

Cognitive Linguistics and Other Sciences: An Integrative Approach

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Abstract

A constellation of cognitive sciences has converged to shape a new linguistic orientation known as Cognitive Linguistics. Moving away from the traditional view of language as an isolated formal system, this approach regards language as a mental-cognitive activity. By adopting experimental and embodied perspectives aimed at studying the human mind and its mechanisms for processing language and concepts, it conceives of language as a cognitive activity rooted in bodily, sensory, and intellectual experience. Consequently, Cognitive Linguistics has become a thoroughly interdisciplinary field, nourished by the theories and insights of neighboring disciplines — namely traditional linguistics, cognitive psychology, neuroscience, philosophy, artificial intelligence, anthropology, and the educational sciences.

This paper highlights the cognitive interweaving between Cognitive Linguistics and these fields. Such interaction is grounded in theoretical and methodological synergy that has established a comprehensive approach to the study of language and mind — one that transcends disciplinary isolation toward an integrative horizon. This synergy opens new possibilities for understanding language in light of the mental and cognitive processes and the cultural contexts that both produce it and are reproduced through it.

Within this framework, our study is titled “**Cognitive Linguistics and Other Sciences: An Integrative Approach.**” The following guiding questions underpin the research: What is Cognitive Linguistics, and what are its theoretical foundations? Which scientific disciplines intersect with Cognitive Linguistics? What forms of cognitive interaction and integration exist between Cognitive Linguistics and neighboring cognitive sciences? What contributions have these other sciences made to Cognitive Linguistics?

These questions constitute the problem this study aims to address.

Keywords: Concepts; Cognitive Linguistics; Approach; Integrative; Mental; Cognitive.

Introduction

Cognitive Linguistics represents a qualitative shift in the study of language: it is no longer viewed as a closed formal system, but rather as a cognitive activity bound up with the mind and human

experience. It studies language as a means of understanding and representing the world, rather than as a mere system of rules. Cognitive Linguistics emerged from the interaction of multiple disciplines — philosophy, cognitive psychology, neuroscience, anthropology, and artificial intelligence — to offer an integrative vision linking language to thought and cognition.

The Concept of Cognitive Linguistics

Cognitive Linguistics is “a recently emerged linguistic current based on studying the relationship between human language, mind, and experience — including the social, material, and environmental — that is, the relationship among language + mind + experience (social, material, and environmental)” (AtiyyaSulayman Ahmed, 2019, p328). It is thus one of the scientific fields holding that language is an essential part of the mental and cognitive processes that human beings use to understand and interact with the world.

Language, then, is part of the human being's general cognitive apparatus (ibid.) — that is, it is bound up with human perceptual, experiential, and cognitive capacities, and reflects mental representations of the world (Abdel-Rahman Mohamed Ta'ma, 2019, p16). In the cognitive conception, language is not merely a tool for communication or an abstract set of grammatical structures; rather, it is:

- An embodiment of thought.
- A means of constructing meaning on the basis of human experience.
 - A reflection of the conceptual representations and metaphors that govern how human beings organize the world.

Meaning is therefore the central axis of Cognitive Linguistics, while grammatical structure and other phonological and semantic phenomena remain bound up with it rather than separate from it.

Figures of Cognitive Linguistics and Their Theoretical Foundations

1. **George Lakoff and Mark Johnson**, authors of *Metaphors We Live By*, in which they established **Conceptual Metaphor Theory**, holding that metaphor is not merely a rhetorical device but a fundamental mental mechanism by which we construct our conceptions and understanding of the world (Lakoff & Johnson, 1980, p3–6). Conceptual metaphor thus ceased to be a mere linguistic ornament and became instead a structure deeply rooted in the human mind. Metaphor, accordingly, is not confined to language alone; it pervades every domain of daily life, in thought as in action, for in Lakoff's view our ordinary conceptual system is fundamentally metaphorical in nature (Lakoff & Johnson, 2009, p21).
2. **Mark Johnson**, author of *The Body in the Mind: The Bodily Basis of Meaning, Imagination, and Reason*, argues that meaning and human cognition are embodied — that is, the body is the foundation on which meaning, imagination, and reason (logical thought) all rest. Language and thought are rooted in bodily and perceptual experience; our cognitive patterns are built upon basic bodily experiences (Johnson, 1987, p13–14). Johnson's work is regarded as complementary to Lakoff's, in that it develops the principle of embodiment, affirming that meaning springs from our bodily experience of the world.
3. **Gilles Fauconnier**, author of *Mental Spaces: Aspects of Meaning Construction in Natural Language*, sets out Mental Spaces Theory, which holds that language creates parallel conceptual spaces for understanding complex meanings such as presuppositions and counterfactuals (Fauconnier,

1994, p1–8). Fauconnier presents the concept of mental spaces as a tool for understanding how meaning is constructed in discourse.

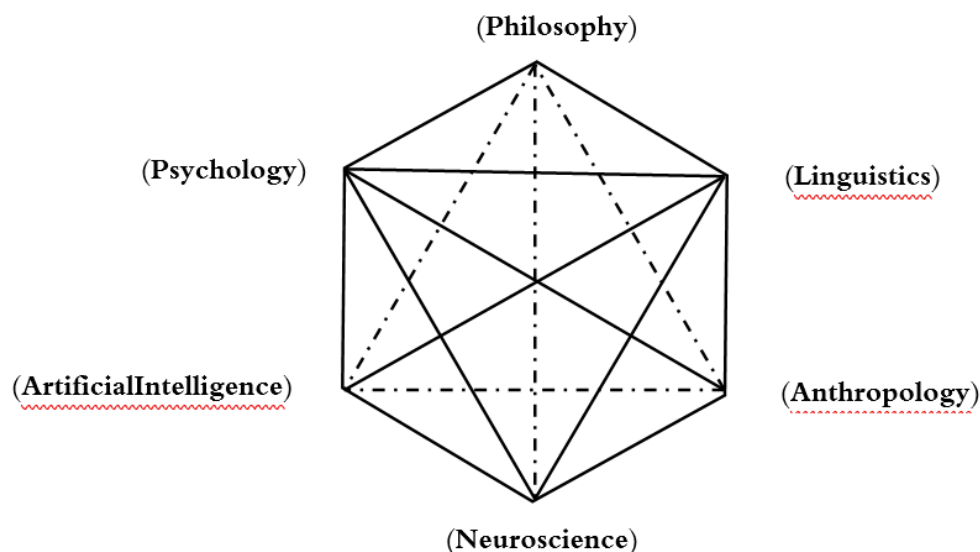
4. **Ronald Langacker**, author of *Foundations of Cognitive Grammar*, established Cognitive Grammar theory, holding that grammatical structure is not an autonomous formal system, as in generative theory, but rather part of the conceptual apparatus (Langacker, 1987, p5–10). Cognitive Grammar is thus the product of lexicon and grammar together within a single system grounded in mental construal (imagery).

5. **Gilles Fauconnier and Mark Turner**, authors of *The Way We Think: Conceptual Blending and the Mind's Hidden Complexities*, established Conceptual Blending Theory, which holds that in the cognitive process the mind merges elements from different mental spaces to produce new meanings (Fauconnier & Turner, 2002, p18–23). Through this theory, linguistic and cognitive creativity can be explained only through the blending of conceptual spaces.

Sciences Intersecting with Cognitive Linguistics

The 1978 request by the Alfred P. Sloan Foundation to study the unified fields comprising the body of sciences and knowledge that converge to investigate the nature of human cognition and the history of the human species marked an early recognition of the interdisciplinary relationship among a cluster of sciences. This was represented in a working committee convened in the American city of Kansas, which brought together panels and discussions involving psychologists, linguists, neuroscientists, philosophers, anthropologists, and computer scientists (Abd al-Rahman Muhammad Ta'ama, 2019, p18–19).

The Sloan Report resulted in a schematic model of the cognitive fields that together constitute general cognitive science, known as the “hexagon” of interdisciplinary cognitive relations among the sciences.



The Hexagon of Interdisciplinary Cognitive Relations, as Presented in the Sloan Report, 1978

In this diagram, the solid lines represent the strong relationships among the sciences depicted, while the dotted lines represent weaker relationships between them; the diagram makes clear the centrality of

neuroscience, linguistics, and psychology within these connections, at varying degrees of interrelation (Abdel-Rahman Mohamed Ta'ima, 2019, p19–20).

Al-Azhar al-Zannad has referred to these sciences collectively as the “cognitive sciences,” concerned with studying the workings of mind and intelligence — a study grounded in the convergence of disciplines, with contributions from philosophy, psychology, artificial intelligence, neuroscience (brain science), linguistics, and anthropology (al-Zannad, 2010, p15).

Cognitive Linguistics is thus, par excellence, an interdisciplinary field of knowledge, open to a range of sciences represented in philosophy, cognitive psychology, neuroscience, anthropology, and artificial intelligence. This openness has made it a multidisciplinary framework capable of contributing to an integrative approach to questions of language — one that brings together the linguistic, the cognitive, and the social. That is, it does not confine itself to the boundaries of linguistics alone, but draws on cognitive, psychological, philosophical, neurological, and computational data in order to provide a comprehensive account of how language operates in the human mind. The following sets out in more detail the aspects of integration between Cognitive Linguistics and the disciplines that intersect with it.

Aspects of Cognitive Interaction and Integration between Cognitive Linguistics and Other Cognitive Sciences

Cognitive Linguistics is an interdisciplinary field; it cannot be studied in isolation from philosophy, psychology, neuroscience, artificial intelligence, and anthropology. The following sets out the most salient features of this interaction.

1. Cognitive Linguistics and Philosophy

In the twentieth century, language became a central subject of philosophy, to the point that philosophy itself became a linguistic philosophy — as indicated by Chomsky's linguistic studies, which demonstrated the importance of certain questions previously raised by philosophers, in particular the problem of linguistic convention and the relationship between language and thought, alongside other philosophical issues and problems earlier raised especially by Aristotle and Descartes (Zouaoui.Beghoura, 2005, p5).

Cognitive science became the site of a contest between two principal philosophical orientations (Mohamed Taha, 2006, p173–174), differing in their view of the problem of knowledge:

- a) **The Empiricist Orientation:** represented by British philosophers such as Locke, Hume, and Mill, who regard the mind as a blank slate shaped by external stimuli, with knowledge formed through associations among these stimuli.
- b) **The Rationalist Orientation:** represented by continental European philosophers, especially Descartes and Kant, who hold that there exist innate mental categories in the human mind responsible for knowledge.

Philosophy thus focuses its inquiry on the relationship between language and thought — the very relationship on which Cognitive Linguistics itself focuses — while the latter tends toward the empiricist position, holding that language is the product of experience and interaction with the world, rather than the product of purely innate mental rules.

2. Cognitive Linguistics and Psychology

Cognitive psychology is concerned with cognition and information — how it is received, analyzed, and stored within an integrated system grounded in the concepts of memory, the developed cognitive structure of the human being, and the various human cognitive capacities such as intelligence and problem-solving ability (Adnan Yousef Atoum, n.d., p25). The focus and domain of cognitive psychology is “the processes and structures of cognition — such as perception and attention, memory, language, intention, and mental and linguistic activity — along with other matters bearing on emotion, personality, and the like, insofar as they interact with the other cognitive faculties” (al-Zannad, p24). This discipline thus centers on studying the higher mental processes that human beings use in processing information and understanding the world around them. Among its most prominent subjects (ibid., p34) are: perception, attention, memory, thinking, language, and intelligence.

Given that cognitive psychology draws on research findings to explain the concepts of perception, attention, and memory that contribute to the production and comprehension of language, these psychological concepts lie at the very core of cognitive-linguistic study — indeed, they are the cornerstone in constructing a cognitive-linguistic theory holding that meaning rests on the organization of human experience within mental structures termed conceptual frames or idealized cognitive models. Cognitive Linguistics has drawn on the experiments of psychology in studying conceptual metaphor, where experimental research has shown that metaphors are not mere linguistic devices but a reflection of cognitive processes. The production and comprehension of language can accordingly be explained only through mental processes.

3. Cognitive Linguistics and Neuroscience

Roger Sperry, through his research with colleagues, discovered a divergence between the two cerebral hemispheres and their functions: the right hemisphere specializes in intuitive, creative capacities and music, while the left hemisphere specializes in the functions of language and analytical operations. Until the mid-1980s, the role of neuroscience within cognitive science was limited to identifying the neural basis of cognitive functions; thereafter, it developed into a source of hypotheses and models concerning how these functions operate. This collaboration between neuroscience and cognitive science gave rise to a new discipline known as cognitive neuroscience (MohamedTaha, p174–175).

Since the subject of study in cognitive neuroscience is language and its relation to the brain — in articulation, production, reception, comprehension, and acquisition — this is the very same subject with which Cognitive Linguistics is concerned in its focus on language as processed within the brain. Cognitive Linguistics employs tools such as brain imaging — functional Magnetic Resonance Imaging (fMRI) — to study linguistic activity: specific regions of the brain are activated during the use of metaphor or complex constructions, demonstrating that the comprehension of metaphor is not a merely ornamental process but the activation of motor and sensory regions of the brain, confirming that the mind is fundamentally embodied and that the body shapes the mind (Lakoff& Johnson, 2016, p39). This indeed confirms that the mind (the brain) is embodied.

4. Cognitive Linguistics and Artificial Intelligence

Artificial intelligence is the science that seeks to enable machines to perform tasks carried out by human beings, by endowing them with an intelligent mental skill possessing the capacities of the human mind. The aim of artificial intelligence is to create intelligent machines capable of behaving intelligently — that is, of interacting with their environment, drawing information from it, and reacting in light of situational demands in a manner that is appropriate, suitable, and effective (al-Zannad, p24). Artificial intelligence is thus the capacity of machines and programs to emulate human mental abilities such as the capacity to learn, to infer, and to respond to situations not programmed into the machine.

Through such programs, Cognitive Linguistics proceeds to build intelligent systems that understand human language in a cognitive rather than a merely structural manner — that is, Cognitive Linguistics contributes to the development of natural-language-processing systems, particularly in constructing conceptual dictionaries, analyzing metaphor, and improving the performance of machine translation.

5. Cognitive Linguistics and Anthropology

Cognitive anthropology represents what was formerly known as cultural anthropology, understood as the investigation of the workings of human thought within diverse cultural contexts, including specific material and social environments. Cognitive anthropology investigates the relationship between culture and mind; among its most notable findings is the existence of cultural variation in perception, memory, and reasoning, and among the cases it has most prominently studied is the categorization of objects and the naming and perception of colors across cultures. Among the principles it establishes is that thought or mind is culturally guided, a matter substantiated by numerous experiments (al-Zannad, *Cognitive Linguistic Theories*, p24). These concepts lead to the conclusion that cognitive anthropology derives from the workings of thought as shaped by experience across multiple environments; culture accordingly constitutes a cognitive system within the individual's mind, given the diversity of its sources and the variety of its characteristics.

It is through the element of culture that the relationship between anthropology and Cognitive Linguistics begins, in that the latter is concerned with how culture influences linguistic cognition, and with how language expresses a given community's view of the world — for example, through the analysis of cultural concepts such as “honor” or “freedom” as expressed through language, as well as the study of differences in metaphor across different cultures.

Conclusion

In sum, Cognitive Linguistics is, par excellence, an interdisciplinary field of knowledge, seeking to understand language not as an autonomous system but as a structure interwoven with mind, body, culture, society, and technology. This openness has made it an important tributary within both the human and natural sciences alike.

This interdisciplinarity may thus be summarized as follows:

1. Cognitive Linguistics draws on philosophy in addressing questions concerning the relationship among thought, language, and reality.

2. Cognitive Linguistics rests on the findings of cognitive-psychological research in explaining the processes of perception, attention, and memory that contribute to the production and comprehension of language.
3. It draws on the techniques of cognitive neuroscience, which reveal the brain structures responsible for linguistic processing, thereby lending linguistic theory a tangible biological character.
4. A close relationship exists between Cognitive Linguistics and artificial intelligence, particularly in the field of natural language processing, where cognitive models are drawn upon to develop computational systems capable of understanding human language.
5. Anthropology offers a cultural and social perspective showing how linguistic concepts take shape within diverse human environments.

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