Cognitive linguistics

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Cognitive linguistics is one of the fastest growing and influential perspectives on the nature of language, the mind, and their relationship with sociophysical (embodied) experience. It is a broad theoretical and methodological enterprise, rather than a single, closely articulated theory. Its primary commitments are outlined. These are the Cognitive Commitment—a commitment to providing a characterization of language that accords with what is known about the mind and brain from other disciplines—and the Generalization Commitment—which represents a dedication to characterizing general principles that apply to all aspects of human language. The article also outlines the assumptions and worldview which arises from these commitments, as represented in the work of leading cognitive linguists. © 2012 John Wiley & Sons, Ltd.

INTRODUCTION

Cognitive linguistics represents a contemporary approach to language, language learning, and conceptual structure. Hence, I will restrict myself in this review to assumptions relating to these specific areas of enquiry. Moreover, Cognitive linguistics provides a perspective on language and the mind which is diametrically opposed to both Generative Grammar and Formal Semantics. While it flies under the colors of cognitive psychology, Cognitive linguistics has much in keeping with functional approaches to language. It is also important to emphasize that Cognitive linguistics is not a single, closely articulated, theory. Rather, it is a broad theoretical and methodological enterprise, wherein lies its strength. What provides the enterprise with coherence is its set of primary commitments and central theses. Influential theories within the enterprise have afforded practicing cognitive linguists the analytical and methodological tools with which to investigate the phenomena they address. What makes Cognitive linguistics distinctive in the contemporary language sciences is its overarching concern with investigating the relationship between human language, the mind, and sociophysical experience. In doing so, Cognitive linguistics takes a clearly defined and determinedly

embodied perspective on human cognition. And in this respect, cognitive linguists have developed a number of influential theories within the interdisciplinary project of cognitive science which self-consciously strive for (and measure themselves against) the requirement to be psychologically plausible, given what is now known about the mind/brain.

Cognitive linguistics has its origins in scholarship which emerged in the 1970s, conducted by a small number of researchers. These include Charles Fillmore,[1] George Lakoff,[2,3] Ronald Langacker,[4] and Leonard Talmy.[5,6] This research arose out of dissatisfaction with formal approaches, especially Generative Grammar[7,8] and Montague Grammar,[9–11] then dominant in the disciplines of linguistics and philosophy. While the origins of Cognitive linguistics were, in part, philosophical in nature, as is evident in the landmark 1980 publication, *Metaphors we Live By*, by Lakoff and Johnson, Cognitive linguistics has always been strongly influenced by theories and findings from the other cognitive sciences, particularly cognitive psychology, and more recently by the brain sciences, especially the interdisciplinary perspective known as cognitive neuroscience.

Cognitive linguists have typically adopted a number of distinct (although complementary) areas of focus. Some researchers within the enterprise have been exercised by the study of language structure and organization. This constitutes a sub-branch of Cognitive linguistics sometimes referred to as *cognitive approaches to grammar*. Notable

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exemplars include Construction Grammar, which in fact represents a family of (related) theories, including Radical Construction Grammar[12] and Cognitive Construction Grammar developed by Goldberg[13,14] and Lakoff,[15] as well as Cognitive Grammar, developed by Langacker[16–20] and Talmy's[21] work on the distinction between open and closed-class systems of language. Others have employed language as a means of studying aspects of conceptual organization and structure. The study of aspects of the mind, such as knowledge representation and meaning construction, employing language as a lens for doing so, is sometimes referred to as *cognitive semantics*. Exemplars include Mental Spaces Theory,[22,23] Conceptual Blending Theory,[24] and Conceptual Metaphor Theory[25,26] A further sub-branch relates to the study of word meanings, sometimes referred to as *cognitive lexical semantics*. Notable exemplars include the Principled Polysemy model,[27,28] and the work of Geeraerts on diachronic prototype semantics.[29] Some scholars have attempted to integrate the study of all three areas. A recent example is the Theory of Lexical Concepts and Cognitive Models (LCCM Theory).[30]

This article presents an overview of the primary theoretical commitments, assumptions and worldview of Cognitive linguistics. This will serve to provide an introduction to the major concerns and theoretical orientation of this rapidly expanding perspective. Hence, I survey the central tenets of Cognitive linguistics. I do so by firstly examining the primary commitments that practicing cognitive linguists subscribe to. I then examine the guiding assumptions, the default hypotheses, that follow from these commitments. And finally, I consider the theoretical and methodological worldview that is built upon these assumptions. The article concludes with an overview of recent trends, and new directions, in cognitive linguistic research.

THE COMMITMENTS OF COGNITIVE LINGUISTICS

Cognitive linguistics is guided by two primary commitments. Firstly, it takes seriously the cognitive underpinnings of language, the so-called *Cognitive Commitment*.[31] Cognitive linguists attempt to describe and model language in the light of convergent evidence from other cognitive and brain sciences. Secondly, cognitive linguists subscribe to a *Generalization Commitment*: a commitment to describing the nature and principles that constitute linguistic knowledge as an outcome of general cognitive abilities[31]–rather than viewing language as constituting, for instance, a wholly distinct encapsulated module of mind

(cf. Chomsky[32]; Fodor[33]). That is, rather than assuming that language arises solely from an innate prespecification, with a domain-specific learning mechanism, Cognitive linguistics assumes a domain-general learning mechanism that is highly sensitive to usage and frequency.[34] Clearly, there must be some prespecification for language learning, given that humans appear to the only species capable of language. However, cognitive linguists emphasize the importance of learning, in linguistic development, and in particular, domain-general sociocognitive abilities.[35,36]

The Cognitive Commitment

One defining feature of Cognitive linguistics is the Cognitive Commitment.[31] This represents a commitment to providing a characterization of language that accords with what is known about the mind and brain from other disciplines. It is this commitment that makes Cognitive linguistics cognitive, and thus an approach which is fundamentally interdisciplinary in nature.

The Cognitive Commitment represents the view that principles of linguistic structure should reflect what is known about human cognition from the other cognitive and brain sciences, particularly psychology, artificial intelligence, cognitive neuroscience, and philosophy. In other words, the Cognitive Commitment asserts that the models of language proposed should reflect what is known about the human mind, rather than purely esthetic dictates such as the use of particular kinds of formalisms or economy of representation.[37]

The Cognitive Commitment has a number of concrete ramifications. Firstly, linguistic theories cannot include structures or processes that violate what is known about human cognition. For example, if sequential derivation of syntactic structures violates time constraints provided by actual human language processing, then it must be jettisoned. Secondly, models that employ established cognitive properties to explain language phenomena are more parsimonious than those that are built from *a priori* simplicity metrics (such as Chomskyan elegance—the view that a theoretical model should eschew redundancy of representation in favor of parsimony as a matter of principle, regardless as to whether such is supported by the empirical facts). For instance, given the amount of progress cognitive scientists have made in the study of categorization[38] (see Lakoff[15] and Taylor[38] for reviews), a theory that employs the same mechanisms that are implicated in categorization in other cognitive domains in order to model linguistic structure is simpler than one that hypothesizes a separate system. Finally, the cognitive linguistic researcher is

charged with establishing convergent evidence for the cognitive reality of components of any model proposed—whether or not this research is conducted by the cognitive linguist.

The Generalization Commitment

The Generalization Commitment[31] represents a dedication to characterizing general principles that apply to all aspects of human language. This goal reflects the standard commitment in science to seek the broadest generalizations possible. In contrast, some approaches to the study of language often separate what is sometimes termed the 'language faculty' into distinct areas such as phonology (sound), semantics (word and sentence meaning), pragmatics (meaning in discourse context), morphology (word structure), syntax (sentence structure), and so on (see Pinker[39] for a case in point). As a consequence, there is often little basis for generalization across these aspects of language or for study of their interrelations.

While cognitive linguists acknowledge that it may often be useful to treat areas such as syntax, semantics, and phonology as being notionally distinct, cognitive linguists do not start with the assumption that the 'subsystems' of language are organized in significantly divergent ways. Hence, the Generalization Commitment represents a commitment to openly investigating how the various aspects of linguistic knowledge emerge from a common set of human cognitive abilities upon which they draw, rather than assuming that they are produced in an encapsulated module of the mind, consisting of distinct knowledge types or subsystems.

The Generalization Commitment has concrete consequences for studies of language. Firstly, cognitive linguistic studies focus on what is common among aspects of language, seeking to reuse successful methods and explanations across these aspects. For instance, just as word meaning displays *prototype effects*—there are better and worse examples of referents of given words, related in particular ways[15]—so various studies have applied the same principles to the organization of morphology,[40] syntax,[13,14] and phonology.[41] Generalizing successful accounts over distinct domains of language isn't just good scientific practice, this is also the way biology works; reusing existing structures for new purposes, both on evolutionary and developmental timescales.[42]

THE GUIDING ASSUMPTIONS OF COGNITIVE LINGUISTICS

In addition to the two primary commitments of Cognitive linguistics, the enterprise also features a number of guiding assumptions. These constitute default hypotheses, and arise on the basis of the primary commitments. These are:

1. the thesis of embodied cognition,
2. the thesis of encyclopedic semantics,
3. the symbolic thesis,
4. the thesis that meaning is conceptualization, and
5. the usage-based thesis.

These are elaborated below.

The Thesis of Embodied Cognition

This thesis is made up of two aspects. The first holds that the nature of reality is not objectively given, but is a function of our species-specific and individual embodiment—the subthesis of *embodied experience*.[15,25,26,28] Secondly, our mental representation of reality is grounded in our embodied mental states: mental states captured from our embodied experience—the subthesis of *grounded cognition*.[30,43,44]

The subthesis of embodied experience maintains that due to the nature of our bodies, including our neuroanatomical architecture, we have a species-specific view of the world. That is, our construal of 'reality' is mediated, in large measure, by the nature of our embodiment. One example of the way in which embodiment affects the nature of experience is in the realm of color. While the human visual system has three kinds of photoreceptors (i.e., color channels), other organisms often have a different number.[45] For instance, the visual system of squirrels, rabbits, and possibly cats, makes use of two color channels, while other organisms, including goldfish and pigeons, have four color channels. Having a different range of color channels affects our experience of color in terms of the range of colors accessible to us along the color spectrum. Some organisms can see in the infrared range, such as rattlesnakes, which hunt prey at night and can visually detect the heat given off by other organisms. Humans are unable to see in this range. The nature of our visual apparatus—one aspect of our embodiment—determines the nature and range of our visual experience.

A further consequence of the subthesis of embodied experience is that as individual embodiment within a species varies, so too will embodied experience across individual members of the same species. There is now empirical support for the position that humans have distinctive embodied experience due to individual variables such as handedness. That is, whether one is left- or right-handed influences the way in which

one evaluates concepts such as good and bad, and hence, important aspects of the way in which one experiences reality.[46]

The fact that our experience is embodied—that is, structured in part by the nature of the bodies we have and by our neurological organization—has consequences for cognition—the sub-thesis of grounded cognition. Put another way, the concepts we have access to, and the nature of the 'reality' we think and talk about, are grounded in the multimodal representations that emerge from our embodied experience. More precisely, concepts constitute reactivations of brain states that are recorded during embodied experience. Such reactivations are technically referred to as *simulations*—an idea I illustrate below. Simulations are grounded in multimodal brain states, which arise from our action and interaction with our sociophysical environment.[47] Such experiences include sensory–motor and proprioceptive experience, as well as states that arise from our subjective experience of our internal (bodily) environment, including our visceral sense, as well as experiences relating to mental evaluations and states and other subjective experiences, including emotions and affect more generally, and experiences relating to temporal experience. From the grounded cognition perspective, the human mind bears the imprint of embodied experience. The embodied experience and grounded cognition perspectives together make up the thesis of embodied cognition.

The Thesis of Encyclopedic Semantics

The thesis of encyclopedic semantics is also made up of two aspects. Firstly, it holds that semantic representations in the linguistic system, what is often referred to as *semantic structure,* interface with representations in the conceptual system. The precise details as to the nature of the relationship can, and indeed do vary, however, across specific cognitive linguistic theories. For instance, Langacker[16] in his theory of Cognitive Grammar equates semantic structure with conceptual structure, whereas Evans,[30] in his LCCM Theory, maintains that semantic structure and conceptual structure constitute two distinct representational formats, with semantic structure facilitating access to (some aspects of) conceptual structure. It is worth noting that the 'representational' view associated with the thesis of encyclopedic semantics is directly at odds with the 'denotational' perspective, what cognitive linguists sometimes refer to as *objectivist semantics*, as exemplified by some formal (i.e., truth-conditional) approaches to semantics.[48]

The second part of the thesis relates to the view that conceptual structure, to which semantic structure relates, constitutes a vast network of structured knowledge. This has been referred to as a *semantic potential*,[30] which is hence encyclopedia-like in nature and in scope.

By way of illustration, consider the lexical item *red*. The precise meaning arising from any given instance of use of the lexical item *red* is a function of the range of perceptual hues associated with our encyclopedic set of mental representations for red, as constrained by the utterance context in which red is embedded. For instance, consider the following examples (drawn from Evans)[30]:

(**1**) The school teacher scrawled in red ink all over the pupil's exercise book.

(**2**) The red squirrel is almost extinct in the British Isles.

In each of these examples, a distinct reactivation of perceptual experience, a simulation, is prompted for. In the example in (1) the perceptual simulation relates to a vivid red, while in (2) the utterance prompts for a brown/dun hue of red. In other words, the meaning of the lexical item *red* arises from an interaction between linguistic and conceptual representations, such that the most relevant conceptual knowledge is activated upon each instance of use. Examples such as those in (1) and (2) suggest that word meaning does not arise by unpacking a purely linguistic representation. Rather, it involves access to a potentially vast body of encyclopedic knowledge. A simulation, then, is a reactivation of part of this nonlinguistic encyclopedic knowledge.

A consequence of this is that each individual instance of word use potentially leads to a distinct interpretation. For instance, *fast* means something quite different in *fast car*, *fast food*, *a fast girl*, and *fast lane of the motorway*. This follows as any instance of use constitutes a distinct usage-event that may activate a different part of the encyclopedic knowledge potential to which a lexical item facilitates access.

The Symbolic Thesis

The symbolic thesis holds that the fundamental unit of grammar is a form-meaning pairing or *symbolic unit*. The symbolic unit is variously termed a *symbolic assembly* in Langacker's Cognitive Grammar,[16,20] or a *construction* in construction grammar approaches.[12–15] Symbolic units run the full gamut from the fully lexical to the wholly schematic. For instance, examples of symbolic units include morphemes (for example, *dis-* as in *distaste*), whole words (for example, *cat*, *run*, *tomorrow*), idiomatic

TABLE 1 | Examples of Symbolic Units

Type of Symbolic Unit	Traditional Name	Example
Complex and (mostly) schematic	Syntax	Form: NP *be*-TENSE VERB- *en by* NP Meaning: ACTION FROM PERSPECTIVE OF PATIENT
Complex and (mostly) specific	Idiom	Form: *pull*-TENSE NP's *leg* Meaning: TO TEASE AS A JOKE
Complex but bound	Morphology	Form: NOUN-*s* Meaning: MORE THAN ONE OF SOMETHING, Form: VERB-TENSE Meaning: TIME REFERENCE WITH RESPECT TO CODING TIME
Atomic and schematic	Word classes	Form: NOUN Meaning: THING, Form: VERB Meaning: TEMPORALLY-GROUNDED RELATION
Atomic and specific	Lexical items	Form: *The* Meaning: *specific entity*, Form: *cat* Meaning: *Felis domestica*
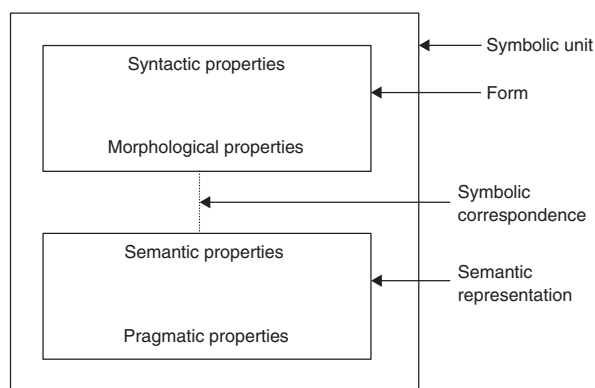
FIGURE 1 | A symbolic unit.

expressions such as *He kicked the bucket*, and sentence-level constructions such as the ditransitive (or double object) construction, as exemplified by the expression: *John baked Sally a cake* (see Goldberg[13]). Some examples of symbolic units are given in Table 1.

More precisely, the symbolic thesis holds that the mental grammar consists of a form, a semantic unit, and a symbolic correspondence that relates the two. This is captured in Figure 1. In other words, the symbolic thesis holds that our mental grammar comprises units, which consist of pairings of form and meaning.

One consequence of the symbolic thesis is that units that do not consist of pairings of form and meaning, such as the abstract rules posited in the generative tradition,[8,49] for instance, are excluded from a language user's mental grammar. Langacker[16] posits a *content requirement*, a principle that asserts that units of grammar must involve actual content: units of semantic structure and phonological form

(even if phonologically schematic), that are linked by a symbolic correspondence. Interestingly, the symbolic thesis, as manifested for instance in Langacker's content requirement, represents a return to some aspects of the core ideas of the American structuralist tradition, but with a significant reworking of the notion of meaning.

The adoption of the symbolic thesis has a number of important consequences for a model of grammar. Because the fundamental element is the symbolic unit, meaning achieves central status in cognitive linguistic approaches to grammar. This follows as the basic grammatical unit is a symbolic unit: form cannot be studied independently of meaning.

The second consequence is that as there is not a principled distinction between the study of semantics and syntax, the study of grammar is the study of the full range of units that make up a language, from the lexical to the grammatical. Cognitive linguists posit a 'lexicon-grammar continuum'[12,16] to capture this perspective. While the grammar of a language is made up of symbolic units, symbolic units exhibit qualitative differences in terms of their schematicity. At one extreme are symbolic units that are highly specified in terms of their lexical form and in terms of the richness of their semantic content. Such symbolic units—for example words—lie at the 'lexical' end of the lexicon-grammar continuum. At the other end, lie highly schematic symbolic units, schematic both in terms of phonological and semantic content. An example of a symbolic unit of this kind is the sentence-level ditransitive construction studied in detail by Goldberg.[13] Lexically unfilled sentence-level syntactic templates such as the ditransitive construction are

held to have a schematic form and schematic meaning conventionally associated with them as exemplified in (3):

(3a) Form: SUBJ VERB NP1 NP2
(3b) Meaning: X CAUSES Y TO RECEIVE Z

Symbolic units of this sort lie at the 'grammatical' endpoint of the lexicon-grammar continuum. While fully 'lexical' and 'grammatical' symbolic units differ in qualitative terms, they are the same in principle, being symbolic in nature, in the sense described. Moreover, examples such as these are extreme exemplars. A range of symbolic units exist in all languages, which occupy various points along the continuum, which are less extreme.

A third consequence is that symbolic units can be related to one another, both in terms of similarity of form and semantic relatedness. One manifestation of such relationships is in terms of relative schematicity or specificity, such that one symbolic unit can be a more (or less) specific instantiation of another. Cognitive linguists model the relationships between symbolic units in terms of a network, arranged hierarchically relating to levels of schematicity. This is an issue I return to below when I discuss the usage-based thesis.

Finally, constituency structure—and hence the combinatorial nature of language—is a function of symbolic units becoming integrated or fused in order to create larger grammatical units, with different theorists proposing slightly different mechanisms for how this arises. For instance, Langacker[16] holds that constituency structure emerges from what he terms *conceptually dependent (or relational) predications*, such as verbs, encoding a schematic slot, termed an *elaboration site*. The elaboration site is filled by *conceptually autonomous (or nominal) predications*, such as nouns. In contrast, Goldberg,[13] in her theory of Cognitive Construction Grammar, argues that integration is due to a fusion process that takes place between verb-level slots, what she terms *participant roles*, and sentence-level *argument roles*—see Evans[30] for further discussion of these issues.

The Thesis that Meaning is Conceptualization

Language understanding involves the interaction between semantic structure and conceptual structure, as mediated by various linguistic and conceptual mechanisms and processes. In other words, linguistically mediated meaning construction doesn't simply involve compositionality, in the Fregean sense,

whereby words encode meanings, which are integrated in monotonic fashion such that the meaning of the whole arises from the sum of the parts—see Evans[30,50] for critical discussion of this notion of compositionality. Cognitive linguists subscribe to the position that linguistically mediated meaning involves conceptualization, which is to say, higher order cognitive processing, some (or much) of which is nonlinguistic in nature. In other words, the thesis that meaning is conceptualization holds that the way in which symbolic units are combined during language understanding gives rise to a unit of meaning which is nonlinguistic in nature—the notion of a simulation introduced above—and relies, in part, on nonlinguistic processes of integration.

There are two notable approaches to meaning construction that have been developed within Cognitive linguistics. The first is concerned with the sorts of nonlinguistic mechanisms central to meaning construction that are fundamentally nonlinguistic in nature. Meaning construction processes of this kind have been referred to as backstage cognition.[23] There are two distinct, but closely related, theories of backstage cognition: Mental Spaces Theory[22,23] and Conceptual Blending Theory.[24] Mental Spaces Theory is concerned with the nature and creation of *mental spaces*, small packets of conceptual structure built as we think and talk. Conceptual Blending Theory is concerned with the integrative mechanisms and networks that operate over collections of mental spaces in order to produce emergent aspects of meaning—meaning that is in some sense novel.

A more recent approach is the LCCM Theory,[30,50] named after the two central constructs in the theory: the *lexical concept* and the *cognitive model*. LCCM Theory is concerned with the role of linguistic cues and linguistic processes in meaning construction (lexical concepts) and the way in which these lexical concepts facilitate access to nonlinguistic knowledge (cognitive models) in the process of language understanding. Accordingly, as the emphasis is on the nature and the role of linguistic prompts in meaning construction, LCCM Theory represents an attempt to provide a *front-stage approach* to the cognitive mechanisms, and specifically the role of language, in meaning construction.

The Usage-Based Thesis

The final thesis to be discussed is the usage-based thesis. This holds that the mental grammar of the language user is formed by the abstraction of symbolic units from situated instances of language use: utterances—specific usage-events involving symbolic units for purposes of signaling local and contextually

relevant communicative intentions. An important consequence of adopting the usage-based thesis is that there is no principled distinction between knowledge of language and use of language, because knowledge emerges from use. From this perspective, knowledge of language *is* knowledge of how language is used.

This perspective stands in stark contrast to the Chomskyan assumption that the (linguistic) environment is impoverished—the so-called the *poverty of the stimulus*.[39] In point of fact, there are a wide range of cues (social, linguistic, statistical) that children use when learning language,[35] and infants and adults have been repeatedly shown to be highly sensitive to these cues. In addition, there is substantial evidence for domain-general learning mechanisms[35,36]—contra Chomsky's domain-specific device.[7] Moreover, it is now apparent how sophisticated humans are at statistical learning based on linguistic input.[51] It is not necessary to posit the existence of innate linguistic knowledge (UG), nor do we require a *language acquisition device*.

The symbolic units that come to be stored in the mind of the language user emerge through processes of *abstraction* and *schematization*,[52] based on *pattern recognition* and *intention reading* abilities.[35,53–55] Symbolic units thus constitute what might be thought of as *mental routines*,[16] consisting, as we have seen, of conventional pairings of form and meaning.[13,14]

One of the consequences of the usage-based thesis is that symbolic units exhibit degrees of *entrenchment*—the degree to which a symbolic unit is established as a cognitive routine in the mind of the language user.[16,20] Moreover, entrenchment of usage and its effects may be different for different users. If the language system is a function of language use, then it follows that the relative frequency with which particular words or other kinds of symbolic units are encountered by the speaker will affect the nature of the grammar. That is, symbolic units that are more frequently encountered become more entrenched. Accordingly, the most entrenched symbolic units tend to shape the language system in terms of patterns of use, at the expense of less frequent and thus less well entrenched words or constructions. Hence, the mental grammar, while deriving from language use, also influences language use.

A further consequence of the usage-based thesis is that by virtue of the mental grammar reflecting symbolic units that exist in language use, and employing cognitive abilities such as abstraction to extract them from usage, the language system exhibits redundancy. That is, redundancy is to be expected in the mental grammar.
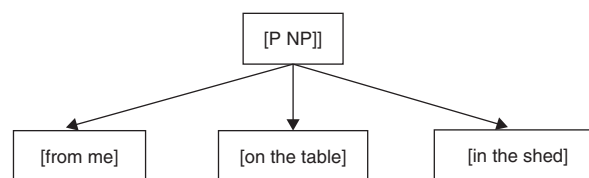

FIGURE 2 | Schema-instance relationships.

As noted earlier, symbolic units are modeled in terms of a network. Redundancy between symbolic units is captured in terms of a hierarchical arrangement of *schema-instance* relations holding between more schematic and more specific symbolic units.[52] By way of illustration, Figure 2 captures the schema-instance relationships that hold between the more abstract [P [NP]] symbolic unit and the more specific instances of this abstract schema, such as [*from me*]. The usage-based thesis predicts that as [P [NP]] is a feature of many (more specific) instances of use, it becomes entrenched in long-term memory along with its more specific instantiations. Moreover, the schema ([P [NP]]) and its instances (e.g., [*from me*]) are stored in related fashion, as illustrated in Figure 2.

THE WORLDVIEW OF COGNITIVE LINGUISTICS

The primary commitments and theses of Cognitive linguistics give rise to a specific and distinctive worldview, which has a number of dimensions. Collectively, these give rise to a distinctive cognitive linguistic perspective on the nature of language and its interaction with nonlinguistic aspects of cognition. In this section, five dimensions of the Cognitive linguistics worldview have been identified and elaborated.

Language Reflects Conceptual Organization

Following the thesis of embodied cognition, cognitive linguists view language as reflecting the embodied nature of conceptual structure and organization. Hence, cognitive linguists study language by taking seriously the way language manifests embodied conceptual structure.

An outstanding example of this is the study of *conceptual metaphor*.[25,26,56] For instance, it is claimed by conceptual metaphor theorists that humans use language relating to more abstract domains such as Time in terms of Space, as exemplified by the example in (4), or states in terms of locations exemplified in (5), precisely because at the level of conceptual structure Time is systematically structured in terms of conceptual structure recruited from the domain of

space, and states are structured in terms of locations in space.

(4) Christmas is *approaching*.

(5) She is *in* love.

Language is a Lens on the Mind

Secondly, language serves as a lens for studying aspects of the mind. It does so, cognitive linguists argue, precisely because it reflects organizational principles of embodied cognition—language does not run on principles associated with an encapsulated module divorced from the rest of cognition, as held by Chomsky.[32] For instance, by studying metaphorical patterns in language, the cognitive linguist is able to discern patterns in the nature and organization of conceptual structure. Conceptual metaphors, *qua* cross-domain mappings—mappings that relate distinct conceptual domains in asymmetric fashion—are evidenced by virtue of examining distinctive and productive patterns in language to uncover their existence.

Of course, in keeping with the Cognitive Commitment, linguistic evidence for conceptual structure must be supplemented with *converging evidence* from the other cognitive sciences. Evidence supporting some of the main claims made by Conceptual Metaphor Theory, for instance with respect to Time-as-Space metaphors, has emerged on the basis of gestural studies,[57] and behavioral experiments (Box 1).[58–60]

BOX 1

CONVERGING EVIDENCE

Given the interdisciplinary nature of Cognitive linguistics, cognitive linguists often employ converging evidence in support of their perspectives and theories. In addition to drawing upon the traditional methods of language science—intuition and theoretical analysis—in order to generate hypotheses, practicing cognitive linguists increasingly draw upon findings from a broad range of methods from a range of behavioral and brain sciences in order to substantiate their theoretical assertions. These provide converging lines of evidence in support of claims. Findings commonly drawn upon include those deriving from linguistic corpora, gesture studies, and sign language, discourse analysis, experimental methods in the discipline of psycholinguistics, behavioral experiments from cognitive psychology, brain scanning, and imaging methods from cognitive neuroscience, as well as computational modeling.[61]

Language Provides a Mechanism for Construal

A given language is constituted of a language-specific inventory of symbolic units. Following the symbolic thesis, any given language provides a means of viewing the same state, situation, or event from the range of perspectives that are conventionally available to the language user—given the language-specific symbolic resources available. In other words, a language provides the language user with resources for viewing the same scene in multiple, and hence alternative, ways. This constitutes a mechanism for *construal*. Construal is a technical term, within Cognitive linguistics, for the facility whereby the same situation can be linguistically encoded in multiple ways. For example, someone who is not easily parted from his or her money could be either described as *stingy* or as *thrifty*. In keeping with the thesis of encyclopedic semantics, each of these words is understood with respect to a different background frame or cognitive model, which provides a distinct set of evaluations. While *stingy* represents a negative assessment against an evaluative frame of giving and sharing, *thrifty* relates to a frame of Careful Management of Resources (Husbandry), against which it represents a positive assessment. Hence, lexical choice provides a different way of framing ostensibly the same situation, giving rise to a different construal.[1]

Indeed, any given language, by virtue of containing a language-specific set of symbolic units, thereby provides a ready-made language-specific repertoire for construing human experience, and the world in, necessarily, different ways. One reason for this is because different languages often encode culture-specific ideas and hence perspectives. For instance, the Korean word *nunchi,* which might be translated as 'eye-measure' in English, provides a conventionalized means of encoding the idea that a host evaluates whether a guest requires further food or drink in order to avoid the guest being embarrassed by having to request it.

Of course, languages provide conventional means of alternate construals even when two similar ideas are both conveyed in two different languages. For instance, both English and French—genetically and areally related—have conventional means of expressing the notion of containment: the preposition *in* for English and *dans* for French. Yet, the scene involving a boy walking in the rain is conventionally construed, in English, as exhibiting a 'containment' relationship, as evidenced by (6) but in French as exhibiting an 'under' relationship, as encoded by the French preposition *sous*, evidenced in (7).

(6) The boy is walking in the rain.

(7) Le gamin marche sous la pluie.

The boy walks under the rain.

'The boy is walking in the rain'

What is remarkable about these examples is what they illustrate about the way in which two relatively closely related languages conventionally construe a similar, everyday experience in what amounts to quite different ways.

Language Influences Nonlinguistic Cognition

The discussion of the English and French utterances in (6) and (7) also helps illustrate the fourth dimension of the Cognitive linguistics worldview. As language provides a means of construing reality in alternate ways, and moreover, remains connected to conceptual representation, it has a transformative function: It can influence aspects of nonlinguistic cognition. That is, language doesn't merely reflect conceptual representation; it can influence and affect it. For instance, as French and English each have conventionalized alternative ways of encoding a particular spatial scene, this leads to what Slobin[62] has labeled differences in *thinking for speaking*: Users of any given language must pay attention to particular aspects of their experienced reality, at the expense of others, in order to package their thoughts for purposes of linguistic communication.

Cognitive linguists hold that this language-specific 'packaging' has profound consequences on nonlinguistic cognition. That is, language influences how we categorize aspects of our sociophysical environment, and how we think about reality, independently of language. For example, based on behavioral findings, Lera Boroditsky[63,64] has concluded that cross-linguistic differences in construing both time and gender influences performance of nonlinguistic activities. This view is of course part of a resurgence in work by linguists of various theoretical stripes who are increasingly vocal in advocating a neo-Whorfian perspective on the relationship between language and nonlinguistic cognition. This resurgence can be traced to the seminal work of John Lucy[65,66] on categorization. Since then, the Neo-Whorfian perspective has been applied to a broad range of domains, perhaps most notably space,[67] and color perception.[68]

A classic illustration of the way in which language can influence thought comes from an experiment carried out by Gentner and Gentner.[69] In their work, Gentner and Gentner trained different

TABLE 2 | Hydraulic System Model

Hydraulic System	Electric Circuit
Pipe	Wire
Pump	Battery
Narrow pipe	Resistor
Water pressure	Voltage
Narrowness of pipe	Resistance
Flow rate of water	Current

Source: Gentner and Gentner (1982, p. 110).

TABLE 3 | Moving Crowd Model

Moving Crowd	Electric Circuit
Course/passageway	Wire
Crowd	Battery
People	Resistor
Pushing of people	Voltage
Gates	Resistance
Passage rate of people	Current

Source: Gentner and Gentner (1982, p. 120).

English-speaking subjects in 'analogical models' of electricity. An analogical model relies upon a relatively well-known scenario or system for understanding a less well-known system, where the parts and relations of the well-known system stand in a similar relation to those in the less well-known system, here electricity. Through analogy, subjects can reason about electricity using the well-known model.

In the experiment, one group was taught that electricity can be represented as a teeming crowd of people, while another group was taught that electricity can be represented as water flowing through a pipe, as in a hydraulic system. The mappings between these two analogical models and an electrical circuit are summarized in Tables 2 and 3.

Importantly, each analogical model correctly predicted different aspects of the behavior of an electrical circuit, but was no help with other aspects. For example, a circuit with batteries connected serially will produce more current than a circuit with batteries in parallel. This is predicted by the analogy based on the hydraulic system, where serial pumps one after the other will produce a greater flow rate of water. In the moving crowd model, where the battery corresponds simply to the crowd, it is difficult to think of a meaningful contrast between a serial and a parallel connection.

Serial resistors in an electrical circuit reduce current, while parallel resistors increase it. The moving

crowd model is better at predicting this aspect of the behavior of electricity, where resistance is modeled in terms of gates. Parallel gates allow more people through, while serial gates allow fewer people through.

Gentner and Gentner hypothesized that if subjects used different analogical models to reason about the circuit, then each group should produce dramatically divergent results, which is exactly what they found. Subjects who were trained in the hydraulic system model were better at correctly predicting the effect of serial versus parallel batteries on current, while subjects who were familiar with the moving crowd model were better at predicting the effect of serial versus parallel resistors on current. This study reveals that different 'choices' of language for representing concepts can indeed affect nonlinguistic thought, such as reasoning and problem solving.

A Common Human Conceptualizing Capacity

Of course, one of the charges that is leveled at those who subscribe to a (neo)-Whorfian perspective is that this entails that language determines how the world is viewed and categorized. If this view were correct, language would effectively provide a straightjacket, resulting in wholly distinct ways of conceptualization across languages and language users, which would be insurmountable.

However, the Cognitive linguistics worldview treats language as but one of the mechanisms whereby humans construct their perceptual, cognitive, and sociocultural reality. Cognitively modern humans have a common conceptualizing capacity: we share with our conspecifics a similar range of cognitive mechanisms and processes that provide us with multiple ways of construing reality. Language is but one modality, and hence, but one way in which we interact with and learn about our environment, our sociocultural reality, others around us and ourselves. Cognitive linguists fully recognize that there are myriad ways in which humans experience their environment, including sense-perceptory experience, proprioception, and subjective experiences including affect, the visceral sense and diverse cognitive evaluations and states. All of these experiences provide a rich basis for a multiplicity of mental representations, providing often complementary and even competing 'views' of reality. From the perspective of Cognitive linguistics, semantic structure encoded by language can influence our conceptualizations, and other outputs of cognitive function, such as categorization, for instance. However, language does not determine them.

CONCLUSION

Cognitive linguistics is a contemporary approach to meaning, linguistic organization, language learning and change, and conceptual structure. It is also one of the fastest growing and influential perspectives on the nature of language, the mind, and their relationship with sociophysical (embodied) experience in the interdisciplinary project of cognitive science. What provides the enterprise with coherence is its set of primary commitments and central theses. Influential theories within the enterprise have afforded practicing cognitive linguists the analytical and methodological tools with which to investigate the phenomena they address. What makes Cognitive linguistics distinctive in the contemporary study of language and mind is its over-arching concern with investigating the relationship between human language, the mind and sociophysical experience. In doing so, Cognitive linguistics takes a clearly defined and determinedly embodied perspective on human cognition. And in this, cognitive linguists have developed a number of influential theories within the interdisciplinary project of cognitive science which self-consciously strive for (and measure themselves against) the requirement to be psychological plausible, given what is now known about the mind/brain.

As it has developed, Cognitive linguistics has inevitably had to grapple with specific problems. Some of the most notable of these remain unresolved. One for instance, relates to the nature of concepts. For instance, what is the difference, if any, between linguistic versus conceptual meaning? Some high-profiled cognitive linguists have, at times, appeared to suggest that linguistic meaning is to be equated with conceptual meaning.[16] Yet, findings in Cognitive linguistics—for instance, the distinction between the closed-class and open-class systems in Cognitive Representation, as persuasively argued for by Talmy[21]—would seem to suggest a more clear-cut distinction. Evans[30] has argued, more recently, for a principled separation between linguistic versus nonlinguistic concepts. Such a separation would seem to be supported by linguistic, behavioral and neuroscientific findings. Yet, some prominent psychologists[70] appear to have underestimated the complexity of linguistic concepts, denying that language has conceptual import independent of the conceptual system. Others have gone the other way,[71] arguing, along the lines of Evans, for a principled separation between the two knowledge types—see also Zwaan[72]; and Taylor and Zwaan.[73] The issue of the relative semantic contribution of linguistic knowledge versus conceptual knowledge to meaning construction is a complex one, and at present is unresolved. Clearly,

communicative meaning relies on language as well as nonlinguistic knowledge.[74] As of yet, however, the relative contribution, and the way the two systems interface, is still not fully resolved.

Another outstanding issue relates to the domain of time. A common assumption within Cognitive linguistics holds that abstract patterns in thought and language derive from the projection of structure across domains—the notion of conceptual metaphor.[25,26] However, it is not clear, in the domain of time, for instance, that time is created by virtue of the projection of spatial content, as is claimed by Lakoff and Johnson.[26] Some researchers[27,75,76] have argued that time is as basic a domain as space.[27,75,76] Moreover, recent interest in reference strategies in the domain of time cast doubt on a straightforward projection of space to time.[77–79]

In addition, there are two issues that have come to the fore in recent work in Cognitive linguistics. These are areas that have not been prominent in earlier research within the enterprise. Both of these areas bear special mention. The first is language evolution. Recent cognitively oriented account have applied core insights from Cognitive linguistics to the nature of language change and its evolution.[80–82] The second is the so-called 'social turn', whereby a cognitive sociolinguistics has begun to be developed.[83]

In terms of methodology, Cognitive linguistics has now well-established criteria and analytic frameworks for the analysis of linguistic and nonlinguistic phenomena. There is an excellent collection detailing empirical methods in Cognitive linguistics[61] as well as informed views on methodology, in general, in the literature, for example, with respect to lexical semantics.[84,85] Since its inception in the mid to late 1970s, Cognitive linguistics has matured in terms of theories, methodologies, and scope. It is now firmly established as a fundamental and impressively broad field of enquiry within linguistics and cognitive science. It features a number of prominent journals, including the journal of the International Cognitive linguistics Association (ICLA), *Cognitive linguistics*, and since 1990 a series of biennial international conferences run under the aegis of the ICLA. Cognitive linguistics is now, arguably, the fastest growing area of language science and represents an endlessly exciting field to work in for the aspiring researcher.

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