Cognitive Pragmatics: Mental Processes Underlying Contextual Meaning Construction

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Abstract.

Cognitive pragmatics examines how meaning is constructed through the interaction of linguistic form, contextual cues, and underlying mental processes. Moving beyond literal language, it explains how speakers convey intentions and how listeners infer implied meaning through mechanisms such as Theory of Mind, mental representation, and relevance-based reasoning. Drawing on foundational theories of implicature and relevance, as well as neurocognitive evidence from ERP and fMRI studies, cognitive pragmatics provides a comprehensive account of how individuals interpret indirect, figurative, and ambiguous expressions. Its interdisciplinary scope spans linguistics, psychology, neuroscience, artificial intelligence, and language education, offering insights into language acquisition, pragmatic impairments in ASD and aphasia, and the development of context-aware computational systems. Overall, cognitive pragmatics highlights the essential role of inference, cognition, and social knowledge in human communication and demonstrates its wide applicability across theoretical and applied domains.

Keywords:

cognitive pragmatics, inference, relevance theory

1. Introduction

Cognitive pragmatics is a branch of pragmatics that investigates how speakers and listeners use cognitive resources—such as attention, memory, inference, and social knowledge—to produce and interpret meaning in context (Bara, 2010; Levinson, 1983; Schmid, 2012). Unlike approaches that treat language primarily as a system of rules and structures, cognitive pragmatics focuses on the mental processes that allow interlocutors to go beyond the literal content of an utterance and recover the speaker's intended meaning. It examines how communicative intentions are formed, encoded linguistically, and then decoded and enriched by the listener using contextual cues and background knowledge (Sperber & Wilson, 1986; Wilson & Carston, 2007).

The field lies at the intersection of linguistics, psychology, neuroscience, and philosophy of language. From linguistics it inherits tools for describing utterances and discourse; from cognitive psychology it adopts models of mental representation, inference, and decision-making; from

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neuroscience it draws on evidence about the brain systems involved in pragmatic interpretation, such as studies using event-related potentials (ERP) and functional magnetic resonance imaging (fMRI) (Bambini et al., 2009; Bosco et al., 2017). Clinical and developmental research further shows how pragmatic abilities emerge, are disrupted by conditions such as autism spectrum disorder or aphasia, and can be rehabilitated (Cummings, 2009; Matthews, 2014).

Studying meaning beyond the literal is crucial because everyday communication is saturated with implicature, presupposition, politeness strategies, metaphor, irony, and other non-literal forms. Speakers rarely say everything they mean explicitly; instead, they rely on shared knowledge and inferential processes on the part of the listener (Grice, 1975; Noveck & Reboul, 2008). A cognitive-pragmatic perspective therefore provides a more realistic model of communication than code-based approaches, capturing how humans manage ambiguity, indirectness, and cultural variation in real time.

The aim of this study is to provide a theoretically grounded overview of cognitive pragmatics, emphasizing its main foundations and core components. Specifically, it (a) outlines the theoretical frameworks that have shaped the field, including Speech Act Theory, Gricean pragmatics, and Relevance Theory; (b) describes key cognitive mechanisms such as context-based inference, mental models, Theory of Mind, and the processing of non-literal language; and (c) highlights the role of cognitive resources like memory and attention in pragmatic interpretation.

2. Theoretical Foundations

Cognitive pragmatics is rooted in several influential traditions within the philosophy of language and pragmatics, most notably Speech Act Theory, Gricean implicature, and Relevance Theory. These frameworks provide the conceptual tools for understanding how utterances function as actions, how meaning can be implied rather than stated, and how listeners infer the most relevant interpretation in a given context (Austin, 1962; Grice, 1975; Searle, 1969; Sperber & Wilson, 1986).

2.1. Speech Act Theory

Speech Act Theory, developed by Austin (1962) and further elaborated by Searle (1969), starts from the observation that to say something is often to do something. Utterances do not merely describe states of affairs; they can also perform acts such as promising, ordering, apologizing, or declaring. Austin's distinction between locutionary, illocutionary, and perlocutionary acts captures different dimensions of this activity: the act of saying something, the social act performed in saying it, and the effect it has on the hearer. Searle (1969) systematically classified speech acts (e.g., assertives, directives, commissives, expressives, and declarations) and proposed that understanding an utterance involves recognizing its illocutionary force and associated felicity conditions.

For cognitive pragmatics, Speech Act Theory is important because it shifts focus from sentences as abstract structures to utterances as intentional actions carried out by agents. Comprehension

thus becomes a matter of inferring what kind of act the speaker intends to perform, drawing on contextual information and background knowledge. This emphasis on intention and inference provides a natural bridge to later cognitive accounts.

2.2. Gricean Implicature and the Cooperative Principle

Grice's (1975) theory of conversational implicature is a cornerstone of modern pragmatics. Grice proposed that interlocutors generally follow a Cooperative Principle, oriented toward effective and rational communication, and are guided by maxims of Quantity, Quality, Relation, and Manner. When speakers appear to violate these maxims, listeners infer additional, implied meanings—implicatures—to restore coherence. For example, the utterance "Some of the students passed the exam" often implicates that not all of them did.

Grice's model is inherently cognitive: it assumes that listeners are capable of attributing rationality and cooperative intentions to speakers and of performing complex inferences based on conversational norms and shared knowledge (Levinson, 1983; Noveck & Reboul, 2008). In cognitive pragmatics, implicature is viewed as one of the main mechanisms by which listeners move from what is explicitly said to what is meant, especially in cases of indirectness, politeness, and understatement.

2.3. Relevance Theory

Relevance Theory, proposed by Sperber and Wilson (1986), offers a more explicitly cognitive and psychologically oriented framework. It maintains that human cognition is geared toward the maximization of relevance, understood as an optimal balance between cognitive effects (e.g., new information, strengthened or revised assumptions) and processing effort. Every utterance carries a presumption of optimal relevance, leading the listener to search for an interpretation that yields sufficient cognitive effects for minimal effort.

Within this framework, the distinction between linguistic decoding and pragmatic enrichment is central. The linguistically encoded meaning of an utterance is only a starting point; the listener must infer speaker intentions, enrich underdetermined expressions, and select contextually appropriate implications (Wilson & Carston, 2007). Relevance Theory thus provides a detailed model of how context and inferential processes shape comprehension, and it has been widely applied to phenomena such as metaphor, irony, hyperbole, and loose talk (Sperber & Wilson, 1986; Recanati, 2004).

2.4. Mental Representation in Pragmatics

A further foundation of cognitive pragmatics is the notion of mental representation. Listeners construct internal models of the conversational situation, incorporating information about the physical environment, prior discourse, speaker characteristics, and shared cultural knowledge (Schmid, 2012; Recanati, 2004). These mental models are updated dynamically as the conversation unfolds and serve as the basis for pragmatic inference.

From this viewpoint, understanding an utterance involves mapping it onto a rich representational space that encodes not only propositional content but also speaker intentions, attitudes, and social relations. Authors such as Kissine (2013) and Bara (2010) have emphasized that successful communication presupposes the ability to represent and coordinate mental states—an ability closely tied to Theory of Mind. This focus on representation and mentalizing further distinguishes cognitive pragmatics from purely formal accounts.

3. Core Components of Cognitive Pragmatics

The theoretical traditions outlined above converge in a set of core components that characterize cognitive pragmatic processing: context-dependent inference, mental models and Theory of Mind, implicature and indirect meaning, non-literal language, and the role of general cognitive resources such as memory and attention.

3.1. Context and Inference

Context in cognitive pragmatics is not limited to the immediate physical environment or preceding utterances; it includes any piece of information that the listener can reasonably use to interpret a speaker's meaning (Recanati, 2004). This encompasses shared cultural norms, interpersonal relationships, discourse history, and assumptions about the speaker's goals. Inference is the process by which the listener combines the linguistically decoded content with contextual information to derive an interpretation that satisfies expectations of coherence and relevance (Sperber & Wilson, 1986).

For instance, the sentence "It's cold in here" may be interpreted as a simple description, a complaint, or an indirect request to close the window, depending on contextual cues and assumptions about the speaker's intention. Cognitive pragmatics seeks to model how such inferences are generated, evaluated, and selected in real time, and how listeners rapidly converge on an interpretation that seems most plausible and relevant in the situation at hand (Wilson & Carston, 2007).

3.2. Mental Models and Theory of Mind

Mental models are internal representations of events, states of affairs, and conversational contexts that allow interlocutors to simulate possible meanings and consequences of utterances (Schmid, 2012). Alongside these models of the external world, speakers and listeners also maintain models of each other's knowledge, beliefs, and intentions. This capacity, known as Theory of Mind, is crucial for interpreting indirect and non-literal language, where the intended meaning differs from the literal one (Bosco et al., 2017).

In irony, for example, the listener must recognize a discrepancy between what is said and what the speaker believes, and attribute a specific communicative purpose, such as criticism or humor. Cognitive pragmatics thus treats pragmatic interpretation as a form of mindreading: the listener uses linguistic cues, contextual information, and general knowledge about human behavior to infer

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what kind of mental state the speaker is expressing (Bara, 2010; Kissine, 2013). Deficits in Theory of Mind, as observed in some clinical populations, often lead to difficulties with pragmatic aspects of communication (Cummings, 2009; Matthews, 2014).

3.3. Implicature and Indirect Meaning

Implicature is a central concept for understanding how speakers convey meanings that are not explicitly encoded in their words (Grice, 1975). Cognitive pragmatics examines the cognitive mechanisms that support the generation and interpretation of implicatures, including the recognition of violated or exploited conversational norms, the evaluation of alternative interpretations, and the selection of the most contextually plausible inference (Levinson, 1983; Noveck & Reboul, 2008).

Indirect speech acts—such as using a question ("Can you open the window?") to perform a request—are also explained in terms of implicature and mental-state attribution. The listener infers that the literal question about ability is not the primary communicative goal and instead identifies the underlying directive intent. This process illustrates how pragmatic meaning arises from the interaction of linguistic form, social convention, and cognitive inference.

3.4. Non-literal Language: Metaphor, Irony, and Sarcasm

Non-literal language provides a rich testing ground for cognitive pragmatic theories because it requires substantial inferential work and often involves complex perspective-taking. Metaphor, for instance, is seen not merely as a stylistic ornament but as a reflection of underlying conceptual mappings between domains (Lakoff & Johnson, 1980). Understanding a metaphor such as "Time is money" involves constructing a mental mapping that highlights certain parallels (scarcity, value, spending) while suppressing others.

Irony and sarcasm go a step further, often involving a reversal of literal meaning and a critical or humorous stance toward a situation. Interpreting an ironic remark like "You've done a terrific job" after an obvious failure requires recognizing the incongruity between literal content and contextual reality, and attributing an appropriate attitude to the speaker (Bosco et al., 2017). Cognitive pragmatics accounts link this capacity to Theory of Mind, relevance-based inference, and sensitivity to social norms and expectations (Sperber & Wilson, 1986; Noveck & Reboul, 2008).

3.5. Cognitive Processing: Memory, Attention, and Cognitive Load

Finally, cognitive pragmatics emphasizes that pragmatic interpretation depends on general cognitive resources. Working memory is needed to maintain and integrate linguistic input, contextual information, and potential inferences; attention is required to select relevant cues and suppress irrelevant ones; and executive control helps resolve ambiguity and manage competing interpretations (Bambini et al., 2009; Bosco et al., 2017).

Experimental and neurocognitive studies show that processing figurative or indirect language often entails increased cognitive load, reflected in longer reaction times and distinct neural signatures,

especially when context is weak or expectations are violated (Bambini et al., 2009; Noveck & Reboul, 2008). These findings support the view that pragmatic comprehension is an active inferential process, constrained by the listener's cognitive capacities and shaped by the search for optimal relevance.

Taken together, these components—contextual inference, mental modeling, Theory of Mind, implicature, non-literal language, and cognitive processing constraints—form the core of cognitive pragmatics. They explain how humans routinely navigate beyond literal meanings to achieve rich, flexible, and socially sensitive communication.

4. Neurocognitive and Experimental Evidence

Cognitive pragmatics has increasingly been informed by experimental and neurocognitive research, which examines how the brain processes pragmatic meaning and how inferential mechanisms unfold in real time. Techniques such as event-related potentials (ERP), functional magnetic resonance imaging (fMRI), and eye-tracking provide converging evidence that pragmatic comprehension engages distributed neural networks and places measurable demands on attention, memory, and executive control (Bambini et al., 2009; Bosco et al., 2017; Noveck & Reboul, 2008). These findings support the view that understanding non-literal, indirect, or context-dependent utterances is not a simple by-product of semantic decoding but a distinct, resource-sensitive cognitive activity.

4.1. ERP and fMRI Studies

ERP studies, which measure time-locked electrical responses to linguistic stimuli, have shown that pragmatic processing can modulate components associated with semantic integration and cognitive control, such as N400- or late positivity–like effects. For instance, the comprehension of metaphors, scalar implicatures, or ironic remarks often elicits enhanced ERP responses compared to literal controls, particularly when contextual support is weak or when the intended meaning diverges strongly from the literal one (Noveck & Reboul, 2008). Such patterns suggest that listeners engage additional inferential work and integration processes when deriving pragmatic meaning.

fMRI research complements these temporal findings with spatial information about the brain regions involved. Studies on irony, deceit, and non-literal meaning indicate activation in networks that extend beyond classical left-lateralized language areas, including medial prefrontal, temporal, and parietal regions associated with mentalizing and social cognition (Bosco et al., 2017). These results are consistent with cognitive pragmatic accounts that link understanding of indirect or figurative language to Theory of Mind and to the construction of complex mental models of the communicative situation (Bara, 2010; Kissine, 2013).

Eye-tracking research provides an additional window on pragmatic processing by recording gaze patterns and fixation times during reading or listening. Bambini et al. (2009), for example, show that metaphor comprehension involves distinct reading patterns compared to literal expressions,

reflecting incremental inferential processes and the evaluation of alternative interpretations. Combined with ERP and fMRI findings, such evidence demonstrates that pragmatic enrichment and implicature generation unfold dynamically as discourse progresses, rather than being postponed to an offline interpretive stage.

4.2. Pragmatic Processing and Right Hemisphere Involvement

Neurocognitive studies also indicate that the right hemisphere plays a particularly important role in aspects of pragmatic processing, especially in the comprehension of non-literal language and in integrating broader discourse context. Patients with right-hemisphere damage often exhibit relatively preserved grammar and vocabulary but experience difficulties understanding jokes, metaphors, irony, or indirect requests—classic hallmarks of pragmatic impairment (Cummings, 2009).

Bosco et al. (2017) report that tasks involving deceitful or ironic communicative intentions recruit right-hemisphere and bilateral fronto-temporal networks associated with social cognition and emotional evaluation. These findings align with theoretical claims that pragmatic understanding draws on mechanisms for perspective-taking, affective appraisal, and global coherence, which are not confined to the traditional left-lateralized language system (Bara, 2010; Schmid, 2012). Cognitive pragmatics thus benefits from a neurocognitive perspective that situates meaning construction within large-scale, domain-general neural networks supporting social interaction and inferential reasoning.

4.3. Real-Time Inference and Ambiguity Resolution

A central concern of cognitive pragmatics is how listeners resolve ambiguity and derive intended meanings in real time. Experimental paradigms using reaction times, eye-tracking, and ERP measures show that pragmatic inference is rapid and often incremental: listeners start drawing pragmatic conclusions as soon as relevant cues become available, rather than waiting for the end of the sentence or discourse segment (Bambini et al., 2009; Noveck & Reboul, 2008).

For example, scalar terms such as *some* can be interpreted literally ("at least some") or pragmatically ("not all"). Experiments indicate that listeners often compute the stronger pragmatic interpretation, but this process is sensitive to contextual support, cognitive load, and individual differences in working memory (Noveck & Reboul, 2008). Similarly, non-literal expressions may initially be processed in a way that preserves literal possibilities, with pragmatic reinterpretation occurring as context accumulates; yet when context strongly favors a figurative meaning, pragmatic interpretation can be accessed quickly and efficiently (Recanati, 2004).

These findings support key claims of cognitive pragmatics and Relevance Theory: inference is constrained by expectations of optimal relevance and by limitations of processing resources (Sperber & Wilson, 1986; Wilson & Carston, 2007). Real-time ambiguity resolution is thus seen as a dynamic negotiation between linguistic form, contextual cues, and the listener's cognitive system, rather than as a purely logical computation detached from processing constraints.

5. Applications

The insights of cognitive pragmatics extend well beyond theoretical linguistics and philosophy of language. By clarifying how contextual information, inferential mechanisms, and mental representations shape meaning, cognitive pragmatics provides valuable tools for language education, clinical assessment and intervention, and the design of artificial intelligence and human–computer interaction systems (Cummings, 2009; Huang, 2017; Matthews, 2014).

5.1. Language Acquisition and Foreign Language Education

Pragmatic competence is a crucial component of communicative ability, yet it often develops more slowly and unevenly than grammatical knowledge. Research on first language acquisition shows that children gradually acquire the ability to use and interpret indirect requests, implicatures, and non-literal expressions, and that this development is closely linked to Theory of Mind and social-cognitive growth (Matthews, 2014).

In foreign language education, learners may master vocabulary and grammar while still struggling with context-appropriate use of politeness formulas, irony, or indirectness. Cognitive pragmatics provides a theoretical basis for designing instructional approaches that explicitly target inferential skills, contextual awareness, and cultural norms (Cummings, 2009; Huang, 2017). Teaching can incorporate tasks that require learners to interpret implied meanings, negotiate ambiguity, and compare pragmatic conventions across languages, thereby fostering deeper communicative competence rather than mere structural accuracy.

5.2. Clinical Pragmatics: ASD, Aphasia, and TBI

Clinical pragmatics applies the tools of pragmatic analysis to the assessment and treatment of individuals with communication disorders. Conditions such as autism spectrum disorder, aphasia, and traumatic brain injury often spare core grammar but disrupt the ability to use and understand language in context, especially when meaning depends on inference, irony, or subtle social cues (Cummings, 2009; Matthews, 2014).

From a cognitive pragmatic perspective, these difficulties can be interpreted as impairments in Theory of Mind, context integration, or executive functions that support inference and ambiguity resolution (Bara, 2010; Bosco et al., 2017). Assessment protocols informed by cognitive pragmatics therefore focus on tasks such as interpreting non-literal utterances, recognizing communicative intentions, or managing turn-taking in conversation. Intervention can target the underlying cognitive mechanisms—for example, training patients to attend to contextual cues, to consider alternative meanings, or to explicitly reason about the speaker's perspective. This approach aligns clinical practice with contemporary models of meaning construction and social cognition.

5.3. Artificial Intelligence and Natural Language Processing

Cognitive pragmatics also offers important guidance for artificial intelligence and natural language processing (NLP), where systems must interpret user input that is often indirect, underspecified, or context-dependent. Traditional NLP approaches have focused on syntax and semantics, but as chatbots, virtual assistants, and translation systems are increasingly embedded in real-world interactions, pragmatic understanding becomes indispensable.

The inferential view of communication advanced by Gricean pragmatics and Relevance Theory suggests that AI systems need mechanisms for modeling user intentions, contextual assumptions, and relevance-based reasoning rather than relying solely on surface forms (Grice, 1975; Sperber & Wilson, 1986; Wilson & Carston, 2007). Concepts such as mental representation and Theory of Mind can inspire architectures that track dialogue history, infer likely goals, and adjust responses accordingly (Bara, 2010; Recanati, 2004). Although current systems are still far from human-level pragmatic competence, cognitive pragmatics provides a conceptual roadmap for developing more context-aware and flexible dialogue models.

5.4. Human–Computer Interaction

Finally, cognitive pragmatics contributes to the broader field of human–computer interaction (HCI), where the goal is to design interfaces that communicate with users in intuitive and socially appropriate ways. As digital systems adopt conversational formats—through voice assistants, interactive agents, and educational platforms—they must manage turn-taking, politeness, indirectness, and clarification strategies in ways that align with human expectations (Huang, 2017; Schmid, 2012).

By emphasizing the role of context, inference, and social cognition in communication, cognitive pragmatics helps designers anticipate how users will interpret prompts, warnings, feedback, and explanations. It also highlights potential sources of miscommunication, such as ambiguous phrasing, culturally inappropriate politeness strategies, or failure to acknowledge user intentions. Integrating pragmatic principles into interface design can thus lead to more transparent, trustworthy, and user-friendly systems, reinforcing the relevance of cognitive pragmatics for both technological innovation and everyday communicative practice.

6. Cross-Cultural Pragmatics

Cross-cultural pragmatics examines how politeness, indirectness, and other pragmatic norms vary across languages and cultures, and how these differences affect interpretation (Huang, 2017; Levinson, 1983). The same utterance may be perceived as polite, rude, or overly direct depending on local conventions, power relations, and expectations about face and solidarity. Miscommunication often arises when speakers transfer their own pragmatic norms into another cultural context, misreading irony, compliments, or refusals. Developing intercultural communication competence therefore requires not only grammatical knowledge but also awareness of culturally specific ways of implying, softening, or intensifying meaning. Cognitive

pragmatics provides tools for modeling how speakers adjust their inferential processes when interacting across cultures.

7. Future Directions

Future research in cognitive pragmatics will increasingly focus on multimodal communication, integrating gesture, gaze, prosody, and visual context into models of meaning construction. A second priority is the integration of pragmatic theory with computational models, enabling algorithms to approximate human-like inference over context and speaker intentions (Sperber & Wilson, 1986; Recanati, 2004). Advances in social-AI systems will depend on such models to handle indirect requests, sarcasm, and politeness in a flexible, culturally sensitive way, drawing on insights from experimental, clinical, and cross-linguistic pragmatics (Bosco et al., 2017).

8. Conclusion

This paper has outlined the main theoretical foundations, core components, neurocognitive evidence, and applications of cognitive pragmatics, emphasizing its focus on inference, context, and mental representation in meaning construction. By linking linguistic structure to social cognition and general cognitive resources, cognitive pragmatics offers a unified account of how humans understand literal and non-literal language in real time (Bara, 2010; Levinson, 1983; Sperber & Wilson, 1986). Its insights are crucial for modeling communication in linguistics and cognitive science, for diagnosing and treating pragmatic impairments in clinical settings, and for designing AI and human–computer interfaces that respond appropriately to user intentions (Cummings, 2009; Huang, 2017). As communication becomes more global and technologically mediated, the role of cognitive pragmatics in understanding and improving interaction will only grow.

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