Precedence in scientific discourse

Precedencia en el discurso científico

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Contents

ABSTRACT:

The aim of the work is to identify and describe linguistic and cognitive mechanisms of the formation of precedent phenomena in Spanish scientific texts. The relevance of this research is due to the growing role of science in the society. According to the research results, one of the ways of transferring scientific knowledge in academic texts is socially precedent phenomena. The research material includes scientific articles and theses of Spanish scientists in the period of 2005-2016.

Keywords: Spanish scientific discourse, precedent phenomena

RESUMEN:

El objetivo del trabajo es identificar y describir los mecanismos lingüísticos y cognitivos de la formación de fenómenos precedentes en los textos científicos españoles. La relevancia de esta investigación se debe al creciente papel de la ciencia en la sociedad. De acuerdo con los resultados de la investigación, una de las formas de transferir el conocimiento científico en textos académicos es un fenómeno socialmente precedente. El material de investigación incluye artículos científicos y tesis de científicos españoles en el período 2005-2016.

Palabras clave: discurso científico español, fenómenos precedentes

1. Introduction

A concept of "precedence" is included in the conceptual framework of the theory of intertextuality, which is understood in the most general sense as the relationship between texts in the permanent continuum of their existence. The meaning of this definition is as follows: "In this context there is one or more preceding texts and therefore the relationship between a text and its pretexts, which can be in an unlimited time-space continuum, should be distinguished during the analysis" (Glushak, & Mirsky). Precedent phenomena are widely discussed in the scientific literature of recent years (Gudkov, 2004; Krasnykh, 2003, 2008; Kutyaeva, 2013; Morozova, 2010; Nakhimova, 2011; Popova, 2012; Slyshkin, 2008; Chistova, 2009).

In the framework of the linguistic and cultural approach, precedent phenomena are studied in two aspects: 1) a communicative-pragmatic aspect, supporters of which (Anisimova, 2004; Valgina, 2003; Karaulov, 1987; Karasik *et al*., 2014, Kostomarov, 1999; Lisochenko, 2007; Slyshkin, 2008) consider the features of the functioning of precedent texts in the

speech of native speakers; 2) a cognitive aspect, supporters of which reveal the nature of the cognitive activity of a listener or a reader when perceiving and interpreting precedent texts (Vasiliev, 2010; Gudkov, & Kovshova, 2007; Krasnykh, 2008).

The authorship of a term "precedent text" belongs to Yu.N. Karaulov, who defines precedent texts as texts with cognitive and emotional significance for a linguistic personality, which are of suprapersonal nature and constantly renewed in the discourse of this linguistic personality (Karaulov, 1987). These are ready-made intellectual and emotional blocks used by a linguistic personality as a tool that facilitates and accelerates the switching from the "factual" context of thought to the "mental" one (Ibid., p. 220). The definition of precedent texts given by Yu.N. Karaulov is proposed to be applied to precedent phenomena in general.

Thus, V.V. Krasnykh considers precedent phenomena as phenomena, which are well known to all representatives of a national linguocultural community, relevant in cognitive terms and are constantly renewed in the speech of the representatives of this linguocultural community (Krasnykh, 1997). The linguocultural approach serves as the basis for the comprehensive study of language and culture, the interrelation of which has been reflected in the notion of "concept". A concept is a universal semantic category, which is reflected in human consciousness, designated by a word of this language and is of an anthropocentric and linguocultural nature. The analysis of concepts, which are nationally specific of this language, is one of the most important directions for studying the linguistic worldview. The people's culture and language as its most important part may be studied by means of key concepts that serve this culture.

Based on the above, a notion of "precedent texts" in science is understood as a mental representative component of a precedent text in a concentrated, concise form, based in the mind of the researcher's linguistic personality, an appeal to which is caused by a unique spectrum of associations. Precedence in science means such properties of phenomena as common knowledge, cognitive significance for a certain scientific community, constant renewability in speech and reinterpretability in other (nonverbal) semiotic systems.

2. Methodology

The methodological basis of our research includes as follows:

1. Philosophical categories: 1) the activity, in which a concept of speech activity of a scientist is distinguished (Leontev, 1964; Dridze, 1986, etc.), and 2) systemic nature (Averyanov, 1976; Bertalanffy, 1968, etc.), according to which the scientific text reflects the scientific worldview;

2. Achievements of cognitive linguistics (Boldyrev, 2008; Demyankov *et al*., 2016; Lakoff, & Johnson, 1980; Popova, 2012; Popova, & Sternin, 2003; Fillmore, 1982, *et al*.) and communicative-pragmatic linguistics (Arutyunova, 1999; Stalnaker, 2005, *et al*.);

3. Discourse theory (Arutyunova, 1999; Dijk, 2008, *et al*.).

As part of the study, a discursive analysis was used, which is meant to be an integrated area of knowledge that studies both oral and written text (Dijk, 2008), while a text is a particular aspect of the broader concept – discourse. The concept of discourse, in addition to the concept of the text, includes mental processes, the socio-cultural context, which allows a researcher to apply a comprehensive approach to studying the features of generation and perception of texts from different spheres of communication.

3. Results

The results of the conducted research suggest that precedent phenomena are one of the ways of storing and transferring knowledge in scientific texts.

Such phenomena refer to socially precedent ones, i.e. they are well known to all representatives of the scientific community and the appeal to them is constantly renewed in the speech of representatives of this community.

The following main features of precedence revealed in Spanish scientific articles and thesis works can be identified:

1. Knownness characterized by such features as the availability of knowledge in a certain sphere, popularity and universality implemented in the Spanish language due to such language mechanisms as: the definite article, a thematic position in the utterance and the use of the author's surname without initials:

"La corrección de actividades estándar, <u>como la de Davies o las ecuaciones extendidas de Debye-Hückel,</u> no son aplicables a disoluciones de extrema fuerza iónica. Para disoluciones de alta fuerza iónica son necesarias formulaciones más sofisticadas, como <u>las ecuaciones de Pitzer</u>, que conllevan interacciones específicas entre iones en disolución";

"<u>Aristoteles</u> dejó escritas hace 2500 años algunas obras (como su investigación sobre los animales) en las que describía la relación entre diversas especies".

2. Content reproducibility, i.e. the constant renewal of the unity of all the basic elements of the whole, its properties and connections. It is implemented in Spanish texts by means of set word-combinations, compound words, word-combinations with words of abstract and event-related semantics: "Retardar el transporte de los radionúclidos que puedan liberarse <u>del sistema combustible-cápsula</u>. <u>Emisores beta-gamma</u> de alta actividad específica y vida corta (con períodos de desintegración inferiores a 30 años) y <u>radionúclidos emisores alfa</u> en concentraciones".

3. Standard form. This feature is expressed in repetition in an unchanged form, stereotypeness, stability and implemented by means of non-verbal means – symbols. A symbol is a conventional designation of a certain dimension accepted by science, the connection of which with this referent is motivated. Symbols are signs chosen in the process of world perception and awareness for the stable, regular embodiment of the value content of science in them, its main categories and meanings. The specificity of a scientific symbol consists in motivating a linguistic sign related to the worldview, background knowledge, and precedent phenomena. A symbol is considered as the result of the semantic development of a sign in science: "Además, es necesario tener en cuenta los procesos de intercambio catiónico, que afectan a la movilidad de especies como <u>$K+$, $Na +$, $Ca2+$, $Mg2+$</u> y diversos radionúclidos <u>($Cs+$, $Sr2+$, $Ra2+$)</u> y son de gran importancia en mecanismos de interacción en arcillas"; "Las técnicas semiclásicas desarrolladas para cuantizar y describir la dinámica de sistemas integrables (teoría WKB) en el límite semiclásico ($2πh→ 0$) no son válidas en el caso de sistemas no integrables".

Many symbols used in scientific discourse are special abbreviations (of a conventional nature) approved by international organizations.

4. Rigid associativity, which is a cognitive link between a particular linguistic unit and the phenomenon that it nominates. This feature of precedence is expressed by such linguistic mechanisms as references, footnotes and the implicit expression of names:

"En una fecha anterior al 2001 De Beers anunció la posibilidad de sintetizar diamantes CVD de grosor mayor a 2 mm37";

"La forma de realizar la normalización difiere de unos autores a otros. Mientras que Kiselev (1) prefiere representar las isotermas como cantidad adsorbida por unidad de superficie, Pierce (2a) o Sing (3) prefieren expresarlas en función del número de capas adsorbidas en el sólido".

5. Frequency of use, implying multiple applications. This feature of precedence is expressed by acronyms and abbreviations: "El entorno de computación científica del CIEMAT está constituido por unas plataformas de tecnología en permanente actualización y de grandes prestaciones que están además abiertas a entidades públicas nacionales académicas o de investigación y accesibles a través de Internet" (CIEMAT – Centro de Investigaciones Energéticas Medioambientales y Tecnológicas);

"Modelos aditivos generalizados y SIG para predecir la adecuación del habitat de rapaces forestales en el sur de España" (SIG – Sistema de Informacion Geografica).

Traditionally, at the beginning of a thesis work, a scientist defines the main terms of the thesis research and offers a list of the abbreviations used in the work: 1D - Unidimensional ; 2D - Bidimensional ; 3D Tridimensional ; CDE - Curvas de distribución de energía ; EF -Nivel

de Fermi, etc.

6. Other-culture precedent phenomena that have appeared as a consequence of modern globalization make up a significant part of the precedent phenomena in scientific Spanish discourse. Other-culture precedent phenomena form a universal cognitive space; these are international precedent phenomena that are woven into the linguistic fund of various linguistic-cultural communities in one way or another.

The appearance of Anglo-American precedent phenomena in Spanish scientific discourse shows the dominant influence of the English language in the international scientific community. In most cases, they are introduced into Spanish scientific discourse in parallel explication and translation into Spanish, since the representatives of the Spanish scientific community do not yet have nationally determined connotations and associations shaping the perception of these other-culture precedent phenomena:

"La espectroscopía de fotoemisión (PES, del inglés "Photoemission Spectroscopy"); la Espectroscopia de Fotoemisión Resuelta en Ángulo (ARPES del inglés "Angle Resolved Photoemission Spectroscopy", o también conocida como ARUPS del inglés "Angle Resolved Ultraviolet Photoemission Spectroscopy")".

7. Functioning of terms-eponyms: the formation of precedent knowledge associated with compression aimed at intertextual relations has led to the appearance of terms with a personal name of a researcher – eponyms (from Greek ἐπώνυμος), i.e. called by the name of someone or giving a name to someone. A proper name is part of the cognitive layer of the term (Popova, 2012). It is a share, a segment of the core of the concept and contributes to the generation of new meanings in the professional linguistic worldview. Precedent phenomena attributed to the names of scientists who made a discovery are the most common in the scientific text: belinograma [E. Belin], nobelio [A. Nobel], nahnio [O. Hahn].
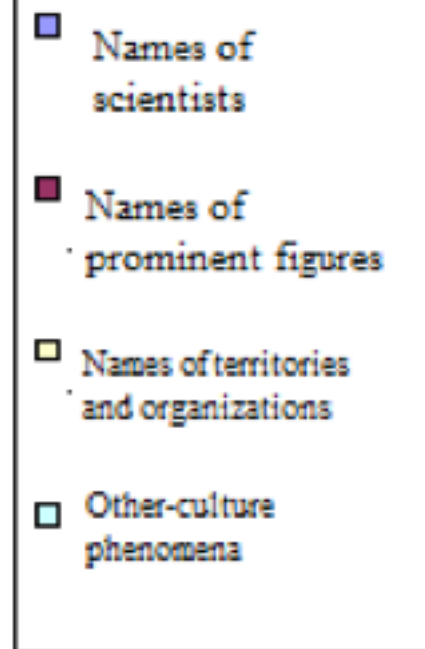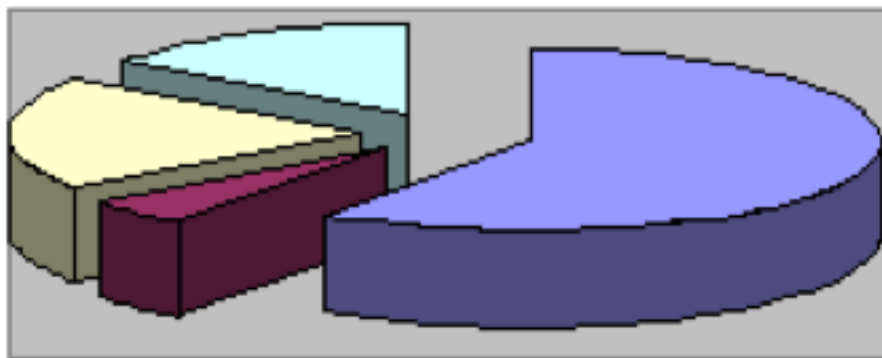
Mythological and literary characters, gods, names of territories, countries, etc., can also be used as precedent phenomena. Chemical elements: cerio (Ce) - named after Ceres, the goddess of fertility in Roman mythology; hélio (He) - named for the Greek Titan of the Sun, Helios, which means "the sun" or the mythological sun-god; torio (Th) - named after Thor, a god associated with thunder in Norse mythology; vanadio (V) - from Vanadís, one of the names of the Vanr goddess Freyja in Norse mythology, etc.

"Complejo de Casandra"- The Cassandra complex is a psychological phenomenon in which an individual's accurate prediction of a crisis is ignored or dismissed. The term comes from Greek mythology, where Cassandra was a daughter of the King of Troy. She was appointed by Apollo with an inability to lie and the gift of prophecy, but when Cassandra refused Apollo's attentions, he placed a curse ensuring that nobody would believe her warnings. Cassandra was left with the knowledge of future events, but could not convince others of her predictions. The name of a method:

"Para estudiar el efecto del material sobre el resultado se han realizado una serie de simulaciones de Monte Carlo modificando la composición de los materiales del maniquí tomográfico".

The Monte Carlo method is a general name for a group of numerical methods based on obtaining a great number of realizations of the stochastic (random) process. The name of the method comes from the name of the commune in the Principality of Monaco, which is widely known for its numerous casinos, since roulette is one of the most widely known random number generators.

The share distribution of the studied verbal precedent phenomena in Spanish scientific discourse can be represented as follows (Diagram 1):

4. Conclusions

Thus, scientific texts function in the text space are in constant interaction. At a certain stage of their existence, some texts acquire suprapersonal significance, become relevant to the scientific community, are constantly renewed in the discourse of members of this community and reinterpreted in various semiotic systems. Such texts acquire the status of precedent ones and, having become reference for this society, set an algorithm for the perception of other texts. Precedents have high semantic volume and minimal formal capacity, since they are the result of compression of the content of source texts and a form of their metonymic replacement. Precedence is one of the ways of storage and transfer of knowledge in Spanish scientific-technical texts. The core of precedent phenomena representing scientific knowledge in Spanish scientific thesis works includes precedent names that make up the term. The precedent texts in Spanish scientific discourse are as follows: 1) texts significant for a researcher in the cognitive sense; 2) texts of suprapersonal nature, i.e. well known to the scientific community; 3) texts, the appeal to which is renewed repeatedly in scientific discourse. Knowledge of such texts shows a person's belonging to the scientific community.

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