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**ABSTRACT**

of the dissertation for the degree of Doctor of Philosophy

**THE GRAMMARS OF PANINI, PORT-ROYAL,  
AND NOAM CHOMSKY IN THE CONTEXT  
OF A DEDUCTIVE APPROACH**

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## INTRODUCTION

**The relevance of the topic and degree of prior research.** The evolution of linguistic science, with its three major paradigmatic phases: a) comparative, b) system-structural, and c) anthropocentric has consistently attracted interest not only due to the assertive articulation of each new paradigm along with all its controversial aspects, but also because of the attempts to historically substantiate these paradigms, or more precisely, to uncover their “pre-historical” foundations. F. de Saussure, who regarded comparative linguistics as a step forward in the history of linguistics following grammar and philology, also remarked that “*this school, in any case, failed to establish a truly scientific linguistics. Nor did it attempt to determine the nature of the subject it studied*”<sup>1</sup>. Shortly after the publication of “Course in General Linguistics” (1916), structuralist linguistic schools in both Europe and America developed along various lines (e.g., descriptivism, glossematics, functionalism, etc.), ultimately limiting the influence of comparative-historical and comparative-typological approaches. The rise of anthropocentrism in science during the mid of XX century, including in linguistics, dealt a significant blow to the dominant position of system-structural analysis. It must be acknowledged that although all three paradigms still play a role: each to a varying extent: in shaping the current state of linguistic science, N. Chomsky’s theory of linguistics is, in many respects, the most pertinent today. The relevance of our research is primarily determined by its focus on this topic.

The theory proposed by the eminent American linguist and thinker has generated significant interest, not only due to its content, methodological frameworks, and potential interdisciplinary influence, but also because of its reflections on the “past”, “present”, and “future” of generative grammar (or linguistics more broadly). The second factor ensuring the relevance of the present dissertation is precisely its focus on the theoretical “past” of this paradigm, particularly the historical essence of universal and rational (logical)

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<sup>1</sup> Sössür, F. Ümumi dilçilik kursu / tərc.ed. N.Cəfərov, İ.Temiroğlu. – Bakı: Azərbaycan Tərcümə Mərkəzi, – 2018. – s.13.

approaches to language(s). Examining the trajectory from ancient Indian (Panini's) grammar to Port-Royal (Cartesian) grammar, and from there to the transformational (and generative) grammar of the 20th century – within the context of a deductive approach – serves two critical purposes: first, to gain a clearer understanding of the often-debated foundations of Chomsky's theory, and second, to appreciate the intellectual and linguistic traditions of the 17<sup>th</sup> – 18<sup>th</sup> centuries. This is particularly important because the emergence of a “new theory of linguistics”, when situated within its historical roots and polemical contexts, demands a re-examination of the entire history of linguistics in terms of the evolution of ideas, methods, and approaches. Moreover, this is not merely about interpreting Chomsky's position, but about constructing the historical trajectory of the deductive approach to language – where the primary reference point, in all cases, is the methodological principles upheld by the new theory.

Another factor contributing to the relevance of the dissertation is its potential contribution to the analytical (and universal) historiography of linguistics, particularly within the framework of linguistic research developed along the trajectory of Ancient Indian grammar → Port-Royal grammar → V.von Humboldt → F.de Saussure → N.Chomsky.

Although *General and Rational Grammar* has been studied from various ideological and methodological perspectives, it has not yet been fully recognized for its deserved significance in the field of linguistics.

Regarding Panini's grammar, as covered in this study, the aim is to attempt a kind of “reconstruction” of the pre-history of the Port-Royal “school”, a subject that has also been explored in depth.

In global linguistics, scholars like F.Max Müller, M.A.Shripad K.Belvalkar, A.Mishra, C.Cardona, B.Faddegon, B.Shefts, Y.S.Stepanov, J.Lyons and others have conducted research from different perspectives. But in Azerbaijan, the topic has been addressed – directly or indirectly – in the works of A.Gurbanov, A.Akhundov, M.Adilov, A.Rajabli, F.Veysalli, N.Jafarov, A.Mammadov, I.Abbasov, and others. However, it must be

regrettably acknowledged that, although the theory in question has gained immense popularity worldwide, it has only recently begun to attract attention within Azerbaijani linguistics and has yet to achieve significant success in this context.

**Object and subject of the research.** The object of the research is the historical development of linguistic science, while its subject is the evolution of the theory of general and rational grammar (and, by extension, linguistics) along the Panini – Port-Royal – N.Chomsky trajectory.

**The aim and tasks of the research.** The aim of the research is to present a chronology of linguistic thought formed in the context of a deductive approach to language, starting from ancient Indian grammar and leading up to Chomsky's grammar. In this regard, the study sets out to address the following objectives:

- to determine the metaphysical continuity among the grammars of Panini, Port-Royal, and N.Chomsky;
- to provide an analytical overview of the historical roots of the deductive approach to language, particularly the intellectual path from Panini to Port-Royal;
- to examine Chomsky's grammar as a qualitatively new stage in the deductive approach to language, highlighting key issues and reflections;
- to explore the relationship between content and form in the context of a deductive approach to language, with reference to Port-Royal grammar, Syntactic Structures, Aspects of the Theory of Syntax, Cartesian Linguistics, and Language and Mind.

**The research methods.** The study employs descriptive and historical-comparative methods, and it draws upon general philosophical and methodological frameworks (including the theory of paradigms) that are commonly used to objectively examine the history of linguistic science.

**The main provisions of the defense:**

- The ancient Indian (Paninian) grammar, as well as subsequent Greek, Arabic-Islamic, and other grammatical traditions, served as a historical foundation for the emergence of Port-Royal grammar.

– Port-Royal grammar reflects a comprehensive system of general (universal) and logical (rational) views on language from the XVII century, primarily attributed to René Descartes, which continued to evolve until the first half of the XIX century with Wilhelm von Humboldt, the founder of general linguistics.

– Noam Chomsky’s particular attention to Port-Royal grammar in the mid of XX century defines the historical foundations of his new linguistic theory.

– Chomsky’s research into general (and generative) grammar has opened a wide methodological domain encompassing the “past”, “present,” and “future” of linguistic theory, necessitating a reevaluation of linguistic history, including comparative-historical and system-structural approaches.

– The theory of grammar (linguistics) developed along the Panini – Port-Royal – Chomsky line offers new horizons in understanding the relationship between language and thought, particularly regarding the interplay between content and form.

**The scientific novelty of the research.** For the first time, this study systematically explores the scientific and methodological roots of N.Chomsky’s new linguistic theory, tracing its origins from ancient Indian linguistics (Panini), through Cartesian linguistics (Port-Royal), to V. von Humboldt. Although Chomsky himself has demonstrated the significance of these roots – especially those of Cartesian linguistics – for his theory of generative grammar, the subject remains a matter of scholarly debate. This dissertation attempts to clarify these debates and argues that Chomsky’s position is both valid and forward-looking.

It is well known that Chomsky did not introduce his new ideas into the academic field all at once but rather through a gradual process – an evolutionary development, so to speak. This raises interest in reconstructing the "chronology" of that development. To the best of the author's knowledge, this study is the first to extensively analyze the stages of that evolution and to justify the underlying reasons for each shift.

Another novelty of the work lies in its expansion of the traditional Panini – Port-Royal (Indian - European) framework of

deductive linguistic inquiry by including the methodological achievements of medieval Arabic-Islamic linguistics.

**The theoretical and practical significance of the research.**

The theoretical significance of the research lies in its contribution to contemporary Chomsky's studies, particularly in relation to his new "theory of linguistics", including considerations of a) its origins, b) its current capabilities, and c) its future potential.

As for its practical significance, the research may serve as a resource in the development of new specialized linguistic courses, as well as in the preparation of relevant curricula and textbooks.

**Approbation and application.** The core arguments of the dissertation have been reflected in the author's published articles, conference presentations, lectures delivered at the Faculty of Philology of Baku State University, and in various teaching materials.

**Name of the organization where the dissertation work is carried.** The dissertation was conducted at the Department of General Linguistics of Baku State University.

**The volume of the structural units of the dissertation separately and the total volume with a sign.** The dissertation consists of an introduction, three chapters, a conclusion, and a list of references. The introduction is 6 pages (10 069 signs), I Chapter is 39 pages (75 772 signs), II Chapter is 42 pages (78 634 signs), III Chapter is 37 pages (71 012 signs), the conclusion is 3 pages (4 942 signs). The total volume of the dissertation is 240 429 signs, excluding the list of references.

## MAIN CONTENT OF RESEARCH

The *Introduction* of the dissertation substantiates the relevance and degree of exploration of the topic, defines the object and subject of the research, outlines the research methods and the main theses to be defended, and presents the scientific novelty, theoretical and practical significance, approbation and application of the research. It also provides information about the institution where the dissertation was carried out and details the structure of the dissertation, including the length of each section and the total character count.

I Chapter of the dissertation is entitled “**The grammars of Panini, Port-Royal, and Noam Chomsky: The metaphysics of continuity**” and is divided into three paragraphs. The first paragraph, titled “*Panini’s Grammar*”, argues that although the grammars of Panini (IV century BCE), Port-Royal (1660), and N.Chomsky (second half of the 20th century) emerged in vastly different periods of linguistic history, they nonetheless share a form of continuity that is best described in metaphysical rather than purely dialectical terms. Despite their temporal and cultural distances, all three grammatical traditions display underlying methodological affinities that suggest a deeper philosophical lineage. Notably, N.Chomsky’s theoretical perspective has played a decisive role in shaping this modern view, significantly increasing scholarly interest in both Panini and the Port-Royal grammar.

Historical linguistic research suggests that the emergence of grammatical science in both ancient India and Greece (and later in its colony, Egypt) served the expressive and ritual authority of classical languages such as Sanskrit and Ancient Greek. Naturally, this function of early grammar contributed to its preservation and reverence over the centuries. Furthermore, this grammatical tradition extended to the grammars of other classical languages that rose to prominence later, such as Arabic and Latin. However, unlike the Indians, the Greeks approached the issue of language (or more precisely, literary speech) with broader scope. The main reason for this difference lies in the textual resources available to each culture: Indian scholarship was predominantly based on sacred texts, while Greek scholars had a richer repertoire of literary works. For this reason, Aristotle, in his *Poetics*, extends beyond the boundaries of grammar and explores the speech practices of Homer, Aeschylus, and Euripides – drawing conclusions so profound that they can be seen as the foundational insights of modern speech act theory (pragmatics). Yet, such “breadth of vision” is no longer evident in later Greek (Alexandrian) grammatical traditions.

Panini’s grammar is notable for a) providing a remarkably comprehensive description of the ancient Indian (Sanskrit) language and b) representing not only the linguistic tradition of antiquity but

also serving as a foundational model throughout the medieval period. It is important to recognize its international influence, particularly in the context of Arabic-Islamic linguistics. This is largely because of the fact that although Islamic culture primarily engaged with sources in Arabic, Persian, and Turkic, it also showed sensitivity to Indian-language monuments. Alongside Indian language and culture more broadly, Indian linguistic thought did not fall outside the scope of Muslim intellectual interest. The grammatical teachings of the so-called “Indian sages”, who enjoyed significant renown in the Arab-Islamic world, were often more aligned with the linguistic intuitions of Muslims than the traditions of Greek grammar. This affinity stemmed from the shared linguistic practice among both Indian and Arab-Muslim scholars: the sacred duty of preserving the literary language of canonical religious texts (scriptures) from the perceived “corrupting” effects of colloquial speech. At first glance, it might appear that this concern was limited to matters of pronunciation (phonetics) or word choice (lexicon), and that grammar, especially syntax, as a functional “periphery” of grammar was less emphasized. However, in Eastern linguistic traditions, the very concepts of “sound” and “word” were in fact imbued with the deeper essence of “language” itself. This is particularly evident in the Arabic term *lughah*, which, although it later came to mean “word” or “vocabulary”, originally denoted “language” in a broader sense.

In both Panini’s grammar and the Arabic-Islamic grammatical tradition influenced by it, the norms of literary pronunciation (orthoepy) were directly linked to norms of writing (orthography). Ancient grammarians often referred to spoken sounds as “letters”, illustrating this connection. This relationship belongs to the realm of speech practice. Another critical aspect is that phonetics encompasses not only morphemes but also syntactic units. In this context, the act of pronunciation – of uttering a phrase – essentially conveys meaning; the articulation of individual sounds (letters) holds importance only in the earliest stages of classical instruction.

Panini’s grammar, which offers a detailed and systematic description of Sanskrit, has been thoroughly analyzed by both Indian

and European scholars. These studies have yielded substantial insights into the structure, methodology, and modeling of grammar.

Based on the relevant literature in Panini's studies and aligned with the specific focus of our research, we can draw the following principal conclusions:

a) Although Panini's grammar and ancient Indian linguistics more broadly possesses distinctive terminology, methodology, and linguistic material, it is not an isolated or wholly sui generis phenomenon;

b) The grammatical rules codified for Sanskrit, a prototypical representative of the Indo-European language typology and a highly developed linguistic system, may be retrospectively viewed as a canonical framework for the entire Indo-European language family;

c) The grammar of Sanskrit, as codified by Panini, represents a paradigmatic instance of human language grammar and approximates the model of a universal and rational grammar.

In the second paragraph of I Chapter, titled "*The Port-Royal Grammar*", it is demonstrated that beginning in the XIII – XIV centuries Latin, despite its transition into a "dead language" began to be presented in Europe as an exemplary linguistic phenomenon. Paradoxically, this development may be interpreted as a continuation of the Hindu and Arabic-Islamic grammatical traditions: like the sacred texts of Hindu and Muslim culture (e.g., the *Qur'an*), Latin texts emerged in history as exemplars of elevated literary language. While it is true that the normative nature of Latin grammars sometimes impeded the evolution of linguistic theory, they also preserved and further developed ancient conceptions of linguistic rationality and universality.

Despite the numerous differences that emerge when comparing Panini's grammar with the Port-Royal Grammar, the metaphysical continuity between them should not be underestimated. This continuity may be sought in the following dimensions:

a) the genetic relationship among ancient languages such as Sanskrit, Hebrew, Greek, Latin, and the modern Indo-European languages;

b) the grammatical models constructed basing on the genotypology of these languages;

c) the retrospective and prospective perspectives of rational grammar, which gained prominence beginning in the early modern period.

It is natural that the philosophical and methodological stance of the Port-Royal grammar stood in contrast to the “neutrality” of Panini’s grammar. This opposition reflected the fact that the modern era, including in the realm of the “art of speech,” diverged significantly from the “mystical neutrality” characteristic of both antiquity and the Middle Ages. Another important issue was the comparison between the canonical subject or “individual distinctiveness” attributed to prestigious languages formed throughout the medieval period, and the concept of “human language” that emerged from the early modern period, indeed, from the Renaissance itself. This comparison and its reception in the progressive public consciousness of the time had significant intellectual repercussions.

In the scientific milieu of Port-Royal, the “*General and Rational Grammar*” was accompanied by the preparation of “*Logic, or the Art of Thinking*”, the latter being published two years after the “*Grammar*”, in 1662. In his preface to the Russian translation of the “*Grammar*”, titled *Port-Royal in European Culture*, Y.S.Stepanov emphasizes that *Port-Royal Grammar* and *Port-Royal Logic* constitute two parts of a unified logical-linguistic framework<sup>2</sup>. According to Stepanov, this is by no means coincidental. He argues that the Port-Royal conception belongs to the broader rationalist movement of the XVII century, of which Cartesian rationalism was an essential foundation.

The Port-Royal scholars, in examining the nature of grammar, logic, and the relationship between the two, had to take into account both religious doctrines and the principles of rationalism. The complexity of the matter lay in the fact that these relationships were

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<sup>2</sup> Арно, А. Грамматика общая и рациональная Пор-Рояля / А.Арно, Кл.Лансло. Перевод с франц. Н.Ю.Бокадорова. Вступительная статья Ю.С.Степанова – Москва: Прогресс, – 1990. – с.12.

subject to frequent change, in response to the intellectual demands of the modern era. The transformation of rationalism from theory into method was a defining feature of the period's intellectual current, a process realized through the genius of Descartes<sup>3</sup>. It becomes clear that the creators of Port-Royal logic and grammar approached their work primarily as scholars rather than theologians. Consequently, the achievements in both fields were grounded in Cartesian philosophy and largely aligned with its scientific program. Philosophical debates of the time led specialists to conclude that Descartes' influence on the Port-Royal scholars was not entirely unequivocal. Antoine Arnauld, for instance, found it necessary to challenge the philosopher on several points, and did not refrain from adopting a critical stance toward some of Descartes' assertions<sup>4</sup>.

It is well known that the history of linguistics in the modern era is characterized not only by the transition of theoretical thought from religion to philosophy, but also by the collection and analysis of data from a diverse range of languages. During this period, ancient languages such as Latin, Greek, and Hebrew, as well as modern languages like Italian, Icelandic, Dutch, German, Flemish, and English, were widely studied in Europe. It is worth noting that Claude Lancelot, in addition to his *Universal Grammar*, also authored several "particular" grammars, including those of Latin, Ancient Greek, and Spanish<sup>5</sup>.

Thus, on the one hand, the deductive-philosophical (universal-logical) approach to language, and on the other hand, the integration of various languages into this analytical framework, thereby gaining empirical reference points through inductive reasoning enabled the Port-Royal scholars to maintain a high degree of consistency in their grammatical and logical reflections. This transition from theory to method was significant in that it demonstrated the interplay between thought and language (or speech activity), particularly through the

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<sup>3</sup> Арно, А. Грамматика общая и рациональная Пор-Рояля / А.Арно, Кл.Лансло. Перевод с франц. Н.Ю.Бокадорова. Вступительная статья Ю.С.Степанова – Москва: Прогресс, – 1990. – p.15.

<sup>4</sup> Ibid. – p.19-21.

<sup>5</sup> Ibid. – p.26-27.

comparison of different languages, exemplifying the mutual relationship between cognition and speech.

In the third paragraph, titled “*Noam Chomsky’s Grammar*”, is demonstrated that linguistic science began to exhibit tendencies toward anthropocentrism, particularly within American descriptivism, even before it had fully moved beyond the system-structural paradigm of structural linguistics. These emerging trends were primarily concerned with the investigation of human cognitive capabilities, focusing on the relationship between language and thought. Since ancient times, the central issue of interest in the "philosophy of language" has been the relationship between the grammar of thought (logic) and the grammar of language (linguistics). When this question resurfaced in the mid-20th century, it seemed natural for the science of cognition to take precedence over the science of language.

This was primarily due to the fact that, although both Panini and the Port-Royal grammar sought to explain thought through language, their approaches remained overly schematic. While the Port-Royal grammarians attempted to reconcile language and thought within the framework of grammar, these efforts were merely the earliest serious attempts to intervene from "language" into "thought". Soon after, comparative-historical linguistics and then system-structural linguistic paradigms almost entirely separated language from thought – thus effectively rendering the human subject “without language” and “without thought”. Nevertheless, it must be acknowledged that without this temporary conceptual distancing of language and thought during the periods of comparative-historical and structural investigations, a clearer understanding of language, cognition, or the nature of the human being would have been impossible. This is because every logical integration must be preceded by an equally logical (and natural) differentiation.

Although descriptive linguistics reached its highest level in generative grammar, passing through several phases such as immediate constituent analysis and transformational grammar, Chomsky's numerous attempts suggest that the issues he set out to resolve were not fully addressed, and the influence of classical

grammar could not be entirely marginalized. However, the clear advantage of generative grammar lies in its focus on the study of speech activity or the speech act itself, thereby placing anthropocentric (individual-centered) analysis of linguistic creativity at the forefront. The analytical technique typically involves dividing an utterance (P) into noun and verb phrases (NP-VP), aligning with the internal demands of the speech process. In generative grammar, an utterance is segmented into parts of speech and analyzed through sequences of the smallest meaningful elements.

Chomsky's theory of generative grammar emphasizes the creative nature of language and views syntactic structures as acts of individual cognitive creation, considering them as derivational properties of grammar. This approach is closely linked to the Cartesian perspective of the 17th century, which regarded language as a creative tool. It reflects the idea that humans possess the capacity to generate new sentences at any moment, thereby expressing individual creativity.

Drawing on the Port-Royal grammar, Chomsky argued that a scientific understanding of human language requires the investigation of syntactic structures, as these structures reflect the human capacity for creativity based on innate linguistic schemas. This viewpoint is rooted in the rationalist philosophy of the 17<sup>th</sup> century, particularly in its assertions about the creative nature of human thought. As a result of Chomsky's interest in syntactic research, linguistic theory (internal linguistics) concedes some ground to speech linguistics (external linguistics), which aligns with the growing influence of the anthropocentric (pragmatic) paradigm in modern science, including linguistics.

Thus, unlike his predecessors, Chomsky applies mathematical, logical, and natural science methods to the study of speech, aiming to clarify the "mathematics of the mind." As a prominent language engineer, his investigations advance from speech → language → thought, presenting language as an interdisciplinary expression of realistic cognitive processes. As John Lyons notes in "Noam Chomsky", "...today, there is a significant convergence of interests among linguists, psychologists, and philosophers. However, this

*convergence has occurred as a result of the development of 'autonomous' linguistics, and it is precisely linguistics, particularly Chomsky's work, that has inspired this alliance of the three sciences*"<sup>6</sup>.

One of N.Chomsky's significant contributions is the introduction of the concept of meaning into grammar (specifically syntax), along with all its associated controversies. A second major contribution is his emphasis on the distinction between "deep" and "surface" structures. According to this perspective, every utterance may manifest in various forms, depending on the individual's linguistic creativity, until it acquires its final sentence structure, that is, until it transitions from thought into language.

II Chapter of the dissertation is titled **“Aspects and methods of the deductive approach in the grammars of Panini, Port-Royal, and Noam Chomsky”** and consists of three paragraphs.

The first paragraph of II Chapter is titled **“*On the deductive approach to language*”**. In the history of linguistic science, the emergence of particular paradigms or periods is generally characterized by changes in methodological approaches. However, it must be acknowledged that while such shifts are sometimes explicitly manifest, in many cases they remain contentious for extended periods or provoke debate regarding their actual significance in the development of the field.

The deductive approach to the grammars of Panini, Port-Royal, and N.Chomsky stems from the inherent nature of these grammatical traditions. Panini's grammar treats Sanskrit – the object of his analysis – as an exemplary manifestation of human language, viewing it as the linguistic archetype endowed with divinely inspired principles, which he sought to identify through intellectual intuition. The authors of the Port-Royal grammar, as previously noted, based their approach on the philosophy of R.Descartes. This seminal thinker of the early modern period placed intuition above deduction, asserting that through intuition, the mind “directly perceives” truth, whereas deduction yields mediated knowledge derived from accepted

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<sup>6</sup> Lyons, J. Noam Chomsky/ J.Lyons. – New York, The Viking Press, – 1970. – p.13.

premises, and thus is limited to what is already implicit in those premises<sup>7</sup>. Indeed, some scholars have been skeptical of deduction as a reliable method of reasoning. For instance, Francis Bacon and subsequent English “inductivists” believed that only inductive reasoning could lead to genuine knowledge. Gottfried Wilhelm Leibniz proposed the idea that the logical laws underpinning deduction are “*true in all possible worlds*”<sup>8</sup>.

At least three directions can be distinguished within the study of language: as a discipline, it contains elements belonging to the humanities, technical sciences, and natural sciences. Accordingly, both inductive and deductive approaches are emphasized at different times. It is also a fact that the growing alignment of linguistics with the mathematical sciences, as exemplified by Chomsky’s work, significantly increased the importance of the deductive method.

Following the era of descriptive linguistics in mid of XX century American linguistics, a new wave of linguistic inquiry emerged that laid the foundations for generative grammar. It would be inaccurate to suggest that this intellectual movement developed along a single trajectory or without controversy, as it was marked by conflicting perspectives and competing ideas. However, one tendency was unmistakable: the prestige of the deductive method in linguistics grew to a degree that was incomparable to that of the inductive method. Moreover, research inspired by this approach extended beyond the borders of the United States and the English language, influencing linguistic thought globally. At the center of both the acclaim and criticism was N.Chomsky’s body of work.

In *Syntactic Structures*, Chomsky lays the foundation for the methodology underlying his newly formulated theory. He emphasizes that his investigation is concerned with syntax, syntactic structures, in both the broad sense (in contrast to semantics) and the narrow sense (in contrast to phonology and morphology). This work is part of a broader attempt to construct a formalized general theory of linguistic structure. While acknowledging that his theory does not

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<sup>7</sup> Azərbaycan Milli Ensiklopediyası / Red.hey.sədri İ.H.Əliyev. – Bakı: Azərbaycan Milli Ensiklopediyası Elmi Mərkəzi, – c.6: – 2015. – p.407.

<sup>8</sup> Ibid. – p.407.

aim merely to adhere to logical precision or to refine traditional methods of linguistic analysis, Chomsky writes: *“It seems to me that those linguists who question the value of precise and ‘technical’ development of linguistic theory may have failed to appreciate the potential of rigorous methods for yielding productive insights, particularly when those methods are applied to linguistic data without the distortions introduced by vague reformulations or ad hoc adjustments aimed at avoiding unwelcome conclusions”*<sup>9</sup>.

It was natural for Chomsky, at the initial stage of developing a new grammar, to take a firm stance against those who questioned his methodology. His effort to refine and “technologize” the research method was not a spontaneous development, but rather the result of a methodological evolution that had already undergone several stages in American linguistics, including the work of his predecessors and mentors.

Chomsky further explains: *“We are developing a third model of linguistic structure - the transformational model, which in certain essential respects is more powerful than the model of immediate constituents and explains these relationships more naturally”*<sup>10</sup>.

Despite the popularity of *Syntactic Structures* among scholars in linguistics, as well as in the technical and natural sciences, it also faced significant criticism. For example, philosopher Hilary Putnam, in his article *“Some Controversial Issues in Grammar Theory”*<sup>11</sup>, disputed Chomsky’s views on several fundamental issues: the recognition of ungrammatical utterances; 1) the boundary between grammar and semantics; 2) the independence of meaning; 3) the autonomy of grammar; 4) the descriptive limitations of transformational grammars.

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<sup>9</sup> Chomsky, N.A. *Syntactic structures*/ N.A.Chomsky, – Hague-Paris:Mouton, – 1957. – p.5.

<sup>10</sup> *Ibid.* – p.6.

<sup>11</sup> Putnam, H. Some issues in the Theory of Grammar. "Structure of Language and Its Mathematical Aspects"// *Proceedings of Symposia in Applied Mathematics*, vol. XIII, –California –1961. – p.25-42.

In the articles Chomsky published after *Syntactic Structures*, he both defended and further developed his theory<sup>12</sup>.

A major step forward in the deductive approach to language, grammar, and sentence structure was taken in *Aspects of the Theory of Syntax*. Naturally, this work begins with an extensive “Methodological Introduction”, in which the author notes: “*This work will address various issues concerning syntactic theory and English syntax... Linguistic theory primarily concerns the ideal speaker-listener in a completely homogeneous speech community, who knows their language perfectly and is unaffected by memory limitations, distractions, shifts of attention or interest, and errors (random or systematic) in applying their knowledge in actual performance*”<sup>13</sup>. Chomsky adds: “*It seems to me that this position, held by the founders of modern general linguistics has not been convincingly challenged*”<sup>14</sup>.

Compared to *Syntactic Structures*, *Aspects of the Theory of Syntax* is more explicitly inclined toward deductivism in its search for a methodological foundation. This is reflected in the author’s attempt to establish new theoretical sources for linguistics. The first step in this process appears to be a break from structuralism and from Ferdinand de Saussure’s theory, leading to a renewed interest in Wilhelm von Humboldt. The tendency to return to Port-Royal and Cartesian linguistics also becomes evident.

The author of *Aspects of the Theory of Syntax* defines the “diachronic” orientation of his theory as follows: “*The contrast I propose is connected to Saussure’s distinction between ‘langue’ and ‘parole’; however, I reject his notion of language as merely a systematic inventory of units and argue for a return to Humboldt’s*

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<sup>12</sup> Chomsky, N.A. On the Notion “Rule of Grammar”// Proceedings of the Twelfth Symposium on Applied Mathematics – Englewood Cliffs: Prentice-Hall, – 1964. – p.6-24; Chomsky, N.A. The Logical Basis of Linguistics Theory// Preprints of Papers for the Ninth International Congress of Linguistics – Cambridge, – 1962. – p.123-236.

<sup>13</sup> Chomsky, N.A. *Aspects of the theory of syntax* / N.A.Chomsky. – Cambridge: Massachusetts: The M.I.T. Press, – 1965. – p.3.

<sup>14</sup> *Ibid.* – p.3-4.

concept of hidden competence as a system of generative processes”<sup>15</sup>.

An important feature of syntactic theory is that it demonstrates, primarily on a theoretical level, the boundless generative capacity of language, particularly at the syntactic level.

The sequence of Chomsky’s works “*Syntactic Structures*” and “*Aspects of the Theory of Syntax*”, followed by *Language and Mind* and then *The Minimalist Program* illustrates the gradual expansion of the deductive method within his scholarship and worldview, both in scale and scope.

It is evident that the deductive approach to language has deep historical roots and, though often characterized as intuitive, contains the seeds of systematic inquiry. Chomsky’s return to these roots in the mid – 20<sup>th</sup> century signified an effort to extend deduction beyond the functional scope of language, directing it toward cognition and the broader understanding of human nature. In this endeavor, language itself was treated as the most authoritative source of data, and the various aspects and methods through which this perspective is expressed are clearly observable.

The second paragraph of II Chapter is entitled: “***The historical roots of the deductive approach to language: from Panini to Port-Royal***”. Every methodological perspective on language has its historical roots, and this is clearly evident in the deductive approach as well.

Panini's grammar is distinguished not only by its deductive-philosophical stance but more importantly, by its role as a foundational source upon which grammatical canons grounded in such a stance are based. In this respect, Panini's grammar represents an origin point, especially considering that from Panini to the Port-Royal Grammar, spanning approximately two millennia, the comparative study of language aimed at uncovering universal aspects, a goal closely tied to the philosophical-deductive nature of linguistic inquiry.

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<sup>15</sup> Chomsky, N.A. *Aspects of the theory of syntax* / N.A.Chomsky. – Cambridge: Massachusetts: The M.I.T. Press, – 1965. – p.4.

Panini's grammar, described by L. Bloomfield as “one of the greatest monuments of human intelligence”, was not fully appreciated in the West until N.Chomsky and others began discussing generative structures. Its rules, which exhibit characteristics akin to algebraic formulas, did not gain significant recognition until that time. As described in the book *On the Architecture of Panini's Grammar*, “he (Panini – G.C.) relies on no framework of 'universal grammar' apart from very general principles such as simplicity... Generative linguists, in turn, were particularly impressed by his ingenious technical tools and the complex system of conventions that regulated the application and interaction of his rules – features that extraordinarily prefigured modern linguistic theory (simply because many of these were originally derived from Panini)”<sup>16</sup>.

Chomsky himself acknowledged that Panini's grammar could be interpreted as a fragment of generative grammar. According to A. Mishra, “the idea of a formal grammar of language capable of generating an infinite number of expressions from a limited set of grammatical rules and finite terms finds a strong parallel in the *Ashtadhyayi*”<sup>17</sup>.

The *Port-Royal Grammar*, on the other hand, is recognized in the history of linguistics as a fundamental expression of a rational and universal approach. According to this approach, the formation of sentence structure is grounded in reason and is closely linked to thought. Moreover, thought is not mystical or indeterminate but rather is based on realistic and logical rules. The *Port-Royal Grammar*, by articulating this idea, advanced the concept of language as a rational and universal system, principles of rationality and universality that constitute its authors' most significant achievement.

R.H.Robins, in *A Short History of Linguistics*, referring to the *Port-Royal* grammarians (also called rational grammarians), writes that “they sought to reveal the unity underlying the grammars of

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<sup>16</sup> Kiparsky, P. *On the Architecture of Panini's Grammar* / P.Kiparsky. – Stanford: Stanford University Press, – 2002. – p.1.

<sup>17</sup> Mishra, A. *Modeling Paninian System of Sanskrit Grammar* / A.Mishra–Heidelberg: Heidelberg University Publishing, – 2019. – p.10.

*various languages and explored the function of grammar in conveying thought, which includes perception, judgment, and logic*"<sup>18</sup>.

Although the Port-Royal Grammar was later overshadowed by the rise of comparative-historical linguistics, its core ideas, that language is a rational and universal phenomenon have re-emerged in modern linguistic thought. There is every reason to assert that the Port-Royal Grammar represents both a crucial phase in the tradition of rational grammar and a significant source of inspiration for contemporary linguistic theories. Consequently, it may be concluded that Panini's and especially the Port-Royal grammars, each within the metaphysical paradigms of their respective eras, demonstrated the potential of the deductive approach to language. They laid the pre-modern intellectual foundations for N.Chomsky's linguistic theory.

The third paragraph of II Chapter is titled as "***Noam Chomsky's Grammar as a qualitatively new phase of the deductive approach to language***". Panini and the Port-Royal grammarians represented only the initial attempts to study syntactic structures based on the principle of deductive reasoning. In reality, it was N.Chomsky who redefined the trajectory of linguistic science, without which those early attempts might not have garnered the historical attention they enjoy today.

Chomsky's *Syntactic Structures*, in both its construction and its methods for solving linguistic problems, provides a rich illustration of the potential of applying the deductive method in linguistics. Following the preface, the work opens with an "Introduction" that provides a concise yet comprehensive overview of the techniques for studying syntax. The subsequent chapters are organized as follows: the autonomy of grammar; elementary linguistic theory; immediate constituent analysis; limitations of immediate constituent description; problems of linguistic theory; certain transformations in English; the explanatory power of linguistic theory; syntax and semantics.

Chomsky approaches the concept of the sentence from a mathematical standpoint, diverging from both traditional and

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<sup>18</sup> Robins, R.H. A Short History of Linguistics / R.H.Robins. – California: Longman, – 1997. – p.123.

structural grammars. In his analyses, the quantitative dimensions of finiteness and infiniteness are not merely theoretical constructs but are articulated with precision. This is primarily because he bases his reasoning on clearly defined forms and models. He demonstrates that *“the set of sentences can be treated as a formalized mathematical theory of a language. The central problem of linguistic analysis is to distinguish grammatically correct sentence sequences of L. from incorrect ones, i.e., those that are not sentences of L. The grammar of L. is thus presented as a mechanism that generates all and only the grammatically correct sequences in the language”*<sup>19</sup>.

It is evident that generative grammar was further developed in Chomsky’s *Aspects of the Theory of Syntax*, where various aspects and methods of the deductive approach played a foundational role. Chomsky emphasized that the inductive method cannot adequately convey the core concepts of language. He underlined the necessity of the hypothetico-deductive paradigm. The deductivism in Chomsky’s theory of grammar and linguistic science emerged and evolved upon profound philosophical and linguistic foundations.

III Chapter of the dissertation is titled **“The relationship between content and form in the context of a deductive approach to language”**. This chapter consists of three paragraphs.

In the first paragraph, titled *“The relationship between content and form in language: Port-Royal Grammar”*, it is demonstrated that the distinction between content (meaning) and form (expression) in language, as well as their comparison for various purposes, is one of the most characteristic, and even conceptual, features of Port-Royal grammar. At the beginning of the work, it is noted that *“speech signs can be viewed from two perspectives. First, according to their nature, they consist of sounds and letters. Second, they represent meanings – the way people use them to express their thoughts. The first aspect of speech signs is discussed in the first part*

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<sup>19</sup> Chomsky, N.A. Syntactic structures / N.A.Chomsky. – Hague-Paris:Mouton, – 1957. – p.13.

of the grammar, while the second aspect is addressed in the second part”<sup>20</sup>.

The fact that the first part of the *Grammar* consists of only six chapters, while the second part contains twenty-four chapters, indicates that issues of content are given more extensive attention than issues of form. However, it must be acknowledged that the relationship between content and form is reflected and more accurately, interpreted in both parts.

Port-Royal grammarians not only considered the relationship between deep and surface structures, a direct expression of the relationship between content and form, but also approached this issue in a highly conceptual manner. Their theory generally posits that “every sentence consists of an internal, mental aspect (its meaning, or deep structure) and an external, material aspect (the sequence of sounds, or surface structure)”<sup>21</sup>.

N.Chomsky has repeatedly acknowledged that the influence of the Port-Royal grammarians on the development of his generative grammar is not limited to the adoption of general principles. In fact, there are several significant analytical elements in which *General Grammar* assumes the position of a direct precursor to transformational grammar.

One of the key insights in the history of studying content-form relations in language is the recognition that “deep structures, in essence, are universal across languages, while their means of expression may vary significantly”<sup>22</sup>.

Port-Royal grammarians delved deeply and methodically into the analysis of the symmetry between deep and surface structures, meaning and sound sequences, and content and form. They aimed to uncover appropriate rules to account for these relations. As a result, it can be concluded that the later expansion of Port-Royal grammar and Cartesian linguistic (and philosophical) ideas, particularly in the mid

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<sup>20</sup> Arnauld, A. *The Port-Royal Grammar* / A.Arnauld, C.Lancelot. – Paris: Mouton, – 1975. – p.71.

<sup>21</sup> Chomsky, N.A. *Cartesian linguistics: A Chapter in the History of Rationalist Thought* Second Edition / N.A.Chomsky – Rochester, MN: Cybereditions Corporations, – 2002. – p. 86.

<sup>22</sup> *Ibid.* – p.86.

of the XX century through generative grammar, is an indisputable manifestation of the overall historical trajectory of linguistic science.

The second paragraph of III Chapter is entitled *“The relationship between content and form in language: from syntactic structures to aspects of the theory of syntax”*. In Chomsky’s linguistic theory, the relationship between content and form occupies a special place within a deductive approach to language. Three aspects are particularly noteworthy here: first, the prominent linguist builds upon existing traditions by analytically incorporating historical grammatical perspectives into the foundations of his theory; second, the theorist gradually develops his views on form and content through successive works from *“Syntactic Structures”* to *“Aspects of the Theory of Syntax”* and then to *“Language and Mind”*; and third, he maintains open perspectives on future directions concerning a variety of linguistic issues, including the relationship between content and form.

Chomsky, while critically assessing the popular linguistic “practice” of treating content and form as mutually dependent in structural analysis, also clarifies certain controversial issues that attempt to “prove” this relationship. At the same time, he aims to dismantle several entrenched conceptions in the field of linguistics. One particularly intriguing notion is the claim that, since there is no direct connection between a sentence’s phonetic structure and its meaning (or, in practical terms, such a connection cannot be conceived), there likewise exists no such link between form and content. To discuss something that does not exist and to place it at the center of a theory is, in essence, a methodological flaw. Admittedly, such a sharp disjunction between form and content, or grammar and semantics, can pose specific challenges for the theorist. However, it must also be acknowledged that the broader scientific and methodological efficacy of the theory allows for these challenges to be, at least for the time being, regarded as episodic and non-central.

Although Chomsky’s efforts to establish a “formal” grammar are consistent, the fact that he devotes considerable attention to semantic issues in defending this grammar shows that certain

problems on the path to developing a new linguistic theory could not be ignored. This stems primarily from the hypothetical–deductive nature of the observations, analyses, and syntheses involved. Regarding Chomsky’s view that one should look “from grammar to semantics” rather than “from semantics to grammar,” it seems that this approach is less about justifying his “meaningless syntax” and more about an attempt to discover new dimensions in the relationship between form and content<sup>23</sup>.

The third paragraph of III Chapter is titled “*Content and form relations in language: from Cartesian linguistics to language and thought*”. While searching for the idea-methodological foundations of his new theory of language, N.Chomsky felt the need to refer extensively to the XVII century -the “Age of Geniuses.” Although his theory emerged as a product of his own intellectual endeavor, independent of external influences, it was only afterward that he developed an interest in exploring its “historical roots.” He based his linguistic theory on key principles from that era, such as universality, rationalism (i.e., logic and correspondence to truth), and deduction.

In *Cartesian Linguistics*, Chomsky examines the key ideas of a major linguistic or philosophical movement concerning language, which began in the mid of XVII century and lasted until the early XIX century. Over time, this movement came under the influence of Romanticism and was eventually almost forgotten.

Chomsky attempts to “translate” Cartesian arguments regarding content-form relations in language into the language of modern linguistics. It turns out that there is ample material to support such a “translation”. Although these earlier thinkers used traditional terminology, many of their arguments anticipated the emergence of a new linguistic theory. For example, “*The syntax of any expression is essentially what we refer to as its deep structure, and its surface construction is what we refer to as its surface structure*”<sup>24</sup>.

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<sup>23</sup> Dildə məzmun və forma münasibətləri: “Sintaktik strukturlar”dan “Sintaktik nəzəriyyənin aspektləri”nə // – Bakı: Pedaqogika və Filologiya: elmi araşdırmalar, – 2024. № 2, – s.109.

<sup>24</sup> Chomsky, N.A. *Cartesian linguistics: A Chapter in the History of Rationalist Thought* Second Edition / N.A.Chomsky – Rochester, MN: Cybereditions Corporations, – 2002. – p.99.

In his book *Language and Thought*, Chomsky revisits the issue of content and form relations not only from a linguistic perspective but also within a broader philosophical context, reflecting on the past, present, and future of his theory.

The publication of *Language and Thought* shortly after *Cartesian Linguistics* reaffirmed the strategic importance of reconsidering the relationship between content and form in language in the broader context of the interplay between language and thought.

The **conclusions** drawn from this research are summarized as follows:

1. Chomsky was a pioneer in promoting the idea that many of the premises and methodological accomplishments of linguistics originating before the XIX century had been neglected due to a general disregard for the historical study of language. As a result, linguistic research in the XIX and XX centuries was deprived of the rich intellectual heritage of the XVII and XVIII centuries.

2. According to Chomsky, the genotypological foundation of grammatical tradition can be traced back to ancient Indian grammar—specifically Panini's grammar. By providing a detailed description of Sanskrit, one of the literary "ancestors" of modern Indo-European languages, Panini not only laid out the developmental path for Indo-European grammars but also served as a model for medieval Arabic-Muslim linguistics.

3. Following Panini, the *Port-Royal Grammar* stands as a classical example of a universal and rational approach to language. It is of particular interest today because (a) it encompasses the analysis of several ancient and modern languages from a linguistic perspective, and (b) its authors did not stop at analyzing only the surface structure of sentences, but extended their analysis to deep structure in accordance with the tradition of logical grammar.

4. Even in its most theoretical and hypothetical form, Sanskrit grammar, considered a universal or rational grammar and a prototype of generative grammar represents an undeniable conceptual foundation of linguistic science due to (a) its linguistic data, (b) its methodological approaches, and (c) its unique system of concepts.

5. The application of deduction as a method in Panini's grammar stems from the worldview of the era. This deductive approach, though somewhat naive, regarded Sanskrit as a divinely originated prototype of human language, rendering any comparison with other languages practically inconceivable. Leading scholars of this tradition (e.g., F.M.Müller, M.A.Shripad, K.Belvalkar, A.Mishra, C.Cardona, B.Faddegon, B.Shefts, etc.) have emphasized both the systematic nature of Panini's grammar and its religious-mystical as well as sociocultural imperatives.

6. The application of the deductive method in the *Port-Royal Grammar*, while inheriting from Panini, also reflects the epistemological and philosophical outlook of the early modern period. Whereas languages like classical Hebrew, Greek, and Latin had been governed by universal canons similar to those of Sanskrit, the emergence of new European languages at the end of the Middle Ages and the beginning of the modern era led to empirical comparison that increasingly relied on both inductive and deductive reasoning.

7. From *Syntactic Structures* onward, Chomsky not only employed the deductive method in his linguistic theory but also traced the historical origins of his theoretical premises back to *Cartesian Linguistics*. This significantly contributed to the development of a new attitude toward the history of linguistics. In line with Hegel's famous triad, this could be summarized as: traditional grammar – thesis, structural grammar – antithesis, and generative grammar – synthesis.

8. Both in the *Port-Royal Grammar* and in Cartesian linguistics as a whole, the opposition of sound and meaning forms a central concept. Language is analyzed through both its material (signifier) and conceptual (signified) dimensions—form and content, respectively. The Port-Royal grammarians, guided by universality and rationality, understandably prioritized content over form and adhered to the principle that sound must conform to logic.

9. The first phase of Chomsky's view on content and form relations begins with *Syntactic Structures* and continues to *Aspects of the Theory of Syntax*. While his first work focuses more on formal

models of sentences, the latter shows increased interest in semantics. This is not coincidental, as the transition from structuralism to anthropocentric linguistics required clarification of the content–form relationship. This phase can be considered the one that most closely connects Chomskyan grammar – and, more broadly, the “new linguistic theory” – to this topic.

10. The second phase of Chomsky’s views on content and form spans the period between *Cartesian Linguistics* and *Language and Thought*. During this time, he identified the historical roots of his “new theory” and re-examined the topic through new interpretive lenses. The creative character of language use, the fact that this creative ability is unique to humans, and the varying perspectives on this issue from Descartes to W. von Humboldt shifted 20th-century linguistic focus more toward the concept of “language form”.

***The main provisions of the dissertation are reflected in the following published articles of the author:***

1. Cəfərov, Q.Q. Qrammatika kanonlarının formalaşmasında Noam Xomski mərhələsi // – Bakı: Bakı Dövlət Universiteti, Dil və ədəbiyyat, – 2022. № 1(118), – s.502-504.
2. Cəfərov, Q.Q. Dilçiliyin təşəkkülü: Panini qrammatikasıdan Por-Royal qrammatikasına // – Bakı: AMEA, M.Füzuli adına Əlyazmalar İnstitutu, Filologiya məsələləri, – 2022. №12, – s.18-22.
3. Джафаров, Г.Г. Філософія сладкування: граматыка Пор-Рояля та Паніні // – Україна: Вчені записки Таврійського національного університету імені В.І.Вернадського, Серія: філологія. Журналістика, – 2023. т.34(73), №2, ч.1, – с.120-126.
4. Cəfərov, Q.Q. Noam Xomskinin dilçilik araşdırmalarında deduktiv metod // – Bakı: Dilçilik araşdırmaları, – 2023. № 1, – s.153-159.
5. Cəfərov, Q.Q. Dilə deduktiv yanaşmanın Por-Royal miqyası // “Heydər Əliyev və milli-mənəvi irsimiz” mövzusunda Respublika elmi konfransı. – Bakı, – 16 may, – 2023, – s.160-164.
6. Cəfərov, Q.Q. Dildə məzmun və forma münasibətləri: “Sintaktik strukturlar”dan “Sintaktik nəzəriyyənin aspektləri”nə // – Bakı:

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7. Cəfərov, Q.Q. Noam Xomskinin linqvistik universaliaları haqqında deduktiv mülahizələri dillərin dialoqu kontekstində // “Heydər Əliyev multikulturalizm və tolerantlıq ideologiyası” mövzusunda beynəlxalq elmi konfransı. – Bakı, – 7 may, – 2024, – s.74-75.
8. Джафаров, Г.Г. Параметры дедуктивного подхода Наума Хомского к синтаксическим структурам // Сборник научных трудов IV международной научно-практической конференции. – Липецк, Россия, – 5 июня, – 2024, – с.62-72.
9. Cəfərov, Q.Q. Por-Royal qrammatikası məzmun və forma münasibətləri kontekstində // – Bakı: Bakı Universitetinin Xəbərləri. Humanitar Elmlər seriyası, – 2024. № 4, – s.5-17.
10. Cəfərov, Q.Q. Dildə məzmun və forma münasibətləri: “Kartezian dilçiliyi”ndən “Dil və təfəkkür”ə // – Bakı: Terminologiya məsələləri, – 2025. № 1, – s.147-154.
11. Cəfərov, Q.Q. Noam Xomskinin dilə deduktiv yanaşmaları kontekstində interdisciplinarlıq // “VII Beynəlxalq Bəxtiyar Vahabzadə – türk dünyası dil, tarix, mədəniyyət və ədəbiyyat (Bəxtiyar Vahabzadə: Vətənpərvərlik və millilik)” adlı elmi konfrans. – Azərbaycan, Şəki, – 2025, – s.1228-1233.
12. Cəfərov, Q.Q. Generativ qrammatika nəzəriyyəsinin Noam Xomski postulatları // Ümummilli lider Heydər Əliyevin anadan olmasının 102-ci ildönümünə həsr olunmuş gənc dilçi doktorant və dissertantların sələflər və xələflər respublika elmi konfransının materialları. – Bakı: “Elm və təhsil”, – 2025, – s.131-134.
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