FROM WRITTEN TO SPOKEN – AND IN BETWEEN

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Abstract

The paper looks at the differences in syntactic and information structure in four types of discourse produced by a single author, the British cosmologist and astrophysicist Sir Martin Rees: a written academic text, a text from a book of popular science, unprepared spoken discourse, and an academic lecture, i.e. a text written to be presented orally. The analysis of the variation in one speaker/writer is expected to highlight systematic differences between the separate types of discourses and to eliminate possible variation across different authors. The paper aims to show how, perhaps even subconsciously, competent language users modify the structure of discourse to fulfil their communicative goals in different types of communication.

Key words

functional sentence perspective, spoken discourse, syntactic structure, variation, word-order, written discourse

1 Introduction

There is now considerable agreement among linguists that spoken and written language differ in many more respects than just in the channel, i.e. the modality through which messages are transmitted between participants in communication (Halliday & Hasan 1989: 58). They are best understood as two partly autonomous subsystems of language, each with its own characteristic features such as grammatical complexity, lexical density, typical patterning of words, etc. The recognition of the autonomy of these two subsystems is demonstrated, for example, by the treatment of written and spoken language in the *Longman Grammar of Spoken and Written English* (Biber et al. 1999), in which Chapter 14: The Grammar of Conversation is devoted to the distinctive features of spoken language, with additional references throughout the book to grammatical features of conversation compared to fiction, news writing, and academic prose.

Most studies exploring the differences between spoken and written discourse are based on sources produced by a variety of writers/speakers. Unlike these studies, the present article deals with variation in texts produced by a single writer/speaker. On the one hand, such an approach may be considered somewhat limiting; however, it is hoped that it might identify some of the essential differences

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by showing how a single author, consciously or subconsciously, modifies the output according to the communicative situation and the communicative goals.

2 The author and the texts

To show the differences in some selected aspects of written and spoken discourse, four different texts produced by a single author were analysed, each representing a category of its own on a scale from writtenness to spokenness: a strictly academic paper, a chapter from a book of popular science, a public lecture, and, finally, unprepared responses to questions preceding and following the lecture. Few authors produce texts spanning such a range of discourse types, or if they do, their texts may not be readily available. The idea to explore variation within a single author was originally suggested by a BBC 4 radio programme – a broadcast of the *Reith Lectures*, which are a series of annual radio lectures on significant issues delivered by leading figures from a variety of fields. In 2010 the speaker was the British cosmologist and astrophysicist Sir Martin Rees, Master of Trinity College in Cambridge, Astronomer Royal, and President of the Royal Society. The BBC broadcast provided the essential language data that would otherwise have been very hard to obtain – a lecture delivered by Sir Martin Rees along with his spontaneous responses to questions raised before and after it, including the transcript. The academic text and the book of popular science were easy to obtain, since Sir Martin Rees has published countless academic papers and several books promoting scientific achievements to lay readers.

More concretely, the language data come from the following sources (full bibliography is given at the end of this article): an academic paper entitled 'Massive Black Holes: Formation and evolution'; a section from the book *Just Six Numbers: The Deep Forces that Shape the Universe*, Chapter 2: Our Cosmic Habitat I: Planets, Stars and Life; *Reith Lecture* 2010 No. 2, Surviving the Century; and, finally, Sir Martin Rees's spontaneous responses to questions asked before and after the same lecture. The analysis only focuses on turns by Sir Martin Rees; those produced by the other participants were not analysed. Since the last source alone would not have yielded a sufficient amount of data, it was complemented by the same type of dialogic discourse accompanying the core of *Reith Lecture* 2010 No. 1: The Scientific Citizen.

Admittedly, the discourse representing spontaneous spoken language in this study is still rather different from an informal chat – it was produced in front of a large audience and it was recorded to be broadcast, and this might have affected the structural and lexical choices made by the speaker. However, as there was no recording available of Sir Martin Rees speaking in a truly informal situation, this

recording had to be accepted as a valid sample of spoken language which, though strictly speaking not informal, is still undoubtedly unprepared.

The assumption was that the four different discourse types would display different characteristics in terms of the length, the complexity and the regularity of sentence structure, as well as in preferences for particular syntactic constructions, especially those presenting new information, and that they would differ in the degree of word-order variation. On the other hand, since all have been produced by the same author, the expectation was that they would also share a number of features in common as a manifestation of the author's personal style.

The factors affecting the process of constructing written and spoken texts are well-known. Written texts are typically planned, i.e. produced with considerably less severe time constraints than spoken texts, and the same is true of their perception. Their structure can therefore be considerably more elaborate and complex, polished to perfection on all levels, including the aesthetic one, sometimes perhaps even at the expense of ease of interpretation. Conversely, spontaneous spoken discourse is produced and interpreted in real time and is typically interactive, which means that the amount of planning is significantly limited by lack of time, by the span of short-term memory, and by the general nature of the interaction with the other participants who contribute to the process of developing the communication by changing the topic, shifting the emphasis, etc. Spontaneous spoken communication is typically face-to-face, which means that the context of communication is shared by the participants to a much higher degree than in written communication, and this, in turn, results in a much lower degree of elaboration on both the lexical and the syntactic level.

The most quintessentially written discourse was expected to be that of the academic paper, presenting highly complex meanings while aiming at clarity, unambiguity, and a high degree of accuracy: a discourse addressed to a readership of specialists sharing a substantial proportion of the factual knowledge presented. The discourse represented by the book of popular science, still firmly within the domain of written language, aimed to present processed, somewhat simplified information capturing the essence of complex processes and relationships to lay readers with little previous knowledge of the subject. The expectation was that, for the sake of comprehensibility, the structures would be somewhat simpler than in the strictly academic paper. The public lecture on a relatively general topic represents a hybrid between written and spoken language; it is essentially a discourse written to be spoken. Like written discourse, it is planned, but since it is to be presented orally, the structural complexity and lexical density are limited. It is a type of discourse occurring in face-to-face communication, but, unlike spontaneous dialogue, it employs one-way contact, since the listeners are not

expected to interact, at least verbally, until after the lecture is finished. The last discourse type to be explored was spontaneous spoken dialogue, produced in real time, with limited planning. This last type was expected to represent the highest degree of spokenness of the four. Internal variation was identified even within the dialogic discourse, namely differences between the section preceding the lecture, where the presenter is asked fairly general questions about his background, family, etc., and the discussion following the lecture, which is mainly concerned with elaboration of some of the issues just presented. The latter seems to show a more complex patterning of structures.

3 Quantitative analysis – structural length

To establish a database consisting of all four discourse types and to make comparison across them possible, continuous passages of 100 sentences were extracted from each of the sources. Punctuation symbols, along with capitals and spaces, were used as boundary signals. The segmentation was, predictably, somewhat more problematic in spontaneous spoken language, cf. the terms clausal and non-clausal units (C-units) as the fundamental units of analysis in spoken language (Biber et al. 1999: 1039). Since transcripts of both the lecture and the dialogic exchanges were available, they provided the graphical delimitation signals in the same way as the written discourse. Since conversion of spontaneous spoken language into a transcript almost invariably involves some degree of editing, the transcript was tested against the recording, and where the segmentation into units suggested by the transcript seemed improbable, prosodic clues were used to set the boundaries between units of analysis.

The following table presents the essential quantitative characteristics of the four discourse types.

Discourse type	Academic paper	Popular science	Public lecture	Dialogue
Sentences/C-units	100	100	100	100
Words	2,780	2,389	1,877	1,777
Predicate VPs	232	289	228	286
Finite VPs	184	221	173	240
Non-finite VPs	48	68	55	46
Words per VP	11.98	8.27	8.23	6.21
Finite to non-finite VPs	3.83	3.25	3.15	5.22

Table 1: Quantitative characteristics of the discourse types

As can be seen from the table, the expected order of the discourse types on the scale from writtenness to spokenness is reflected in the decreasing extent of the texts in terms of the number of words. For the purposes of word-count, a word was characterised as a unit separated from others by spaces on both sides; where mathematical formulae occurred within sentences, they counted as one word. References to literature occurring in the scientific paper were also counted, although, strictly speaking, they are not constituents of the syntactic structure. The reason is that they are a characteristic feature of this discourse type, significantly contributing to the density of information.

Interestingly, comparison of different quantitative characteristics reveals different parallels between the separate discourse types. The number of words per 100 sentences alone suggests a division between written and spoken types of discourse; however, this characteristic only provides a rough indication of the complexity of sentence structure. A clearer picture occurs when the number of words is related to the number of predicate verb phrases, both finite and non-finite, i.e. verbs taking complementation which can be interpreted in terms of clause constituents. In this respect, the scientific paper and the spontaneous dialogue constitute two extremes, with the average number of words per clause in the scientific paper almost twice that of the spontaneous dialogue, while there is hardly any difference between the book of popular science and the public lecture, though they rank in the domain of written and spoken discourse, respectively. And in terms of the ratio of finite and non-finite verbs, the boundary lies between spontaneous spoken dialogue, where the finite verbs significantly outnumber non-finite ones (by a ratio of over 5:1), and the other three discourse types, where the contrast is less sharp.

While these quantitative characteristics do suggest differences between the separate discourse types, it has to be borne in mind that they only represent average values and do not capture the internal variation within each of the samples. For instance, the spoken dialogue contains a significant proportion of elliptical responses, typically at the beginning of the turn, as reactions to what was said by the previous speaker. Some of these are one-word responses (five instances of *Yes*), others include several elliptical responses and question tags containing a finite verb (*No, they weren't; they didn't, didn't they*, etc.). As to the proportion of finite and non-finite verbs in the same discourse type, there is a very high incidence of *I think* used as a means of relativisation of what is being conveyed (31 instances in total). Though this phrase nominally constitutes a finite superordinate clause complemented by a dependent object clause, functionally it represents a lexical bundle (Biber et al. 1999: 1002-1003) marking personal stance, feelings, etc. If instances of *I think* were not included among finite verbs

proper, the ratio of finite and non-finite verbs in spoken dialogue would not be so sharply different from the other discourse types. The following example demonstrates the frequency of this phrase: five instances within a relatively short section of text.

(1) *Well I think I would disagree because the amount spent in actual pure research is only a tenth of what is spent in the development stage. And I think if we look back in the past, we have found that the research that's paid off has been the unpredictable part, and I think it's in the development and the applications that we need to make the choices. And obviously I think we need to spend more on the developed countries; and in terms of energy research, I think we could afford to multiply the amount spent on energy R&D by a factor of 5 or 10 very easily.* (Rees 2010a: 5)

An interesting parameter is the variation in the length of sentences/clauses within the separate discourse types. In the academic paper, short simple sentences are almost non-existent, cf. the following example representing a notable exception.

(2) *Simple inner engines give rise to very messy and complicated phenomena.* (Rees & Volonteri 2006: 51)

In the other discourse types, the variation in length is considerable, cf. two examples from the book of popular science.

(3) *These discs are not unexpected.* (Rees 2000: 12)
(4) *This scenario, supported by the actual evidence of discs around newly formed stars, has superseded the 'catastrophist' theories popular at the beginning of the twentieth century, which envisaged planetary formation as a rare and special accident*. (Rees 2000: 13)

It is not surprising that similar variation in the length of sentences should be found in the discourse of the lecture, where short sentences are employed to highlight a particular point or introduce new topics.

(5) *And there's a third technology: space*. (Rees 2010a: 2)
(6) *But nearly half the world's people live in countries where fertility has fallen below replacement level, and this so-called demographic transition is a consequence of declining infant mortality, availability of contraceptive advice, women's education and so forth*. (Rees 2010a: 2)

In spontaneous spoken language, the degree of variation in clause and sentence length is also considerable. However, prosodic delimitation signals are often of limited use in distinguishing between clause and sentence boundaries.

4 Structural preferences

Different discourse types are characterised, among other things, by the choice of syntactic structures they typically employ, or, more precisely, by the relative frequency of certain structures, for it would be absurd to expect that some constructions are banned from a particular discourse type altogether. The structures explored in the following section include the *there is* construction, used to present new information, the *wh-cleft* and the *demonstrative wh-cleft* (e.g. *That's what I thought*) constructions, which are believed to be among the distinctive features of spoken discourse, whereas written discourse, particularly academic prose, shows a markedly higher proportion of the passive and *it-cleft*s (Biber et al. 1999: 938, 961, 963). The actual distribution in the discourse types explored is given in the table below; admittedly, some of the structures are so rare that the 100-sentence section of text did not yield any examples.

Discourse type	Academic paper	Popular science	Public lecture	Dialogue
there is	4	9	10	15
wh-cleft	–	–	1	4
demonstrative wh-cleft	–	–	–	1
it-cleft	–	–	1	1
passive (finite)	41	30	20	8
passive (non-finite)	9	14	4	4
passive total	50	44	24	12

Table 2: Structural preferences in the discourse types

The results presented in Table 2 show that the expectations about the occurrence of the separate structural patterns were only partly fulfilled. It was so in the case of the *there is* structure, with frequency rising from four instances in the quintessentially written academic paper to fifteen in the dialogic discourse. This corroborates the assumption that this structure is essentially characteristic of spoken discourse. However, the scarcity of *there is* in the academic paper may not be exclusively a matter of stylistic preference; it may also be the consequence of the fact that this type of discourse is not primarily concerned with introducing

new concepts or phenomena onto the scene, but rather with commenting on those already established. It is probably not a mere coincidence that of the four instances of *there is* in this discourse type, one contains a verb other than *be*, namely *exist*, and two contain a modal verb in the structure. Additionally, all of the *there is* structures belong to the purely existential subtype.

(7) *It is worth mentioning that between the observed populations of stellar mass BHs (up to a few tens solar masses) and supermassive BHs (the smallest, detected in the Seyfert 1 galaxy POX 52, … , there might exist an intermediate league, in the range of hundreds or thousands solar masses, bridging the gap.* (Rees & Volonteri 2006: 51)

(8) *For spinning holes there may be a rocket effect perpendicular to the orbital plane, since the spins break the mirror symmetry with respect to the orbital plane.* (Rees & Volonteri 2006: 54)

The stylistic preference for structures other than *there is* may be observed in the occurrence of constructions where the new phenomenon is not presented as the subject, but rather as a postverbal element, typically the object, achieving the linear distribution of clause constituents from low to high information, which corresponds to the principle known as the *end-focus* (Quirk et al. 1985: 1357). Consequently, the examples of structure**s** like the one illustrated in Example 9 replace those represented by the hypothetical Example 10.

(9) *If most galaxies host BHs in their centre, and a local galaxy has been made up by multiple mergers, then a black hole binary is a natural evolutionary stage.* (Rees & Volonteri 2006: 53)

(10) *If there are BHs in the centre of most galaxies*, *...*

Conversely, in spontaneous spoken discourse the *there is* structure represents the principal means of introducing new phenomena onto the scene, and since the speaker, processing structures under time constraints, cannot pay due attention to stylistic diversity, multiple instances of the *there is* structure may be accumulated in short sections of the discourse.

(11) *Well I think there are lots of people who could help with the solar energy, but I think there are other ways I would get them rather than from the Hadron Collider. I think there are many other types of activity which are lower priority than fundamental research.* (Rees 2010a: 6)

Sometimes, however, repeated instances of the same structure may be a conscious strategy, employed by the speaker to highlight a point or to make a contrast, etc.

(12) *Well I think if we are to get our energy by non-fossil fuels, then there's a limited number of options, isn't there? There's tidal, there's wind, or there's nuclear, and all of them have some environmental negative effects and I think ...* (Rees 2010a: 7)

Interestingly, in the discourse of the lecture, where the frequency of the *there is* structure was also relatively high, the separate instances were distributed much more evenly, probably due to conscious avoidance by the speaker of structural monotony.

Unlike the distribution of *there is*, which closely corresponded to that described in linguistic literature, the use of the other structures presented in the table above did not reveal any particular patterns, perhaps with the exception of *wh-clefts*, exclusively found in spontaneous spoken discourse.

(13) *So I think what is wrong is that the big companies ought to be investing from the huge turnover they have.* (Rees 2010a: 6-7)

Contrary to expectations, no instances of *it-clefts* occurred in the two types of written discourse, and a mere two instances were found in the spoken discourse – one in the lecture and one in the dialogue. Of these, only that occurring in the dialogue fulfilled the function typically associated with *it-clefts*, i.e. a marked highlighting of a particular unit of information, usually in the context of contrast, etc. To make this obvious in context, the following example contains a sentence preceding the one actually containing the *it-cleft*.

(14) *Well I think I would disagree because the amount spent in actual pure research is only a tenth of what's spent in the development stage. And I think if we look back in the past, we have found that the research that's paid off has been the unpredictable part, and I think it's in the development and the applications that we need to make the choices.* (Rees 2010a: 6)

On the other hand, the *it-cleft* found in the lecture was used as a mere stylistic device, since the information singled out was diathematic, with the rhematic subject in its usual postverbal position at the end of the sentence; this is a stylistically marked alternative to adverbial fronting, cf. the factual Example 15 and the hypothetical Example 16.

(15) *It was in 1958 that Kilby and Noyce built the first integrated circuit.* (Rees 2010a: 2)
(16) *In 1958 Kilby and Noyce built the first integrated circuit*.

Written discourse, and particularly academic written discourse, is associated with a higher frequency of the passive than spoken discourse, owing to the impersonal, objective manner of presenting information in the former. This was fully corroborated by the present research. While the active remained the dominant voice in all four discourse types, the proportion of the passive in the academic paper was four times higher than in spoken dialogue, with the other two discourse types distributed evenly between the two endpoints of the scale. The passive structures used within spoken dialogue were reduced to cases of general or unspecified agency where an alternative active structure would have been clumsy or stylistically inappropriate (Example 17). Conversely, in academic writing, the passive is such a natural linguistic device that it occurs in the very first sentence of the text (Example 18).

(17) The *technical details involve mathematics and formulae, etcetera, but the essence I think can be explained in plain English to the extent that is needed by a citizen to make an informed decision.* (Rees 2010a: 8)
(18) *Supermassive black holes are nowadays believed to reside in most local galaxies.* (Rees & Volonteri 2006: 51)

Somewhat surprisingly, the instances of non-finite passive structures were slightly more frequent in the discourse of popular science than in the strictly academic paper; in form, most of these were past participles postmodifying a NP, and multiple instances of them were occasionally found within a short stretch of the discourse, as shown in the following example.

(19) *The spectrum of starlight reveals patterns due to the distinctive colours emitted or absorbed by the various kinds of atoms (carbon, sodium, etc) that stars are made of. If a star moves away from us, its light shifts towards the red end of the spectrum, as compared from the colours emitted by the same atoms in the laboratory – ...* (Rees 2000: 14)

None of the syntactic structures explored above can be thought of as exclusively related to a single discourse type. Additionally, the general scarcity of structures such as the *it-cleft* makes it difficult to assess their role in marking different discourse types.

5 Word-order and FSP

Some of the structural preferences in various types of discourse are related to word-order and to FSP (for a comprehensive account of the concept of functional sentence perspective cf. Firbas 1992), namely to the abovementioned principle of *end-focus* and to the principle of *end-weight*, i.e. a tendency for shorter (lighter) elements to precede longer (heavier) ones (Quirk et al. 1985: 1361-1362, Huddleston & Pullum 2002: 1382-1383). These principles have limited effect in English since they can only assert themselves if they are not overridden by the more powerful grammatical principle (a default linear distribution of clauses constituents). When they do apply, sentences start with short and informationally light (thematic) subjects, typically pronominal in form, and finish with informationally and structurally heavier postverbal constituents. When the information focus (rheme) falls on the subject of the sentence, it either still remains in the initial position, or is moved into the postverbal position by a variety of strategies, e.g. by the use of the *there is* construction, inversion, etc. The subject *an asteroid* in the second part of Example 20 is undoubtedly rhematic, but remains in the initial position in accordance with the grammatical principle; it breaks the principle of *end-focus*, but since it is structurally light (short), it complies with the principle of *end-weight*.

(20) *They [dinosaurs] were wiped out in the most sudden and unpredictable of all extinctions: an asteroid crashed onto Earth, causing huge tidal waves and throwing up dust that darkened the sky for years.* (Rees 2000: 18)

The separate discourse types show different levels of compliance with the principles just mentioned. The academic paper largely observes the canonical distribution of clause constituents, even when this results in structurally and informationally heavy initial elements.

(21) *The creation of a radiation-driven outflow, which can possibly stop the infall of material, is also a possibility.* (Rees & Volonteri 2006: 59)

In one instance, the author used subject-verb inversion, rather than the expected extraposition, to move a *wh*-clause subject into the final position and comply with both the *end-weight* and the *end-focus* principles. Notably, the initial element *of particular interest* constitutes a cohesive link to previous discourse; the following example therefore includes the relevant preceding context (in brackets).

(22) *Did black holes form with the same efficiency in small galaxies (with shallow potential wells), or did their formation have to await the buildup of substantial galaxies with deeper potential wells? This issue is important because it determines the expected event rate detected by LISA, and whether there is a population of high-z miniquasars.) Of particular interest is whether the merger history can be traced back to 'seed' holes, and be used to distinguish between seed formation scenarios.* (Rees & Volonteri 2006: 54)

The discourse of popular science, where more attention to form and style would be expected, contains structures similar to Examples 21 and 22, i.e. heavy initial elements on the one hand, and the use of inversion to move them into the final position on the other.

(23) *The challenge of fully elucidating how atoms assembled themselves – here on Earth, and perhaps on other worlds – into living beings intricate enough to ponder their own existence is more daunting than anything in cosmology.* (Rees 2000: 19)

(24) *(Part of it is a glowing nebula, heated by bright blue stars; the rest is cold, dark and dusty.) Within it are warm blobs, emitting no light but generating heat that can be picked up by telescopes fitted with infrared detectors.* (Rees 2000: 12)

The discourse of the lecture and the dialogue does not contain any instances of inversion. Since spoken discourse can use intonation to mark the rheme, word-order operations are not as important in marking the information structure as in written discourse. Yet, there is an example where the final position of a constituent was used, along with intonation, to mark its rhematic status. Interestingly, this was done at the expense of the principle of *end-weight*.

(25) *I think an attractive long-term option for Europe is solar energy: huge collectors - most maybe in North Africa – generating power that's distributed via a continent-wide smart grid.* (Rees 2010a: 4)

Even if the order of the constituents was reversed in the first sentence, intonation would still suffice to mark *solar energy* as the rheme of the sentence; the final position just gives it additional prominence.

6 Conclusion

On the one hand, analysis of different types of discourse produced by one author has revealed substantial variation, particularly in the extent of structures (the average length of sentences and clauses) and in structural preferences (the *there is* construction, the use of the passive voice, etc.). On the other hand, it has been shown that there is considerable variation within each of the four discourse types, and also that similarities between the separate types of discourse do not always coincide with the principal distinction between written and spoken – for instance the average number of words per predicate verb was found to be almost identical in popular science and public lecture, halfway between academic writing and spoken dialogue. It has also been demonstrated that the separate discourse types cannot be regarded as discrete categories, separated from each other by firm boundaries. A much more realistic picture is one of a scale on which the separate discourse types are distributed, not remaining in one strictly defined position, but oscillating around their centrepoint to one or the other side of the scale, with respect to the various linguistic features in question. It will be a matter for further research to establish whether the similarities between the discourse types are largely due to single authorship, or whether they apply generally across a variety of writers/speakers.

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