# A Review of Linguistic Research Methods

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**Abstract:** Language is a complex hierarchical system, and the complexity of language systems requires a diversity of research methods. Different sub-disciplines and schools of linguistics have different research methods. Despite their different orientations, these methodological approaches are complementary rather than diametrically opposed to each other.Different research methods can reveal the essential features of language from different perspectives and help us to describe and explain language more accurately and scientifically. In this paper, we will take the historical development process of modern linguistics as an entry point to make a comprehensive overview of the research methods in linguistics.

## 1. Introduction

Method is derived from the Greek words "meta-" and "-hod", meaning the way to approach things along the road. It refers to the means to understand and transform the world scientifically [1]. Simply put, method is the means, the way, the procedure, etc. to solve problems. Methodology is the doctrine of method, the theory of the way people understand and transform the world. Methodology (methodology), is the doctrine of methods, a theory of the way people understand and transform the world [2]. Methodology is a theoretical system or system aimed at solving problems. It usually involves the discussion of problem stages, tasks, tools, and methodological techniques.It is a series of specific methods to analyze and study, systematically summarize and finally put forward more general principles. It is the sum of the categories, principles, theories, methods and means that are generally adapted to the specific social sciences and play a guiding role.

Linguistics is the study of linguistic phenomena by scientific methods. Where it is called a study, there must be an academic method, a systematic approach to the search for answers to questions. If the method is concrete and practically operable, the methodology is abstract and more metaphysical. It usually permeates the whole of some theoretical model.

## 2. Modern Linguistic Research Methods

Linguistic research is constantly developing in a scientific direction and has made significant theoretical and methodological achievements. Since linguistic phenomena are so varied and numerous, the methods of studying them should also vary from topic to topic, reflecting the diversity of features. Modern linguistics, in particular, has a broader range of research methods due to the continuous development of its interdisciplinary approach.It can be said that the rapid development of modern linguistics is not only evident in the deepening and expansion of theory, but also in the continuous innovation and change of methods and methodology. The following is a summary of the research methods and methodologies of different linguistic schools to explain.

### 2.1 Research Methods in Structuralist Linguistics

Saussure is one of the most famous and influential linguists of the 20th century. His work has been called the "Copernican revolution" and led to the birth and development of structuralist linguistics in Europe and the United States, making linguistics a truly independent and specialized discipline, from which modern linguistics originated [3]. In terms of linguistic methodology, Saussure emphasized the principle of dichotomy and the "division into two".This is reflected in the General Linguistics Course, with a series of binary divisions. For example, speech activity is

divided into langue and parole (the first bifurcation); speech states are divided into synchronic and diachronic (the second bifurcation); linguistic elements distinguish between internal and external; and linguistic conformity in terms of energy and reference, invariance and variability, absolute arbitrariness and relative arbitrariness; combinatory and aggregative relations, etc.This methodological principle and the series of binary distinctions created by Saussure have been followed by many subsequent schools of linguistics. Specifically, the "homogenization" approach runs throughout Saussure's research. Based on the distinctions between langue and parole, internal and external, and synchronic and diachronic, he sought to remove heterogeneity from the study of language by taking "internal, diachronic language" as the object of linguistic study.Saussure considered parole activities as heterogeneous, while langue as a social phenomenon is homogeneous. In the selection of internal and external elements of language, Saussure likewise advocates the study of internal elements based on the purpose of homogenization.The distinction between the synchronic and diachronic also reflects the idea of homogeneity. Since the rules in the collective idea are concentrated in the coprime system of language. Although the historical evolution of language has rules, it is more subject to external influences and each language has its own specificity.

Saussure's linguistic theories have been inherited and developed, or questioned and criticized by later generations. But there is no doubt that Saussure's influence is unparalleled, and it is he who laid the cornerstone of modern linguistics [4]. After Saussure, three schools of structuralist linguistics emerged: the Prague School, the Copenhagen School, and American Structuralism.The Prague School focuses on phonology, especially the differentiation of phonemic features, and emphasizes the study of language from a functional point of view, advocating the theory of the "actual cut of the sentence". The Copenhagen School focuses on the relationship between language structures and emphasizes the use of hypothetical deduction in its methodology.American Structuralism linguistic theory has made a great contribution to the systematic analysis and depiction of language, and it opposes the isolated analysis of linguistic phenomena. It advocates a systematic and comprehensive study of language in terms of the relationships between its components simultaneously, using mainly distributional and substitution methods in the analysis of language structure, and the creation of the direct component analysis method gradually became prevalent. The influence of structuralism linguistics has spread to all fields and schools of linguistic research.

## 2.2 Research Methods in Systemic Functional Linguistics

Since its founding, systemic functional linguistics has undergone more than fifty years of development [5]. Early on, under the influence of Saussure and Yemtslev, the representative of this school, Halliday, focused on the form of language [6]. In the middle period, under the influence of the Prague School, he focused on the meaning and function of language; later, under the influence of Firth and Bernstein, he analyzed the relationship between language and society [7].

Specifically, in the 1950s and 1960s, systemic functional linguistics incorporated lexico-grammar into the study of language. It also linked the depiction of lexico-grammar with functional semantics. It was also mentioned that linguistic theory should consist of a system of categories that explain linguistic material, which can also be explained at different "levels".In the 1970s and 1980s of the 20th century, Systemic functional grammar was maturing, and the depiction of lexico-grammar had become quite well developed in a systematic and holistic way. The important issue at this stage was the organic connection between lexico-grammar, discourse semantics and context. Thus, the description of language gradually expanded from lexico-grammar to the (structural) description of the semantics of the discourse, and the semantic study of the discourse contributed to the further description of the context.Since the 1990s, systemic functional linguistics has become increasingly detailed in its depiction of lexical syntax. The study of the semantics of discourse has focused on the depiction of semantic systems. In the study of context, the theoretical depiction of its hierarchy and exemplification has not only provided a clearer depiction of context, but also provided theoretical support for linguistic-related studies. The

depiction of context has developed greatly at this stage.

As can be seen, systemic functional linguistics takes a holistic and integrative approach to the study of language, focusing on the study of meaning and function and treating language as a social phenomenon. It studies all aspects of it through analysis, description, and comparison, thus improving its own descriptive and explanatory power in this process of continuous development and revision.

## 2.3 Research Methods for Transformational-Generative Grammar

The birth of transformational-generative grammar was marked by Chomsky's *Syntactic Structures* in 1957, which has been regarded as a revolutionary change in the field of linguistics for more than 60 years [8]. Chomsky argued that language is a linguistic faculty located in the human mind and brain, and his theoretical goal was to establish a general theory of linguistic structure, a highly generalized, extremely clear and concise universal grammar.In his study of language, Chomsky found that there were many phenomena that structuralism and behaviorism psychology could not explain. Language creativity can never be produced by a simple "stimulus-response" [9]. Moreover, the differences in children's talent for learning their native language are rare.So he argues that children have an innate ability to learn language: the language acquisition mechanism. Regarding the content of "language acquisition mechanism", Chomsky hypothesized by inference that the initial state of human brain should include the characteristics common to all human languages, which can be called "universal grammar" or "universal phenomenon of language".The specific research steps include first observing and collecting linguistic material to prove the hypothesis, then revising or refining the hypothesis to explain more new linguistic material, and then arguing for it. In terms of specific research methods, Chomsky borrows from mathematical logic and uses distinctive mathematical symbols to study language in a highly formalized and abstract manner.For example, the minimalist scheme considers that a language consists of an arithmetic program and a lexicon to show that the universality of a language may exist in an abstract arithmetic system. It is clear that the research methods used in transformational-generative grammar were very different from those used by the prevailing structuralist school of descriptive linguistics, which depicted the structure of language and transformations by various formal means through mathematical and logical analysis.

The linguistic ability that Chomsky is trying to describe refers to an idealized, purely personal linguistic ability that is not influenced by subjective factors unrelated to language, such as memory, emotion, and exertion. This is one of the reasons why his theory has been criticized and questioned.It has been argued that the economic principle underpinning the minimalist scheme arbitrarily assumes that language is a "perfect" system of operations. However, Chomsky does not make clear why "perfect" and "optimal" are features of this grammar. The mere fact that a grammar is a "perfect" system does not guarantee that its operations are necessarily simple.Despite its naysayers, Chomsky's theory has undeniably opened up a new dimension in linguistics. Lyons has commented, "I personally believe, as do many linguists, that even if Chomsky's efforts to formalize the concepts of linguistic analysis fail, the effort itself will greatly deepen our understanding of these concepts, and in this sense the Chomsky Revolution will surely triumph." The research methods used in transformational-generative grammar deconstruct language in the dimension of natural science, expanding the research horizon of linguistics and contributing to the rapid development of computer science in artificial intelligence, machine translation and human-computer dialogue, contributing to the close integration of language and computers and enabling linguistic research along more scientific paths [10].

## 2.4 The Research Method in Sociolinguistics

Sociolinguistics emerged in the 1960s, and the representative Labov once stated, "I do not think that what we need now is a new theory of language; on the contrary, what we need is a new approach to language research that can lead to decisive interpretations (Labov, 1972).[11]" It is evident that he believed that what was important was not a school of thought, but rather an inquiry into what methods of language study would provide the most realistic depiction and interpretation

of the object of study.

Specifically, sociolinguistics analyzes problems from a perspective and in a manner that primarily employs quantitative research and qualitative analysis. In terms of quantitative research, sociolinguists use the everyday conversations of a representative small sample of language community members as the entry point for language research, trying to discover what kind of quantitative relationships exist between linguistic variables and social variation in the same language community [12].For example, in 1964, Labov completed his study on the use of the linguistic variant "r" in New York City department stores. He found that different pronunciations of "r" actually represented different social classes. This study, which was designed to investigate the relationship between linguistic variation and general parameters such as social class, gender, and age, used an analytical model that is still followed by many sociolinguists today.

In terms of qualitative analysis, sociolinguists argue that difference can no longer be seen as simply a difference between certain linguistic and cultural systems of different origins, or as grammatical and semantic differences between different language systems. The existence of differences is universal, and researchers need to adopt methods of analysis that can be applied to all situations without having to make homogeneous preconceptions about linguistic and cultural contexts.

Since the 1990s, sociolinguistics has undergone significant changes in research methods: It focuses on the organic combination between research content and different methods. It introduces appropriate econometric analysis tools. It emphasizes interdisciplinary integrated research. It analyzes the linguistic behavior of discourse groups to find out the laws and patterns of speech behavior.

## 2.5 Research Methods in Cognitive Linguistics

Cognitive linguistics began in the early 1980s and has developed into an influential branch of linguistics over the past 30 years, producing many results [13]. It is concerned with the relationship between language and other cognitive abilities, trying to explain the formation and characteristics of language structures, the way language is used, etc. from a cognitive perspective [14]. Its disciplinary characteristics determine the interdisciplinary and diversified nature of the research approach of cognitive linguistics, which is inextricably linked to psychology, brain neuroscience, and computer science. Specifically, research methods have evolved from the traditional introspective approach to the current empirically oriented approach, especially the psycho-experimental and brain-neuro-experimental approaches, which are increasingly used.

Introspection is the most important approach of cognitive linguistics, and it is also the most misunderstood and criticized approach of cognitive linguistics, which mainly relies on researchers' linguistic "intuition", academic experience, and common sense to analyze and interpret certain specific linguistic forms and contents [15]. At the beginning of cognitive linguistics, in order to build the theoretical framework of the school, the main method used was introspective and discursive research. This means that the researcher develops a regular understanding of linguistic phenomena by means of observation, introspection, analysis, and reasoning. However, findings that rely solely on intuition and linguistic sense lack scientific reliability and persuasiveness. Some of the hypotheses proposed by cognitive linguists must be supported and validated by solid, reliable empirical evidence to truly establish their status as scientific theories.Later, in order to reduce the influence of subjectivity, linguists improved and modified this method, such as the oral report method and the memorial recording method, which reasonably incorporated some ideas of the introspective method. This research method has thus been relatively improved in terms of procedures and specific implementation details, making the use of it as objective as possible.

The psycho-experimental method refers to inferring the cognitive mechanisms or processes involved in the whole process by giving the subjects a certain stimulus or task under certain conditions, and then observing the subjects' responses to the stimulus, or the completion of the task. In recent years, the psycho-experimental method has been increasingly adopted by scholars in cognitive linguistics.

The experimental brain-neurological approach focuses on the observation of the activity of brain nerves or brain regions associated with a certain language mechanism by means of some instrumentation. The main methods currently applied to the neurocognitive study of language are ERP (Event-Related Potentials), FMRI (Functional Magnetic Resonance Imaging), PET (Positron Emission Tomography), MEG ( Magnetoencephalography), etc. These advanced technological tools have helped linguists to discover some important neural mechanisms in language-related brain regions during the cognitive processing of language and have had a profound impact on the development of cognitive linguistics. With the help of experimental brain neurological methods, linguists have evolved from merely making introspective inferences in the past to being able to obtain evidence from cognitive neuroscience to support them.

As can be seen, the experimental method is very clearly characterized by the natural sciences. The researcher's concept of research design, research equipment, and especially the control of manipulation of procedures are pivotal to the final outcome of the study.

## 3. Conclusion

The vigorous development of linguistics requires a pattern of a hundred schools of thought and a hundred flowers. No single theory or approach can solve all linguistic problems. Different schools of linguistics have different research goals and therefore different research methods.Different perspectives and different levels can explain different linguistic phenomena. In other words, there are only differences in research focus and goals among schools of thought, and there is no difference in the merits of research methods. The relationship between schools of thought should be mutually reinforcing, so that linguistic research can develop more deeply and linguistics can have more sustained vitality.

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