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Linguistic Relativity in Cross-Cultural Context: Converging Evidence From Neuroanthropology

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Abstract

Kemmerer’s discussion of links between semantic typology and embodied cognition is welcome, especially his survey of available evidence. Focusing on mechanisms of embodied enculturation, however, we must understand that language is just one part of developmental assemblies that shape cognition, alongside other cultural elements such as sensory learning, behavior patterns, social interactions, and emotional experience. We believe that a source of this problem is an obsolete definition of “culture” as shared mental information that is inconsistent with models of embodied cognition and yet pervasive in human and cognitive sciences. We point to microethnographies of cognitive ecologies as a tractable remedy.

Keywords: Neuroanthropology; Microethnography; Dynamic assemblage; Embodied cognition; Human echolocation

From our perspective as researchers interested in the cultural canalization of neurological and cognitive variation, David Kemmerer’s (2023) discussion of the links between semantic

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typology and embodied cognitive science is welcome. His wide-ranging review of recent research in semantic typology reinforces the necessity of incorporating a much broader recognition of cultural diversity into cognitive science. We agree with Kemmerer that linguistic variation is too little discussed in the field. As his account so richly demonstrates, the estimated 6,500 extant languages evidence dramatic variation; even fundamental aspects of language, often treated as universal by Western theorists, can operate in profoundly diverging ways (see also Evans & Levinson, 2009). As Kemmerer writes, extant languages “exhibit far more differences in the lexical partitioning and packaging of particular conceptual domains, and in the aspects of experience that they require speakers to regularly express in grammatical morphemes and constructions and hence habitually track.” His review convincingly shows that one consequence of appreciating cognitive embodiment and its developmental emergence is a requirement to take account of just how profoundly the variation in languages can influence forms of cognition.

However, even though Kemmerer himself is careful not to overstate his claim, the under-specification in his article of the mechanisms through which linguistic variation influences neurocognitive variability leaves us concerned. If researchers are genuinely interested in exploring how language can shape cognition in specific contexts—rather than just highlighting correlation—then an extra level of precision is required, especially to consider linguistic embodiment. Discussing solely how semantic structure influences cognition not only neglects non-linguistic dimensions of enculturation; it also fails to acknowledge that linguistic practice often exercises influence through pragmatic rather than purely semantic channels. Semantic structures are embodied strongly precisely because they are also, simultaneously, reinforced through non-semantic mechanisms: language is confirmed and embedded in sensory perception, everyday activities, habits, attention, emotional reactions, skills, and social interaction. If researchers focus exclusively on linguistic relativity absent reference to other channels of enculturation, this can reinforce a bias toward excessively representational models in cognitive theory more generally—biases that embodied cognition has long sought to overturn.

We can simultaneously demonstrate this issue and provide a remedy by examining the shortcomings in the definition of “culture” that Kemmerer adopts—one common in fields like cognitive science, psychology, and cultural evolution, but very much out-of-step with approaches in biocultural anthropology. Non-anthropologists often assume that human diversity is best characterized as clearly bounded populations—“cultures” or linguistic groups that resemble ethnic groups. These “cultures” are described as sharing a body of stored semantic or symbolic information. In this approach, “culture” can be treated as a uniform body of shared information with a clearly defined boundary, and language often serves as the best analog and a central component. Kemmerer describes “cultures” as “held together by common ground—that is, the customs, beliefs, attitudes, institutions, and so on, that define a particular society and that *all members understand and accept* by virtue of a sophisticated form of mentalizing (a.k.a. theory of mind) that may be uniquely human” (emphasis added). He focuses, not surprisingly, on semantic structure. In this model, “words in the local language ... encode the most plentiful publicly shared concepts,” facilitating “brain-to-brain coupling.”

There are three issues with this definition of culture. First, the definition is implicitly derived from an internalist representational model of cognition. This contradicts both embodied accounts of cognition and the profound variation in semantic typology that Kemmerer

discusses. Limiting culture to shared sets of information stored as representations in the head not only raises a host of conceptual problems; it also overlooks the diverse range of cultural features and elements that cannot be characterized this way. Diets, footwear, bodily techniques, and animal husbandry—to name only a few examples—all have significant impacts on embodied cognition (Henrich et al., 2022). But describing these only in terms of shared information mischaracterizes them as epiphenomenal to mental representations.

Second, the definition assumes that groups share a uniform body of cultural information, “beliefs,” or “attitudes.” This view contradicts many decades of anthropological work that resoundingly shows internal diversity, even in small groups considered homogeneous by outsiders (D’Andrade, 1987). Groups are not only divided by generation, education, status hierarchies, and specialist knowledge; they are also often home to fierce internal debate, disagreement, even outright opposition. Linguistic practice can differ markedly, even within small groups, sometimes due to gendered language norms or the need to perform linguistically markers of status (Agha, 2006). Specialists have their own beliefs and concepts, and unevenly divided skills or occupations can lead to a varied distribution of forms of embodiment. Within a group that shares a common language, the effects of disability, gender, class, and race may also influence language and embodiment.

Downey (2021), for example, worked with a group of vision-impaired (VI) individuals able to use active echolocation to navigate and avoid obstacles; they perceived space through the echoes of palatal tongue clicks. These individuals share a vocabulary with surrounding, sighted individuals (or as one VI person referred to them: “light dependent”). The echolocators sometimes use visual vocabulary to describe what they perceive through active echolocation, which they call “FlashSonar.”™ They may tell each other to “look over here” or ask, “do you see that?” even when they are discussing perceptions through audition. This use of visual vocabulary (specifically, “look”) to describe the dominant sense modality is consistent with findings by Landau and Gleitman (1985, p. 69), although the vision-impaired children they observed used it to describe haptic examination. The persistent practice and early adoption of active echolocation can also lead to observable differences in brain function, including recruitment of the calcarine cortex or “primary visual processing” areas in the posterior brain (V1) for echo interpretation, a dramatic case of an embodied cognitive substrate to a perceptual capability (for a review, see Thaler, Arnott, & Goodale 2011).

The word, “FlashSonar,” does not inflect embodied cognition in semantic isolation. Rather, the behavioral and social assemblage of the concept helps to anchor—the constant daily use of echolocation, exploratory sensory behaviors, acute attention to fine auditory distinctions, social interactions including through language that reinforce desire for the skill and confidence, and even role modeling, together—shape, over developmental time, a specialized form of embodied cognition. The language VI echolocators use is virtually identical not only to sighted individuals but also to other VI people who wayfind through other means (e.g., guide dogs, memorized routes, and electronic aids) and do not develop the embodied cognitive correlates of expert echolocation. The semantic element, “FlashSonar,” is part of a dynamic assemblage of resources, a developmental niche of structured experiences, social supports, explicit lessons, and changed expectations. The semantic reference is fundamental to the emergence of this type of variation, but language alone cannot explain

how the neurological adaptations that subserve the perceptual skill emerges nor is a word or concept sufficient to create the distinctively embodied cognitive actor (Downey, 2021).

Wnuk and Majid (2014, p. 127) make a similar point about primary olfactory terms in the Aslian language, Maniq. Members of the community routinely discuss aromas, which are essential to ritual, medicinal practices, and avoiding hazards in everyday life. Linguistic practice, especially high stakes, emotionally salient discussions around socially reinforced and repeated behaviors, can recruit the assemblage of resources—neurological, motivational, and developmental—that produce highly derived forms of neurocognitive embodiment. Simply having a linguistic resource is not sufficient; how the resource is deployed matters crucially for its developmental effects.

These examples also raise a third critique: that the metaphor of “brain-to-brain coupling” not only misrepresents the mismatches, partial conversions, disagreement, and diversity within linguistic and cultural communities but it also simplifies the complex mechanisms that build up culturally diverse forms of embodied cognition. The “brain-to-brain coupling” metaphor compresses the developmental timeframe of cultural handover, the guided rediscovery, the staged scaffolding of experience, and the construction of developmental niches that enculture embodied cognitive actors. The metaphor conceals the sites of language practice that contribute to cultural varieties of embodiment. These are precisely the sites in which close study—what we call “microethnographic” analysis of cognitive ecology—can be so rewarding. In these sites, we can better see the behavioral, pragmatic, and social mechanisms through which specific semantic constellations become embodied. Our sense is there is no single account that will cover the rich variety of ways that language and embodied practice, sensory experience, and other factors build up culturally diverse forms of cognition. We should not mistake the outcome of linguistic analysis—semantic typologies—for the cognitive and neurological mechanisms that subserve linguistic practice or instill cognitive diversity.

In making our critique, we recognize that the simplified model of “culture as information,” presented in one section of the article, is not essential to Kemmerer’s argument about the importance of considering semantic variation for cognitive science. We find Kemmerer’s argument compelling, and the examples offered persuasive. But we are worried that such a rich consideration of cultural variation alongside a limited and obsolete definition of culture is inconsistent and ill-suited for the task of investigating embodied cognition because of its conceptual baggage of internalism and representationalism. We urge Kemmerer and others that if they want to theorize cognition in the wild comprehensively, then microethnographies of cognitive ecologies are crucial. Grounded cognition needs to be based on a variety of rich real-world case studies of communities of practice—not just thought experiments or correlations in data—where we can see the mechanisms through which semantic typologies are embedded by pragmatic engagements in embodied cognition.

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