A COGNITIVE-PRAGMATIC APPROACH TO THE STUDY OF COUNTERARGUMENT IN SCIENTIFIC COMMUNICATION

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Abstract: The article is devoted to a comprehensive pragmatic-cognitive approach to the study of counterargument. The article analyzes the existing approaches to the study of counterargument in scientific communication: logical, pragmatic-dialectical, rhetorical, interpersonal and cognitive approaches. Their heuristic possibilities and boundaries are revealed. The thesis is substantiated that the most adequate methodological strategy is the synthesis of cognitive and pragmatic approaches, which makes it possible to model counterargument as a dynamic process in which mental operations and communicative actions are mutually dependent on each other. The novelty of the research lies in the transition from the description of discursive practices to the reconstruction of cognitive mechanisms that ensure the effectiveness of counterargument in scientific dialogue.

The proposed three-level model (cognitive structures → pragmatic implementation → feedback) can serve as a methodological guideline for empirical research on counterargument in scientific communication, including analysis of specific genres (scientific article, review, oral discussion, electronic polemic).

Key words: counterargument, scientific communication, cognitive mechanisms, pragmatics, synthesis of approaches, frame, conceptual integration.

1. Introduction

The high intensity and polemic of modern scientific communication actualize the problem of not just the translation of knowledge, but its critical verification. As Chinese

researcher Wang Zhuo rightly points out, there is a large number of opinions in society in the absence of truth [1], and it is in the scientific community that counterargument becomes the main tool for filtering justified statements from unfounded ones. However, despite the obvious significance of this phenomenon, its status in the theory of speech interaction remains controversial: there is still no universal definition of counterargument, the relationship between the formal structure of the objection and deep cognitive processes has not been identified, and the mechanisms ensuring the transition from recognition of intellectual contradiction to its pragmatic formulation have not been explicated.

The novelty of this work lies in the fact that it goes beyond the traditional opposition of logical, rhetorical and pragmatic-dialectical views on counterargument. Instead of an isolated analysis of speech intentions or discursive strategies, it is proposed to consider counterargument in scientific communication as a cognitive-pragmatic process in which deep mental structures (frames, mental spaces, conceptual metaphors) mediate the choice and success of specific communicative actions.

The scientific significance of the study is determined by the need to create an integrative model explaining why some counterarguments are effective and others are not, regardless of formal correctness. Such

a model is important not only for linguistics and argumentation theory, but also for such applied fields as the analysis of scientific discourse, expert assessment, as well as for the development of artificial intelligence systems modeling rational polemics (see works [2], [3]).

The article *aims* at a critical analysis of the main approaches to the study of counterargument (logical, pragmatic-dialectical, rhetorical, interpersonal, cognitive) and substantiation of the need for their synthesis with the priority of the cognitive-pragmatic paradigm as the most relevant for the study of scientific communication.

2. Basic approaches to the study of counterargument: heuristic potential and limits of applicability

Modern argumentation theory has accumulated a significant amount of knowledge about counterargumentation, but this knowledge is rather fragmentary and belongs to different scientific traditions.

The logical approach considers counterargument as a mental and linguistic structure that provides justification for the falsity of the opponent's position [4]. Within the framework of this direction, presented in the classical works of Yu.V. Ivlev [5] and V.I. Kirillov, Starchenko A.A. [6], counterargumentation is reduced to the operation of refutation: criticism of the thesis, arguments or demonstration. The heuristic potential of this approach lies in a clear formulation of criteria: a counterargument is considered successful if it reveals a logical error, contradiction, or inconsistency of the premises.

The insufficiency of the logical approach, however, is revealed during the transition to real scientific communication. First, it does not take into account the role of the audience and context: an argument that is logically sound may be pragmatically ineffective if it is not adapted to the epistemic preferences and rules of a certain scientific community.

Secondly, as N.S. Barebina emphasizes, "the effective part of the argumentative process is concentrated not only in logos, but also in ethos" [7]. Logic does not explain why scientists often accept lax but intuitively convincing counterarguments and reject formally correct but rhetorically weak ones.

The pragmatic dialectical approach of F.H. van Eemeren and R. Grootendorst overcomes the narrowness of a purely logical view, considering argumentation as a purposeful verbal, social and reasonable activity embedded in the procedure of critical discussion [8], [9]. Counterargument here appears as an illocutionary act subject to the ten rules of critical discussion (rules of freedom, burden of proof, thesis, relevance, etc.). The introduction of the concept of strategic maneuvering (F.H. van Eemeren, P. Hautlosser) allows us to explain how the participants in the dispute balance between the effectiveness of the argument and dialectical validity.

The limitations of pragma-dialectics are revealed when trying to analyze the cognitive side of counterargument. The rules of discussion describe the normative environment, but do not answer the question of how exactly the opponent recognizes a vulnerable spot in the proponent's thesis, how relevant counterexamples are activated in memory, and how the mental representation of an alternative conclusion occurs. The pragma-dialectic captures the external, interpersonal aspect, leaving the "black box" of intrapersonal cognitive operations.

The rhetorical approach and non-rhetoric (X. Perelman, L. Olbrecht-Tyteka) shift the focus from formal correctness to interaction with the audience. The key to this analysis is the concept of a universal and private audience. In scientific communication, counterarguments are simultaneously addressed to the community of scientists (a universal

audience) and to specific reviewers or representatives of a scientific school with their epistemic preferences (a private audience). As noted by H. According to Perelman, argumentation is fundamentally different from formal logical proof, since its ultimate goal is not to search for abstract truth, but to convince the audience [10], [11]. A.A. Ivin, developing this tradition in Russian science, distinguished empirical, theoretical and contextual argumentation, showing that the same argument It can be effective in one audience and completely useless in another [12].

However, the rhetorical approach, for all its sensitivity to context, tends to be descriptive. He explains well which strategies are used, but does not penetrate into the cognitive mechanisms behind the choice of these strategies. The question remains: how exactly does this "adaptation to the audience" take place at the level of the mental representations of the participants in the discussion?

M.A. Gilbert's *interpersonal (cooperative) approach* offers a radically different view: the purpose of argumentation is not to defeat an opponent, but to find solutions together, where the emotional and intuitive modes of argumentation are as important as the logical ones [13], [14]. Although this approach is valuable for analyzing collaborative forms of scientific work, it is less applicable to situations of explicit controversy (for example, opposing a thesis defense or a discussion in a peer-reviewed journal), where a conflict of opinion is the essence of communication.

The cognitive approach shifts the focus to the mental structures underlying the generation and understanding of counterarguments. According to this approach, counterargument is not just a speech act, but a complex process involving the activation of frames, the

construction of mental spaces [15], conceptual integration (blending) [16] and the work of conceptual metaphors [17].

The strength of the cognitive approach is its explanatory potential: it allows us to reconstruct how an opponent identifies a "discrepancy" in a thesis through a mismatch of frames, how new knowledge is born through the mechanism of conceptual integration, which was not in the original premises. However, the cognitive approach has its own "Achilles heel": the impossibility of direct observation of mental processes. Any reconstruction remains an operational hypothesis. In addition, the gap between linguistic means (particles, conjunctions, word order) and the intended cognitive operation is often difficult to verify.

2.1. Key limitations of monoapproachs and the need for synthesis

The analysis shows that each of the considered approaches captures an important, but only one aspect of the counterargument. The logical approach is strong in formal normative studies, but ignores the audience. Pragma-dialectics takes into account the dialogical nature, but does not penetrate into mental processes. Rhetoric is sensitive to context, but tends to be descriptive. The cognitive approach explains the underlying mechanisms, but suffers from the problem of verification.

The most vulnerable point of an isolated pragmatic analysis focused on speech intentions is that it cannot explain why in complex discursive practices such as scientific counterargument, the success of communication depends not only on accurate recognition of intent, but rather on the "inclusion" of deep cognitive mechanisms in the audience — heuristics, frames, attention. How rightly does I.

Kechkesh, any pragmatic theory should be both cooperative and egocentric: participants in communication inevitably rely on information extracted from their own cognitive experience [18], [19].

The cognitive approach, on the other hand, provides tools for analyzing mental representations (the theory of frames by Ch. J. Fillmore, theory of mental spaces. Fauconnier), but without a pragmatic "binding" to real speech interaction, it risks remaining speculative. This leads to the key thesis of this article: the synthesis of cognitive and pragmatic approaches is the most optimal methodological strategy for studying counterargument in scientific communication. Such a synthesis is not a mechanical addition, but an inter-enrichment: cognitive mechanisms explain the underlying causes of choosing a particular strategy, and a pragmatic analysis shows exactly how these mechanisms are implemented in specific speech acts, genres, and institutional contexts

2.2. Cognitive-pragmatic synthesis: foundations, model and analytical advantages

The synthesis of cognitive and pragmatic approaches has both theoretical and empirical foundations. Theoretically, it is based on the idea that linguistic means serve as a kind of window on the world in the human mind. In other words, any counterargumentative statement is both a product of cognitive processing (activation of frames, construction of mental spaces) and a pragmatic action (an illocutionary act with a specific purpose). Cognitive structures of knowledge representation are text-forming within the framework of the organization of argumentation discourse, while mental structures and structures of language actively interact in the processes of text

construction and text perception, and structures of meaning are structures of knowledge representation.

Empirically, the synthesis allows us to answer two interrelated questions that cannot be solved separately.

1. Cognitive question: what mental operations (recognition of contradiction, search for counterexample, reframing) are triggered in the opponent's mind?

2. Pragmatic question: what language tools and speech tactics are used to formalize these operations in a real scientific discussion?

We propose a model of cognitive-pragmatic analysis of counterargument, which includes three levels.

The first level is cognitive structures (frames, mental spaces). Participants in the scientific dialogue have background knowledge organized into frames. The counterargument begins from the moment when the opponent's thesis does not "fit" into the activated frame or creates a conflict between two mental spaces (real and hypothetical, the opponent's space and his own). For example, if the proponent claims that "method X is universal," the opponent activates the "universality" frame, which includes the slots "applicability in all conditions" and "no exceptions." Then he constructs the mental space of a counterexample, where method X does not work, and generates a counterargument through blending (conceptual integration).

The second level is pragmatic implementation (speech acts, strategies, discursive formulas). The revealed cognitive contradiction should be formulated into a speech action acceptable for scientific communication. Genre restrictions (article, review, oral discussion), institutional norms, and rules of critical discussion come into effect here. Typical pragmatic implementations are: an illocutionary act of refutation ("It's not true because..."), an act of criticism ("This

conclusion does not take into account..."), an act of clarification ("What exactly does the author mean by the term X?") or a qualified statement ("Yes, but in the absence of ..."). discursive formulas of mitigation ("Allow me to disagree"), reinforcement ("This directly contradicts") and input of someone else's speech ("The author claims ... however...") play an important role.

The third level is the reverse effect of pragmatics on cognitive structures. A successful counterargument does not just express disagreement, but rebuilds the addressee's belief system. This happens through the mechanism of "cognitive adjustment": the opponent is forced to either modify his original frame or admit its inadequacy. Thus, counterargument acts as a mechanism of distributed cognition, where knowledge is not transmitted, but is jointly constructed in the process of dialogue.

Let's show the analytical advantages of this synthesis by analyzing one of the key cognitive mechanisms, conceptual integration (blending). According to J. According to Fauconnier and M. Turner, blending allows you to create new meanings that are not directly derived from the initial premises [16]. In scientific counterargument, this mechanism works as follows. The opponent takes the proponent's mental space (premise P, conclusion Q), his own space (facts F1, F2) and creates a mixed space in which the contradiction or absurdity of the conclusion is revealed. At the same time, new knowledge (counterargument) it is not contained in the source spaces individually. Without a pragmatic measurement, we would not be able to answer the question of which language markers signal the start of blending. An analysis of real scientific texts shows that such markers are often: conjunctions "however", "but", introductory constructions "on the

contrary", "therefore", as well as conditional and contrastive constructions.

3. Results and conclusions

The analysis of existing approaches to the study of counterargument allows us to formulate the following conclusions.

Logical, pragmatic-dialectical, rhetorical, and interpersonal approaches have undeniable heuristic value, but each of them has internal boundaries: the first ignores the audience and context, the second does not penetrate into mental processes, the third is prone to descriptiveness, and the fourth is limited in its application to clearly polemical situations.

The cognitive approach, despite the problem of verification (the impossibility of direct access to mental processes), provides the necessary explanatory apparatus for reconstructing the deep mechanisms of counterargument — frames, mental spaces,

However, none of the monopods is able to independently explain how the transition from recognizing an intellectual contradiction to its verbal formulation and the reverse effect of the counterargument on the addressee's belief system occurs.

Cognitive-pragmatic synthesis is the most appropriate methodological strategy. It allows you to:

• explain why some counterarguments are effective and others are not (through an analysis of cognitive mechanisms);

• describe how these mechanisms are implemented in specific speech acts and discursive practices (through a pragmatic analysis);

• bridge the gap between internal (mental) and external (communicative) the parties to the counterargument;

• Ensure the operationalization of abstract cognitive concepts through their linguistic and discursive correlates.

The proposed three-level model (cognitive structures → pragmatic implementation → feedback) can serve as a methodological guideline for empirical research on counterargument in scientific communication, including analysis of specific genres (scientific article, review, oral discussion, electronic polemic).

Conclusion

Counterargument in scientific communication is neither a purely logical operation, nor an isolated speech act, nor only a rhetorical device. It is a complex cognitive-pragmatic process in which deep mental structures and their external communicative design are in relation to mutual determination. Only a synthetic approach combining the achievements of cognitive linguistics, pragmatics, and argumentation theory can provide an adequate explanation for this fundamental mechanism of scientific knowledge growth.

The prospects for further research are related, firstly, to the development of methods for empirical verification of cognitive-pragmatic hypotheses (for example, through the analysis of scientific text bodies with subsequent reconstruction of frames and mental spaces); secondly, to the comparative analysis of counterarguments in different types of scientific discourse (natural science vs. humanities); thirdly, using the developed approach to the analysis of conflict episodes in modern digital scientific communications (preprint platforms, comments in electronic journals).

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