

## The Text-Organizing Function of Compression in English Scientific Discourse

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### **Abstract**

English scientific discourse can be characterized as a key area of the economy principle realization in the form of text compression. The latter carries out a major text-organizing function due to its potential to form implicit meanings and presuppositions thereby minimizing the use of linguistic units while enhancing the informativity of the text. Thus, the given paper is an attempt to provide a general overview of the role of compression in the production of scientific discourse by examining its concrete manifestations at the syntactic and semantic-cognitive levels in the light of some key pragmatic parameters of communication.

**Key words:** linguistic economy, compression, implicitness, informativity, pragmatic universe of discourse, principle of pragmatic sufficiency, metaphor.

### **Introduction**

The economy principle in language plays a significant role in the choice of linguistic units as well as their combination in such a way as to ensure maximum efficiency in the exchange of information in line with the situational, functional and pragmatic requirements of communication. As recent studies in linguistics show, the economy principle can be tracked throughout all levels of linguistic structure such as phonological, morphological, lexical, syntactic and semantic<sup>1</sup>. Furthermore, it has been established that, due to unique syntactic structure, various means of text compression as a medium of the economy principle realization in speech serve the purpose of forming implicit meanings and presuppositions, which in their turn enable to convey a great volume of information during communication by using as few linguistic units as possible. It is by the latter fact that the extensive use of text compression in different functional styles of the language can be accounted for. Namely, English scientific discourse can be characterized as a key area of the economy principle realization in the form of text compression given some basic requirements of this particular sphere of human communication such as the conciseness and clarity as well as high degree of informativity of scientific

texts, the economical use of time, space, etc. In other words, text compression as the realization of the economy principle in actual communication carries out a major **text-organizing function** in English scientific discourse, to elucidate which it is essential to elaborate on such key concepts as **linguistic economy and compression, compression and implicitness, informativity as well as some basic pragmatic parameters of communication.**

### **Linguistic Economy vs. Compression**

First of all, it is to be noted that though linguistic economy and compression often tend to be identified with one another, they actually constitute different phenomena<sup>2</sup>. The point is that the economy principle, which is also referred to as the principle of least effort, consists in tending towards the minimum amount of effort that is necessary to achieve the maximum result and displays itself in language use as a conscious or unconscious tendency of language users to save more time and energy by conveying more information with as few language units as possible (Zhou 2012:100), whereas compression is not merely a way of using as few linguistic units as possible thus making the understanding of the conveyed message easier and saving the addressee's efforts but also, and more importantly, it pursues the ultimate purpose of carrying out other functions, through economizing language means, which are more relevant to the final aim of the communication. Thus, for instance:

*We still have an opportunity to not only bring the fish back but to actually get more fish that can feed more people than we currently are now. **How many more?** Right about now, we can feed about 450 million people a fish meal a day based on the current world fish catch...*

(SJ SO: 5:41)

The example adduced above, which is an excerpt from a lecture on how to efficiently manage fish stocks, illustrates the use of ellipsis as a means of text compression at the syntactic level. Namely, the elliptical utterance **How many more?** (which constitutes the compressed, reduced variant of the non-contracted construction *How many more people can we feed?\**) does not, in fact, simply serve to reduce the number of used words but, by doing so, helps the speaker draw the audience's attention to the key message of the lecture, i.e. the increase in the number of people who could be fed on fish if the actions described in the lecture

were implemented. In other words, by using the elliptical utterance constituting a question, the speaker emphasizes the important information in the lecture so that the audience can be concentrated to grasp it in the answer to the question, which is to be found in the following part of the lecture. Thus, she also activates the audience's attention keeping them focused on the topic of the speech.

Hence, **compression can be defined as an economy principle based regular process, which covers all the levels of linguistic structure and consists in the reduction of the form of linguistic units and parallel preservation of the information contained in them with a view to ensuring the maximum efficiency of communication in line with the pragmatic requirements of the communicative act.** Moreover, the efficiency and completeness of communication is to be determined not by the volume or number of the verbal means being used, but by the situational and functional relevance of the latter.

### **Compression and Implicitness**

Speaking about compression as a means of linguistic economy principle realization in English scientific discourse, we cannot but dwell upon the interrelation between compression and implicitness. Thus, according to the way of representation, the information contained in a text can be of two major types: **explicit and implicit.** A smart combination of these two types of information in the informative structure of the text serves two main purposes: ensures conciseness in terms of the form, and increases the degree of informativity in terms of the content. It is to be noted that the term "implicit" is used to refer to the elements in the semantic structure of the utterance that have an incomplete verbal expression or no verbal expression at all. Furthermore implicit information is decoded on the basis of the explicit. Therefore, **the implicit element in the structure of the text can be defined as that part of the information contained in the text, which is not directly represented via verbal means or has an incomplete verbal expression; however it can be inferred or restored from the explicit content, the context of speech as well as other relevant factors.** Among the latter **the principle of pragmatic sufficiency** should be mentioned. As we know, the general goal of any text created within a certain context of interaction is to make a particular intended impact on the addressee, and to achieve this goal the speaker not only in scientific discourse but also any other situation, should know how much information to convey and how. So the principle of pragmatic sufficiency implies that only that part of information should be conveyed explicitly which is necessary and sufficient

to achieve the goal of the communicative act within a given context. Moreover, it's a well-established fact that very often the main purpose of the speaker, influenced by various linguistic and extra-linguistic factors, is not to get to the hearer what is said explicitly but to make him perceive what is left unsaid (Bagdasaryan 1983:10-11). As they say, language serves not only the purpose of expressing thoughts but also of concealing them. Thus, for instance:

*Good afternoon. My name is Uldus. I am a photo-based artist from Russia. I started my way around six years ago with ironic self-portraits to lay open so many stereotypes about nationalities, genders, and social issues – [“I am Russian. I sell drugs and guns”] [“**Vodka = water. I love vodka!**”] (Laughter) – using photography as my tool to send a message. [“**Marry me, I need a visa.**”].*

(BU WP: 0:11)

The example adduced above, which is an excerpt from a lecture on stereotypes delivered by a Russian photo-based artist, illustrates the use of implicit information inferred on the basis of stereotype-based presuppositions in creating a special humoristic effect, which helps to keep the audience entertained. Namely, while the speaker is delivering her speech, the audience is watching a number of funny photos representing common stereotypes with the corresponding subtitles following one another on the screen. So the speaker, being well aware that people, namely those sitting among the audience, stereotypically associate Russians with vodka for their great love and consumption of it on daily basis as if it were water for them, as well as that it's a common practice throughout the post-Soviet countries to marry American citizens to obtain a US visa, intentionally chooses to leave this part of the information implicit to be inferred by the audience. Thus, she not only uses short compressed texts based on implicit meanings to express stereotypes in the form of photos but also produces a certain impact on the audience keeping them amused throughout her speech.

As it can be concluded from the above, compression and implicitness are two sides of the same coin. Namely, in text production when we proceed from the content to the form of expression, i.e. in considering the text from the point of view of the speaker, we deal with the process of implicitness, expressing the information implicitly, whereas in text perception when we proceed in the opposite direction, from the form to the content, i.e. in considering the text from the viewpoint of the

hearer, we deal with compression. In other words, it is the task of the hearer to identify and restore the compressed elements in the text in order to decode and adequately restore the implicit information. In other words, on the one hand, compression functions as a means of encoding implicit information, on the other hand, it serves as a means of decoding it. Moreover, both processes are largely influenced by the context as well as extra-linguistic factors which make up the situation in which communication proceeds.

### **Pragmatic Factors Underlying Text Compression**

It follows from what has been said above that in the process of speech production, i.e. in choosing an appropriate form of verbal expression for the information to be conveyed, the speaker is normally guided by a set of principles which determine the use of this or that surface structure for verbalizing the same piece of information. Those principles are to be tracked at the pragmatic level. In other words, the choice of this or that syntactic construction for giving a verbal expression to a given content, which is closely related to text compression as a means of the economy principle realization, is to be accounted for by a number of pragmatic factors. Among the latter, of special significance to the production of scientific discourse are the following: distribution of information in the text (functional sentence perspective), the so-called **pragmatic universe of discourse** (otherwise referred to as “frame of reference”<sup>3</sup>) by which we mean the mutual knowledge of the speaker and the hearer, the genre peculiarities of the text as well as the potential addressee of the message or the target audience, the communicative environment, etc. Namely, a key role in text production, which is closely related to compression as a text-organizing function, is attributed to the distribution of information within the text. It is a well-known fact that in order to ensure effective communication first the known or the so-called “old” information (theme) should be conveyed, which is essential to the adequate perception and interpretation of the following message. Furthermore, in terms of text compression, the known or old information is normally conveyed in the form of presupposition, which is defined as a proposition or set of propositions which, in the speaker’s opinion, are known to the hearer at the moment of speech and are essential in the context of speech. It is here that the concept of pragmatic universe of discourse comes in, by which the totality of presuppositions shared between the speaker and the hearer is meant (Luzina 1996:15). In other words, they constitute the mutual knowledge of the speaker and the hearer. Accordingly, the informativity of the text is determined by

that part of the utterance which does not constitute the pragmatic universe of discourse. Hence, in order to ensure the highest degree of informativity and, therefore, maximum efficiency of scientific communication, the main purpose of which is to convey new knowledge or information, it is essential for the speaker to have a good idea of the hearer's awareness of the state of affairs, which is otherwise used to refer to the extra-linguistic situation (Nuyts 1992:51-54). Briefly speaking, not only the speaker's own knowledge but also his awareness of the pragmatic universe of discourse matters in the production of scientific discourse of which compression is an intrinsic component.

Last but not least, text compression as a means of conveying implicit information with a view to raising the degree of informativity of the text, is largely determined by the genre peculiarities of communication, which in their turn are closely related to such factors as the potential addressee of the text or the target audience and the communicative environment. Thus, for instance, in lectures as a traditionally academic genre, the speaker is supposed to take into account the level of the audience (students, specialists, narrowly specialized professionals) in determining the feasible limits within which he or she is allowed to speak "implicitly". The higher the level of awareness of the audience, the larger the scope of the pragmatic universe of discourse is supposed to be. On the other hand, there are the requirements of the communicative environment. Namely, lecture as a genre of oral discourse always presupposes imposition of certain time limits, which often account for the speaker's effort to compress as much information as possible within the boundaries of the oral presentation to manage in terms of time. Hence the wide use of various tools such as slideshows, video and photo materials, diagrams, etc. accompanying oral speech, which in this case serve as means of not only facilitating understanding but also compressing information.

To illustrate the role of the above-mentioned pragmatic factors in lectures as a genre of scientific discourse, let's adduce an excerpt from Noam Chomsky's lecture entitled "Who Owns the World" delivered at the University of Massachusetts at Amherst, September 2012:

*In a few weeks, we'll be commemorating the 50th anniversary of "the most dangerous moment in human history." Now, those are the words of historian, Kennedy adviser, Arthur Schlesinger. **He was referring, of course, to the October 1962 missile crisis, "the most dangerous moment in human history."** Others agree. Now, at that*

*time, Kennedy raised the nuclear alert to the second-highest level, just short of launching weapons. He authorized NATO aircraft, with Turkish or other pilots, to take off, fly to Moscow and drop bombs, setting off a likely nuclear conflagration.* (CN WW)

In the example adduced above the speaker refers to the 13-day (October 16-28, 1962) confrontation between the United States and the Soviet Union concerning Soviet ballistic missile deployment in Cuba. In fact, it was one of the “hottest” periods of the Cold War, it was the closest the Cold War came to escalating into a full-scale nuclear war. Now, the speaker, having in mind the level of knowledge of his audience, presupposing that those who have come to listen to his lecture, are supposed to have a basic idea of at least the most famous moments in the history of the United States, chooses not to elaborate on what the 1962 missile crisis is and why it is described as “the most dangerous moments in human history”. Thus, the speaker’s awareness of his mutual knowledge with his audience makes it possible for him to avoid overloading the surface structure of the text with information which is deemed as already known to the audience. In other words, based on the pragmatic universe of discourse, he conveys the so-called “old” information implicitly, in the form of presuppositions, thus compressing the text of the lecture, which in its turn results in saving the time allocated to the lecture as well as drawing the audience’s attention to the new and more important information expressed explicitly.

### **Metaphor as a Means of Text Compression at the Semantic-Cognitive Level**

The role of the interaction of the so-called “old” and “new” information in text compression displays itself in the use of **metaphors in scientific discourse, which act as means of economy principle realization at the cognitive-semantic level.** Namely, metaphor, which, as a linguo-cognitive model for non-stereotypical perception and reproduction of the objective reality<sup>4</sup>, constitutes a condensed or compressed image of that reality thus enabling the speaker to verbalize as much information as possible concerning this or that object or phenomenon of the objective reality while reducing the number of used language units to the minimum possible, makes it possible for the speaker to introduce or explain an object or phenomenon which is new or unknown to the hearer based on the latter’s knowledge of another object or phenomenon related to the one being introduced in terms of similarity. It is this property of the metaphor which makes it a key

mechanism of scientific thinking (Mishankina 2010), which displays itself in scientific discourse as well. Thus, for instance:

*So I was about 11 when I went along to my first meditation class...Now as I was there, I guess, like a lot of people, I assumed that **it was just an aspirin for the mind**. You get stressed, you do some meditation.* (PA MM: 02:12)

The example adduced above, which is an excerpt from a lecture on the effects of meditation, illustrates how the speaker explains to the audience the tranquilizing effect of meditation on the human mind by implicitly (i.e. by using the underlined metaphor) comparing it with an aspirin. Based on the extralinguistic knowledge (which in this case constitutes the mutual knowledge of the speaker and the audience) about the properties of aspirin, i.e. that it is a medication which is used to treat pain, fever, inflammation, the audience easily decodes this implicit message. So, due to the use of the metaphor, the speaker manages to convey to the audience a basic but comprehensive image of the impact of meditation on the human mind, by using as few linguistic means as possible. On the other hand, such a strategy helps the speaker give a special stylistic effect to his speech making it entertaining for the audience.

The role of shared extra-linguistic knowledge in conveying and adequately decoding implicit information through a metaphor, which enables to economize linguistic means and carry out other accompanying functions in speech, can be commonly tracked in most metaphors used in scientific discourse, including in the genre of lecture. For example:

*... For my part, what I wanted us to do was just to look at terrorism as though **it was a global brand, say, Coca-Cola**. Both are fairly bad for your health. If you look at it as a brand in those ways, what you'll come to realize is, **it's a pretty flawed product**. As we've said, it's pretty bad for your health, it's bad for those who it affects, and it's not actually good if you're a suicide bomber either. **It doesn't actually do what it says on the tin**. You're not really going to get 72 virgins in heaven. It's not going to happen, I don't think. And you're not really going to, in the '80s, end capitalism by supporting one of these groups. It's a load of nonsense.* (McJ TB: 01:00 – 17:33)



The example adduced above is a small excerpt from a lecture on ways to fight terrorism, throughout which the speaker compares the struggle between the state and the terrorists with a market competition, identifying terrorists with Coca-Cola as “a pretty flawed product”. Namely, implicitly referring to the ideology in which Muslim suicide-bombers are raised (the speaker avoids mentioning the religion for ethical reasons), the speaker denounces it as a lie while avoiding sounding critical due to the use of the metaphor *It doesn't actually do what it says on the tin*. And the audience understands what the speaker means because they all share common knowledge of the history of the advertising slogans of “Coca-Cola” company such as Coca-Cola...Makes Good Things Taste Better (1956), Things Go Better With Coke (1963), It's the Real Thing (1969), Coke Adds Life (1976), Have a Coke and a Smile (1979), America's Real Choice (1985), Always Coca-Cola (1993), Coca-Cola.Enjoy (2000), Life Tastes Good (2001), Coca-Cola...Real (2003), Open Happiness (2009), etc., each of which could be found on the tin of Coca Cola at different periods. In other words, the speaker compares terrorism with Coca Cola based on the similarity that, as Coca Cola advertisements promise that Coca Cola will do its consumers good but actually it ruins their health, terrorists too promise their suicide-bombers that the latter will find bliss and happiness in heaven after killing themselves, yet, in fact, they destroy their as well as their victims' lives. Thus, due to the use of a single metaphor based on the shared extra-linguistic knowledge of the speaker and the audience, the speaker manages to express his position and does so implicitly without sounding too critical. In other words, the example illustrates the role of extra-linguistic knowledge in the production and perception of metaphor in scientific discourse as a text-organizing element due to its function of compressing information.

### **Conclusion**

Linguistic literature abounds in various ideas regarding the nature of compression. The latter is frequently identified with the economy principle or is defined in terms of the concrete means of its realization. The analysis of theoretical literature as well as factual manifestations of the economy principle in English scientific discourse enables us to claim that compression is an economy principle based process aimed at ensuring the maximum efficiency of verbal interaction, which is determined not only by linguistic factors but also – and even more importantly – by the situational and pragmatic requirements of communication.

Compression inherently presupposes encoding and decoding of implicit information, the latter processes being guided by a set of pragmatic rules and principles. Due to its potential for contributing to the informativity of the text while using as few verbal means as possible, text compression is recognized as an inherent text-organizing element of scientific communication given certain key requirements of the given variety of discourse. Furthermore, compression as the economy principle realization in actual communication affects all levels of linguistic structure, from the lowest to the highest, semantic-cognitive level, with the metaphor as a linguo-cognitive model for non-stereotypical reproduction of the compressed image of the objective reality. Hence, the findings of the research are not only meant to constitute a useful contribution to discourse theory but also to provide grounds for further studies along these lines.

#### Notes:

1. The analysis of the materials studied within the framework of the given research has enabled us to add to this traditionally accepted classification the textual and semantic-cognitive levels at which the economy principle is realized.
2. The term “compression” (from Latin “compressio” meaning contraction, condensation), which was initially used in the communication theory to refer to the process of condensation of the verbal signal without a loss of the information contained in it, was borrowed by Soviet linguistics in the 1960s. Despite its common use in linguistic theory, the term has no unanimously accepted definition. Some linguists view it as a source of formation of implicit meanings and presupposition (Glukhov, Komarova 2004), others define it in terms of the concrete means of its realization (Litvin 2003), whereas others regard it as the economy principle realization in speech (Vasilyeva, Vinogradov, Shakhnarovich 2003), etc.
3. The term was introduced into the theory of pragmatics by Jan Nuyts to refer to the mutual knowledge of the speaker and the hearer (Nuyts 1992).
4. This interpretation of metaphor as a linguo-cognitive model of thinking is based on the cognitive theory of metaphor elaborated by G.Lakoff and M.Johnson (Lakoff, Johnson 1980).

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### **Խտացման տեքստակազմիչ գործառույթն անգլերեն գիտական դիսկուրսում**

Տեքստի խտացումը՝ որպես լեզվական տնտեսման սկզբունքի իրացում խոսքում, դարձել է անգլերեն գիտական դիսկուրսի բնորոշ առանձնահատկությունը, որտեղ այն հանդես է գալիս տեքստակազմիչ գործառույթով: Վերջինս պայմանավորված է խտացման՝ ներակա իմաստներ և կանխենթադրություններ ձևավորելու հատկությամբ, որը թույլ է տալիս, լեզվական միջոցների գործածությունը նվազագույնին հասցնելով հանդերձ, ապահովել տեքստի բարձր տեղեկատվականությունը: Սույն հոդվածում փորձ է արվել ներկայացնել խտացման դերը անգլերեն գիտական տեքստերի ստեղծման հարցում հարողակցության գործաբանական առանձնահատկությունների լույսի ներքո շարահյուսական և իմաստաբանական-ճանաչողական մակարդակներում դրա կոնկրետ դրսևորումների քննության միջոցով: