns and questions to establish proximity with readers
	Minimal questions link science with readers' lives	Questions generate involvement and draw readers into argument
	Limited range of directives to aid comprehension	Directives used to encourage action
Self-mention	General avoidance to let facts speak	Used to assert clear stance on issue

Hedges	Highlight uncertainties in science Knowledge and gain credibility from scientific caution	Reduce imposition of statements on readers and project reasonableness
Boosters	Remove doubts and upgrade claims	Offer strong support for arguments
Attitude markers	Give writer's response to material and encourage reader's buy-in with markers of importance and surprise	Align writer-reader responses

These interactional metadiscourse variations can be explained by the different attitudes writers of the two genres take towards their texts and their audiences.

There are, firstly, variations in communicative purposes which impact on interactional choices. While both genres are influenced by the journalistic imperative of *novelty,* the analysis shows that ways in which novelty is negotiated with readers differ tremendously. We find, for example, that popular science authors use devices to contrast what is new with current thinking, explicitly seeking to reference readers' assumed existing knowledge and underscoring ways in which the innovation impacts on their lives. Interactionally it mimics something of the author-hidden and cautious claim elaboration of the professional sciences, using hedges and boosters to negotiate significance and tentativeness, and avoiding authorial pronouns unless they are used in recounting the voices of the scientists themselves. Opinion pieces, on the other hand, make a virtue of the author's rhetorical dexterity, commitment and novelty of expression. Here the writer draws on self-mention, boosters and a wide array of attitudinal expressions to explicitly "discharge his emotions to achieve his own individuality or embody his personal or group aspirations" (Kinneavy 1969: 303).

Secondly, the distribution of interactional features reveals authors' assessments of readers' different expectations and needs in these genres, suggesting how they adapt to the different persuasive demands of the two contexts. We do not only see different forms of argument in the distinctive warrants employed by popular science and opinion writers, but also in the different ways they seek to establish their own credibility towards their topics and readers. Academic journalism draws, at least to some extent, on the established knowledge-making practices of the natural sciences in

avoiding self-mention and explicit expressions of attitude to minimize authorial intrusion in the texts. The facts are supposed to speak for themselves and the writer's job is simply to present them. Opinion writers, on the other hand, actively trade on their textual identity, bringing a personal and authoritative voice to an issue and seeking to align the views of their readers with their own through interactive choices which insinuate a proximity with readers and a shared set of values and beliefs.

This is not, of course, to say that popularizations present scientific arguments in the same way as academic papers, but we do see in these interactional choices an appeal to the view that science offers an objective description of what the natural world is actually like. The label 'scientific' confers reliability on a method and prestige on its findings, so while rhetorically different to academic papers, containing more certainties and appeals to the everyday voices of real researchers for example, popular science nevertheless piggy-backs on this credibility. Popular science authors imply that they are communicating truths which have emerged from observation and experimental methods. Consequently the reader is already half persuaded of the arguments he or she finds in the texts and simply wants to discover its relevance. The writer of the opinion piece, in contrast, has a harder job in persuading readers of an argument. Readers are likely to be more skeptical and may often come to the text with their own views on the subject, perhaps even holding a contrary view to the one they find in it. As a result, authors have to draw on a wider array of rhetorical tricks in their efforts to persuade readers.

The fact that popular science texts contain fewer explicit interactional markers therefore indicates that authors can afford to persuade by stealth, taking a backseat role to the fascinating discoveries of science itself. This involves recontextualizing academic research for a lay audience, removing its mystique to portray research as an immediate encounter of a scientist with nature. Certainties replace tentativeness, scientists become real actors, readers are involved with questions and inclusive pronouns, results are boosted and academic claims become climaxes in an exciting narrative. The author's role, then, is to persuade by making research accessible and

relevant to readers and by allowing non-specialists to recover the voice of the scientist. In opinion pieces the writer's stance is far more personal, with a need to establish a more intimate relationship with readers and claim an individual credit for arguments. The heavy use of the 'I' pronoun, greater marking of attitude and explicit conviction, and a generous sprinkling of references to the reader are the major ways authors accomplish these rhetorical goals.

It is interesting to note that the differences in interactional patterns we have found in these texts mirror those observed between comparisons of research articles in the physical and social sciences, suggesting that important interdiscursive borrowings may be occurring. Interactional metadiscourse uses in "soft" science articles significantly outnumber those in "hard" science articles (e.g. Hyland, 2005a, 2010) with the former relying more on more discursive argumentation and explicit interpretation. Similarly, we have found that the opinion papers carry a greater interactional weight, with authors taking a far more personal and explicitly evaluative stance than popular science writers. Articles in the physical sciences, on the other hand, depend for their effectiveness on the perceived trustworthiness of an informed an unbiased reporter of the facts who is in full command of his or her subject. Popular science authors, at least to some extent, appropriate the authority of the experimental practices they describe, assuming the efficacy of scientific method and its ability to explain our natural world. Each genre, in other words, mimics a set of rhetorical resources available to academic authors and shapes these for a lay audience.

Finally, in addition to offering a description of these common public genres and contributing to the literature on the interactive aspects of rhetorical persuasion and metadiscourse, we also believe our findings may be useful for students, particularly those engaged in the study of rhetoric, writing in English, and critical discourse analysis. Public discourses have not been subjected to the same interactional scrutiny as business and academic texts, but we hope to have shown that there is much for students to learn from the ways authors engage with their readers and seek to enhance the persuasiveness of their texts. By drawing attention to these features, teachers may

be able to raise students' awareness of contemporary persuasive practices in public discourses and to help them become more critical readers and effective writers.

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