Stephen Hawking's Community-Bound Voice A Functional Investigation of Self-Mentions in Stephen Hawking's Scientific Prose

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Abstract

Thanks to the development of the concept of metadiscourse, it is now widely acknowledged that academic/scientific writing is not only concerned with communicating purely propositional meanings: what is communicated through academic/scientific communication is seen to be intertwined with the negotiation of social and interpersonal meanings. While a large number of so called metadiscoursal resources contribute to the simultaneous negotiation of propositional and interpersonal meanings, the present study aimed at investigating the functions self-mention forms can fulfill in academic/scientific communication. Two of Stephen Hawking's scientific books were selected as the corpus of the research, and based on Tang and John's (1999) model, the constructed corpus was analyzed in terms of the functions self-mention forms can fulfill in academic/scientific writing. The findings revealed that from among the different roles identified by Tang and John, the *representative* role constituted the most frequent self-mention function in the corpus. The remarkably heavy presence of *representative* role in Hawking's scientific prose was interpreted as a further evidence for the claim that scientists are more likely to persuade readers of their ideas if they frame their messages in ways which appeal to appropriate community-recognized relationships.

Keywords: scientific prose, self-mention, Stephen Hawking, function, community-bound voice

Introduction

The awareness that success of academic communication is partly accomplished through strategic manipulation of interpersonal and rhetorical elements has stimulated a fresh wave of studies exploring the interactive, interpersonal, evaluative, persuasive, and rhetorical dimensions of academic discourse. Many of these studies can be clustered under the uniting umbrella of metadiscourse—an intuitively attractive concept as it seems to offer a principled way of collecting under one heading the diverse range of linguistic devices writers use to explicitly organize texts, engage readers, signal their own presence, and signal their attitudes to their material and their audience. The concept of metadiscourse brings to the fore qualities of academic written communication, such as non-topical linguistic material that may be irrelevant to topic development but key to understanding discourse as a whole (Lautamatti, 1987); linguistic material that does not add propositional information but signals the presence of an author (Kopple, 1985); author's intrusion into the discourse to direct rather than inform (Crismore, 1983); and non-referential aspects of discourse that help to organize prose as a coherent text and convey a writer's personality, his or her awareness of readers, and his or her stance toward the message (Hyland, 1998).Studies that have developed a cross-cultural perspective (e.g., Adel, 2006;Breivega, Dahl, &Flottum, 2002; Dahl, 2004; Mauranen, 1993; McEnry&Kifle, 2002; ThueVold, 2006) have revealed that metadiscourse is not uniform across languages; studies that have looked at metadiscourse from cross-disciplinary point of view (e.g., Charles, 2006; Harwood, 2005;Hewings&Hewings, 2001; Swales et al., 1998) have shown how metadiscourse use is sensitive to the ways texts are written, used and responded by individuals acting as members of academic discourse communities; and studies that have adopted communicative purpose (Swales, 1990) as the major focus—genre-based studies of metadiscourse—have also contributed to awareness of how different communicative purposes and different audiences can influence the use of metadiscourse. Different academic genres have been investigated both individually and in comparison with other genres. While due to its significance in the life of academy, the research article (RA) has been studied more extensively (e.g., Hyland, 1996a, 1996b, 2002c, 2007), other academic genres like textbooks (e.g., Hyland, 1994), dissertations (e.g., Bunton, 1999), and undergraduate essays(e.g., Myers, 2001) have also been investigated. Other studies have compared two or more academic genres: Hyland's (1999) study of research articles and textbooks; Hyland's (2002a) study of textbooks, research articles, and student reports; de Oliveira and Pagano's (2006) study of research articles and science popularization articles;

Hyland's (2004) investigation of master's and PhD dissertations; Hyland's (2002b) investigation of expert and non/less expert writers; and Hyland and Tse's (2005) investigation of research articles and dissertations.

Metadiscourse and Shift in the Philosophy of Language

Probably the most fundamental perspective form which the findings of metadiscourse research should be understood is that of linguistic philosophy. Although the concept of metadiscourse is the outcome of a discoursal conception of academic communication and it has more explicitly emerged from a Systemic Functional approach to discourse (particularly form Hallidayan philosophy of language; see, for instance, Halliday, 1973/2004), we argue that not all discourse-based approaches will be of equal significance in defining the metadiscoursal character of academic communication. Here we need to be more specific about the characteristic of an approach which will more appropriately lend itself to an interpretive framework. An appropriate interpretive framework for metadiscourse research should avoid a representational philosophy of human communication in which discourse and reality are conceived to be operating independently from one another, and the operation of discourse is reduced to a mere representative, reflective function.

Reducing discourse to a transparent instrument which reflects realities as they are denies the essence of the concept of metadiscourse. Instead, we need a reality-constitutive perspective in which the blurred boundaries of discourse and reality are recognized (for a comprehensive discussion on the distinctions between these two see Shi-Xu 2005; Lecercle 2006); a perspective within which instrumentality (i.e. I speak language) can be replaced by the Heideggerian possibility of "language speaks I", and within which the principle of transparency can be replaced by the principle of opacity. We will find these alternative principles more explicitly stated in and in line with the claims of a critical approach to discourse analysis (see, for instance, Fairclough 1992; Fowler 1981; Candlin 1997; Foucault 1972), and hence we can more explicitly suggest that metadiscourse research should be defined and interpreted in light of CDA principles (and not many of other functionally-oriented approaches to discourse). The reason why we see CDA more appropriate for interpreting metadiscourse research is that the methodology CDA provides is in line with the very claims that gave rise to interest in the concept of metadiscourse (we cited some of these claims above). In fact, the essence of metadiscourse research lies in the assumption that academic knowledge is a social construct and hence it is constructed in the complex webs of human activity and social process of meaning making. Metadiscourse research assumes that the act of knowledge construction and meaning making in academic communication

should be seen as a social practice; therefore, the reality of the knowledge constructed in academic communication cannot be seen as independent from the identities of the interlocutors, their interpersonal relationships in the social structure of the academy, and their cultural backgrounds.

Metadiscourse and Shift in the Philosophy of Science

All aspects of human experience in general and science and academic study in particular become possible through and are fundamentally based on acts of classification. If we can reserve the concept of science as a means of building knowledge and interpretations, we can claim that this becomes possible largely through a process of defining boundaries between conceptual categories, labeling and naming those categories and the relationship among them. Classification, labeling, and naming are linguistic acts in nature and in fact as Lee (1992) rightly argues it is through language that classification becomes possible. Defined from such a point of view, language ceases to be a neutral medium for the transmission and reception of already constructed knowledge. Language is the key ingredient in the very construction and constitution of knowledge (Jaworsky and Coupland 1999). In light of this understanding, we have gradually been getting rid of some misconceptions and now we can easily feel the irony in the following piece of advice given to the writers of scientific texts (Bazerman, 1984, p. 163-5 as cited in Hunston, 1994, p. 192):

   a. the scientist must remove himself from reports of his own work and thus avoid all use of first person;
   b. scientific writing should be objective and precise, with mathematics as its model;
   c. scientific writing should shun metaphor and other flights of rhetorical fancy to seek a univocal relationship between word and object; and
   d. the scientific article should support its claims with empirical evidence form nature, preferably experimental.

These misconceptions may have their roots in the feelings of "alienation" we have developed towards the discourse of science, a kind of alienation whose eloquent account has been presented by Halliday (1993):

It is not only schoolchildren who have felt alienated by the discourse ofscience Within a century of so-called 'scientific revolution' in Europe,

peoplewere feeling disturbed by the picture that science presented, of a universe regulated by automatic physical laws and of a vast gulf between humanity and the rest of the nature. (p. 199-200)

In fact, the shift we notice here from the mentioned 'alienation' towards a constitutive way of characterizing the role of language in building scientific knowledge paves the way for interpreting the findings of metadiscourse research. One excellent example of this direction of contextualizing metadiscourse research can be found in Crismore and Farnsworth (1989). This research has concentrated on one of the highly prestigious and influential scientific texts, Darwin's *The Origin of Species*, and has traced Darwin's use of modality markers (hedges and boosters), attitude markers and commentary in this text. An interesting finding of this research is that it has resulted in identifying 890 instances of such metadiscourse markers in Chapter *One of The Origin of Species*, which sets out a framework for the book and Chapter Four, which presents the theory of natural selection. Among the identified metadiscourse resources, hedges and boosters accounted for 83 percent of all metadiscourse in the study, with hedges being four times more frequent. The significance of this research lies in the fact that what used to be seen as an influential scientific text and counts as a representation of pure hard science is nothing but the voice of a cautious scientist who resorts to metadiscourse to indicate the relative uncertainty of his claims. Based on the patterns of metadiscourse use in *The Origin of Species ,*Crismore and Farnsworth (1989) have attempted to develop an image of a scientist which fundamentally differs from the impressions developed by the above-mentioned alienation:

We believe that Darwin's ethos is constructed form aspects taken form the following: the tentative, cautious, naturalist; the modest, gentleman naturalist; the non-assertive, tactful   presenter of ideas; the trustworthy expert, the childlike human being given to wonder – in short, the nonthreatening, endearing Mr Darwin (p. 101).

Metadiscourse, therefore, cannot and should not be approached from a realist scientific perspective, which characterizes knowledge as something emerging form our direct access to the external world (through experiment, induction, observation and falsifiability; to look at the issue form Kuhn's (1970) perspective, nature cannot speak to us directly and interpretation of events in the natural or social world always depends on the assumptions scientists/academics bring to the problem. Instead, metadiscourse should be

understood in light of a social constructivist position which, in opposition to the theories of positivism and empiricism, questions the idea of an objective reality.

Metadiscourse and Individual Rhetorics

Much of what is seen an agreed-upon, social convention of meaning making in an academic discourse community may emerge from a parent member's personal rhetorics. In fact, parent members of an academic community play a significant role in both 'what-to-says' and 'how-to-says' of that community. In a number of metadiscourse investigations to be discussed below, we notice how these features are strategically manipulated by the giants of academic discourse communities and how this strategic investment on metadiscourse plays a significant role in establishing their authority and competence. In fact, part of what establishes an academic as a parent member lies in his intelligent manipulation of discourse, and metadiscourse performs vital functions in this regard: it promotes rational appeals when it explicitly links ideas and arguments; it relates to credibility appeals where it concerns the writer's authority and competence; and it addresses affective appeals when it signals respect for reader's point of view (these functions reflect three major means of persuasion which have characterized persuasive discourse since the time of ancient Greece: ethos, pathos and logos). While Crismore and Farnsworth's (1989) research on Darwin's use of metadiscoursal features in *The Origin of Species* (discussed above) can be considered as an excellent example of this way of contextualizing metadiscourse research, we can review some of the most influential studies of this type here in more details:

> Hyland's (2008) investigation identifies self-mention, hedging and attitude markers, reader engagement and considerateness as the main characteristics of John Swales' rhetoric and concludes with the view that this is a disciplinary voice informed by a keen assessment of his readers and representing an independent creativity shaped by accountability to shared practices. Based on the findings of the study, Hyland argues that Swales' writing shows that we are not automatons individuals blindly following the dictates of disciplinary socialization or the prescriptions of style manuals. The creation of an authorial persona is clearly also an act of personal choice, where the influence of individual personality, confidence, experience, and ideological preference all enter the mix to influence our style. The distinctiveness of Swales' voice reveals both the breadth of the options that are acceptable to community members and the freedom of established disciplinary celebrities to manipulate them.

Hyland also suggest that the strong presence of Swales in his writing might result from his decision to emphasize an individual persona over a collective ethos.

In an interesting study of this type, Hoey (2000) investigates persuasive rhetoric in the language of Noam Chomsky. Hoey bases his argument on the assumption that until relatively recently, it has been difficult to offer new ideas in linguistics without using transformational-generative grammar as bearings; and anyone who has tried to do so has been in danger of being dismissed as hopelessly out of the mainstream of linguistic thought. This has happened, according to Hoey, due to several factors including the theoretical vigor of Chomsky's contribution, the sense of autonomy and identity Chomsky has granted to linguistics and the theoretically elegant combination of old and new in Chomskyan linguistics (e.g., transformations had been discussed by Zellig Harris as early as 1952; the way they were presented, however, in Syntactic Structures was novel). Hoey, however, believes that besides the mentioned factors, what makes Chomsky and generative-transformational linguistics dominate the field lies in Chomsky's skillful manipulation of rhetorical resources. Hoey resorts to Botha (1973) in justifying his claims to show that the whole transformationilist camp have developed power in argument through skillful manipulation of persuasive strategies, two significant of which are (Botha, 1973 as cited in Hoey, 2000,p.30):

1. Inflate the apparent merit of your own argument by emphatically calling them 'striking', 'powerful', 'strong', 'forceful', 'convincing', and so on. Deflate your opponents' argument by means of the corresponding antonyms.
2. Warn your opponent that if he did not accept your theoretical viewpoint, your data, or your argument,
    i. then he would be guilty of irrationality and/or
    ii. then your common field, as a field of research, would be destroyed.

Chomsky as the leading figure of this camp has his own strategies of establishing interpersonal relationships in his discourse. According to Hoey, Chomsky pre-empts criticism of his ideas through a clever use of evaluation, in particular by evaluating negatively any reader whose assumptions about language and about the discipline of linguistics differ from Chomsky's own. Also, Chomsky's evaluations are so embedded in the structure of the clause and that of the discourse that they are difficult to challenge. In other words, evaluation in Chomsky's texts tends to be so embedded in other information

that although there is a good deal of evaluation, few if any clauses encourage the readers to ask questions such as "what do you feel about this?" Of course, this is not the use of evaluation that distinguishes Chomsky's writing form the rest of linguists; rather, this is the overuse of evaluation, the interweaving of them with situational elements, and the presentation of arguments without basis that makes him unique in manipulating rhetorical devices – while the more normal practice in scientific writing is that either evaluation is offered and then a reason for that evaluation and basis follow, or the situation is presented first and then evaluated. In Chomsky's writing, the presentation of evaluation is in such a way that evidence is not required to support. Chomsky's writing, according to Hoey, attacks alternative position and adopts a threatening tone towards any reader whose views of linguistic theory or method is different from his own.

Henderson's (2001) study of exemplification strategies in Adam Smith's *Wealth of Nations* is another instance of studies which have focused on how great writers and thinkers utilize interpersonal resources in order to create more persuasive discourse. Henderson examines samples of writing drawn from the opening chapters of the Wealth *of Nations* in order to establish how Smith develops and uses examples. The study finds three broad categories of examples in Smith's text: current examples, historical examples and hypothetical examples. Henderson's attempt to relate Smith's use of examples to the wider discourse and indicates that the recurrent use of examples creates a balance between theoretical propositions and social possibilities. Mingled with the spoken language sense hidden in Smith's work, this gives Smith's discourse a systematic and 'teacherly' approach, based on an understanding of what a lecture is and what is required pedagogically to convince others of the effectiveness of an argument. Henderson sees Smith's work as packed with exemplification, presented within a wider pedagogical strategy that could be thought of as 'planned repetition' or even 'extensive familiarization technique'.

Salahshooret.al's (2012) investigation of interpersonal resources in Henry Widdowson's discourse is also a good example of research conducted on individual rhetorics. This investigation concentrated on a number of interpersonal markers (attitude markers, boosters, self-mentions, engagement markers and hedges) in a 20-chapter sample of Widdowson's texts and revealed a considerable frequency of occurrence of the focused features. The authors concluded that the creation of an authorial persona is clearly an act of personal choice, where the influence of individual personality, confidence, experience and ideological preference can be clearly seen. The authors argue that at least

part of the influence of Widdowson's discourse is the outcome of his intelligent manipulation of these resources.

The Present Study

Drawing on the assumptions outlined above on the nature and functions of metadiscourse, the present study chose to investigate the frequency and discoursal functions of self-mentions – as a significant metadiscoursal feature – in Stephen Hawking's scientific discourse. Stephen Hawking – as one of the giant and outstanding representatives of modern science – was deemed as deserving such investigation. He has worked on the basic laws which govern the universe. With Roger Penrose he showed that Einstein's General Theory of Relativity implied space and time would have a beginning in the Big Bang and an end in black holes. These results indicated that it was necessary to unify General Relativity with Quantum Theory, the other great scientific development of the first half of the 20th Century. One consequence of such a unification that he discovered was that black holes should not be completely black, but rather should emit radiation and eventually evaporate and disappear. Another conjecture is that the universe has no edge or boundary in imaginary time. This would imply that the way the universe began was completely determined by the laws of science. Some of his outstanding publications include *The Large Scale Structure of Spacetime* with G F R Ellis, *General Relativity: An Einstein Centenary Survey*, with W. Israel, and *300 Years of Gravity*, with W. Israel. Among the popular books Stephen Hawking has published are his best seller *A Brief History of Time*, *Black Holes and Baby Universes and Other Essays*, *The Universe in a Nutshell*, *The Grand Design and My Brief History*.

Method

Corpus and Model of Analysis

The corpus of this study consisted of two of Stephen Hawking's outstanding books: *A Brief History of Time* and T*he Universe in a Nutshell*. These books have been written in English and were published in 2001. *A Brief History of*

Time included twelve chapters and *The Universe in a Nutshell* included seven chapters.

In order to meet the above mentioned objective – the frequency and discoursal functions of self-mentions in Hawking's scientific prose – Tang and John's (1999) model of authorial presence in academic writing was utilized. Tang and John (1999) developed their framework to deal with the functionality of first person pronouns based on the concept of 'creating identities'. They proposed a continuum of authorial "I" and the degree of power embedded in the use of first person pronouns. The classification is from least powerful authorial presence which is the absence of "we/I" to most powerful authorial presence which is I/we as originator.

Table.1
Tang and John's (1999) continuum of authorial presence in academic writing

No "I"	"I" as the Representative	"I" as the Guide	"I" as the Architect	"I" as the Recounter of Research Process	"I" as the Opinion Holder	"I" as the Originator

Least powerful authorial presence--→Most powerful authorial presence
*" I" refers to all forms of first and second person pronouns (my, we, our etc.).

In the proposed model, the functional categories of self-mention have been characterized as:

1. "I" as the Representative:

This function is usually realized by the plural form 'we' or 'us' which the writer use as a proxy for a larger group of people. It could refer to either the general people or a small group of people who share the same discourse community or property.

2. "I" as the Guide

This function refers the reader and the writer together in the time and place of the text. To put it simply, it tells the reader where "we" are now. In this category the writer is guiding the reader through the assignment.

3. "I" as the Architect

This use of the first person pronouns foregrounds the person who writes, organizes, structures, and outlines the material in the essay.

4. "I" as the Recounter of the Research Process

Recounter role identifies the past events of research and the researcher recounts those events.

5. *"I" as the Opinion Holder*

Opinion holder refers to the person who shares an opinion, view or attitude (for example, by expressing agreement, disagreement or interest) with regard to known information or established facts. In Tang and John's categories "opinion-holder" entails the expression of an opinion, usually occurring with a mental process.

6. *"I" as the Originator*

"Originator" as the sixth category involves the writer presenting or signaling new ideas or knowledge claims (Tang & John, 1999). Originating knowledge is thus the most powerful role that a writer can portray.

Reliability Matters

Throughout the analytic procedure of this research, we were completely aware of the subjective and pragmatic nature of decision-making in this type of analysis. That is why both authors of this text have been intimately engaged in the process of assigning values to the self-mention forms. That is, the samples have been checked twice by the authors and in cases of disagreement, the cases have been discussed to reach a shared position.

Results and Discussion

Table 2 demonstrates the descriptive statistics results regarding the use of different types of self-mention in the corpus of the present investigation.

Table 2
Different types of self-mentions and their frequencies in Stephen Hawking's scientific prose

Self-mention Form	Frequency in the Corpus/ per 104117 words	Percent
I	207	18.31
Myself	5	0.44
My	39	3.45

Mine	2	0.17
Me	12	1.06
We	607	53.71
Our	137	12.12
Ourselves	6	0.53
Ours	1	0.08
Us	114	10.08
Total	1130	100

As Table 2 clearly demonstrates, among the different types of self-mention used in the corpus, "we" has been used more frequently than other forms, and in terms of frequency matter, it is clear that Stephan Hawking is willing to use "we" more than any other form of self-mention. After "we", the most frequent self-mention form in the investigated corpus is" I" while "ourselves", "myself", "mine" and "ours" stand as the least frequently used forms of self-mention in Stephen Hawking's scientific prose.

Based on Tang and John's (1999) taxonomy, the identified self-mention forms were also investigated in terms of the functions they perform in the investigated corpus, and Table 3 illustrates the frequency of each of these functions. In this table, the identified functions have been ranked from high frequency to low frequency.

Table.3.
Frequency of occurrence of different functions of self-mention forms in Stephen Hawking's scientific prose

Functions of self-mention forms	Frequency in the corpus/per 104117 words	percent
Representative role	805	71.23
Recounter	154	13.62
Originator	56	4.95
Opinion-Holder role	52	4.60
Guide role	42	3.71
Architect role	21	1.94
Total	**1130**	**100**

As it can be seen in Table 3, Stephen Hawking resorts to all the resources of authorial presence in his scientific prose, and almost all functional roles identified by Tang and John (1999) contribute to the construction of a scientific "self" in his prose. However, the representative role is the most frequent role in the investigated corpus, and the interesting finding is that more than two-thirds of the self-mentions in his prose carry a representative function. After the representative role, the second most frequent role in the corpus is the recounter, while the architect role stands as the least frequent function of self-mention forms in the corpus. Regarding the functional distinctions in Tang and John's (1999) taxonomy, the representative role as the most frequent self-mention function in Stephen Hawking's discourse is a resources by which a writer creates a proxy for a larger *discourse community* to which the writer himself belongs. Not necessarily ignoring the significance of the frequencies of other functions, we have decided to highlight the significance of this role in the present investigation. After all, it has been identified as the most frequent function of self-mention forms in the corpus with a noticeable presence of 71.23 percent. That is the justification for our preference in the explanation of our findings here.

The very dominance of the representative role in Stephen Hawking's scientific prose helps us examine his discourse from a sociological perspective in which the beliefs of human communities are explained by reference to aspects of their social organization – something hard science largely escaped until relatively recently. The alleged impartiality, neutrality, impersonality and objectivity of hard science discourse, of which Stephen Hawking's is a representative sample, seemed to give it a unique epistemological status which placed it beyond the bounds of sociological scrutiny. However, in light of the understanding we have outlined in the introduction to this article, we have begun to look for more social bases for knowledge and the process of the

construction of knowledge. In fact, form the perspective we have developed in this article, it can be strongly argued that we are currently faced with a model of science in which "independent creativity is disciplined by accountability to shared experience" (Richards 1987, p.200) – and this is the very function of the *representative* role as the most dominant form in Hawking's prose. It is through this role in discourse that an author coordinates and approves his scientific methods and findings through public appraisal and peer agreement. The findings of the present research, and more particularly the finding that *representative* role is the most dominant form of self-mention in Hawking's prose, confirms the sociological claim that "communication system is … the basic structural component of the scientific community, and an understanding of knowledge involves an understanding of how it is employed in the social justification of belief" (Hyland 2009, p. 33). Hence, what establishes the adequate evaluation of a scientific claim is the collective agreement of the members of a discourse community. It seems that in his resort to the representative role of self-mentions, Hawking heavily draws upon the recognition that scientist are more likely to persuade readers of their ideas if they frame their messages in ways which appeal to appropriate community-recognized relationships – or what we can call community-bound voices.

Therefore, through emphasizing the *representative* role of self-mentions, Hawking helps us not hear an individual scientist's voice. He helps us hear the voice of a scientist who is intimately bound to the voice of a community. Then scientific writing is not and cannot be an individual activity based on the creativity of a sole author, rather it is a community-situated activity and the use of metadiscourse – of which self-mention is a strategic resource – depends on the author's observation of appropriate interpersonal and intertextual relationships. For scientific authors to have an influence on their fields, they must exploit their understanding of these relationships.

This and other similar studies can have some implications for novice members of scientific/academic communities. The major implication could be that development of an effective rhetorical and verbal repertoire to better operate in scientific/academic communication can start with raising novice members' awareness of what makes the parent members' discourses so influential. This and other similar investigations highlight the fact that success and influence in scientific/academic communication is not the outcome of purely objective, faceless, transparent and impersonal discourses. Interpersonality plays a significant role here. However, in order to utilize these interpersonal resources, we need to see how the giant members of scientific/academic communities play with them in their own texts.

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