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Implications of Grounded Cognition for Conceptual Processing Across Cultures

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Abstract

Cross-linguistic differences in concepts have implications for all theories of concepts, not just for grounded ones. Failure to address these implications does not imply the belief that they do not exist. Instead, it reflects a division of labor between researchers who focus on general principles versus cultural variability. Furthermore, core principles of grounded cognition—empirical learning and situated conceptual processing—predict large cultural differences in conceptual systems. If asked, most grounded cognition researchers would anticipate and endorse these differences, as would most researchers from other perspectives. Finally, by incorporating ethnographic and linguistic analysis, grounded cognition researchers can examine how cultural differences manifest themselves in conceptual systems.

Keywords: Concepts; Categories; Culture; Language; Grounded cognition; Situation

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1. Implications of linguistic relativity for *all* theories of concepts

I fully agree with David Kemmerer's proposal that "When [grounded cognition] is forced to confront … crosslinguistic differences, its core hypothesis must be modified so … that modal brain systems for perception and action not only … ground the sensory and motor features of concepts, but do so in ways that are, to a nontrivial extent, language-specific" (Kemmerer, in press, p. 15). The extensive evidence that Kemmerer reviews in his target article clearly supports the proposal that conceptual systems vary across cultures, similar to previous proposals (e.g., Atran & Medin, 2008; Majid, Bowerman, Staden, & Boster, 2007; Majid, Jordan, & Dunn, 2015; Malt & Majid, 2013; Medin & Atran, 2004; Medin et al., 2006). Kemmerer focuses on the implications of these findings for grounded theories of concepts: As languages vary, the grounding of conceptual systems is likely to vary as well.

t These findings, though, have similar implications for *all* theories of concepts. They have, for example, the same implications for amodal theories. If an amodal theory of concepts turned out to be correct the evidence for cross-cultural variation in concepts would similarly imply that amodal concepts vary across cultures. If so, then why single out grounded theories of concepts for special attention? Why not draw the implications of this evidence for all theories of concepts?

2. Division of scientific labor in the study of concepts

In the study of concepts, decades of research have focused on issues surrounding representation and process. Are concepts represented by definitions, prototypes, exemplars, attractors, and so forth? How is category membership established for perceived entities and events in the environment? How are inferences drawn that go beyond the information given? How are categories learned? How are concepts combined?

While addressing these kinds of issues, concepts researchers often begin by searching for principles likely to hold within their specific language and culture (Posner & Keele, 1968; Rosch & Mervis, 1975; Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976; Smith & Medin, 1981). Some of these researchers might have even believed that a subset of these principles holds across languages and cultures (and even across species; e.g., Medin & Schaffer, 1978; Wasserman, Kiedinger, & Bhatt, 1988; Zentall, Wasserman, Lazareva, Thompson, & Rattermann, 2008). Importantly, however, searching for these kinds of principles does not imply the further belief that important differences between languages, cultures, and species are absent. Indeed, Rosch came from a background in cultural psychology, and Medin's later work championed cultural differences in concepts. Thus, it is possible to search for important principles that underlie a single language or multiple languages while simultaneously assuming that important differences exist between them. Indeed, many cross-cultural researchers who study concepts believe that conceptual development reflects both biologically based universals and cross-cultural variation (e.g., Atran & Medin, 2008; Malt, 1995; Medin & Atran, 2004; Waxman et al., 2007).

What about grounded cognition researchers? As Kemmerer (in press) notes, these researchers often focus on whether conceptual processing utilizes multimodal systems across the brain, overlapping with processes that underlie perception and action. Focusing on overlapping processes within a language—and even assuming that a general overlap principle holds across all languages—does not imply the belief that the overlap principle manifests in the same way across languages. Examining and defending the basic overlap principle has been sufficiently demanding to keep grounded cognition researchers busy. Examining its cross-cultural variation might have seemed like a wee bit of an indulgence at the time, albeit no doubt a potentially interesting one, as Kemmerer demonstrates compellingly.

Over the years, a division of labor has emerged in the study of conceptual systems. Whereas some researchers have searched for principles within a single language or across languages, other researchers have focused on cross-linguistic differences. One can certainly second-guess this division of labor. Perhaps research on concepts would have made more progress under a different division. Perhaps research would have made more progress by simultaneously examining universals and cultural variation together. Tellingly, some concepts researchers have indeed worked from an integrated perspective for years (Atran & Medin, 2008; Malt, 1995; Medin & Atran, 2004; Waxman et al., 2007).

Regardless, it does not follow from how research communities have evolved that one community necessarily denies the findings of the other. To my mind, at least, both communities have been contributing different evidence and insights into the nature of conceptual systems. Although I have never performed cross-cultural research, I have always assumed, based on the kinds of evidence that Kemmerer (in press) cites—that large cross-cultural differences exist and that theories of the conceptual system must explain them.

3. Do grounded cognition researchers assume that concepts are constant across languages?

Kemmerer (in press) makes the surprising claim (to my mind at least) that "advocates of [grounded cognition] appear to adopt, at least implicitly, the naïve and incorrect view that the meanings of words in English and a few other familiar languages not only map onto reality in a fairly natural and impartial manner, but also exemplify the sorts of concepts found in languages worldwide" (p. 7). Interestingly, no references are provided for researchers who appear to be making this assumption. Again, however, following the division of labor just described, an alternative explanation is that, while busy addressing the overlap issue, grounded cognition researchers simply have not had the time and resources to address cross-cultural issues.

What might these researchers say, though, if asked whether cross-cultural differences in conceptual grounding exist? To answer this question, consider two core assumptions that grounded cognition researchers typically make:

1. Empirical learning plays a central role in concept acquisition.
2. Conceptual processing is situated.

Let'ss explore each of these assumptions in turn.

3.1. Empirical learning

The first assumption lies at the heart of grounded cognition. As sensory-motor states in the brain emerge during situated action with the environment, memory systems capture these states for future representational use to support the spectrum of cognitive functions (Anderson, 2010; Barsalou, 1999, 2008). Furthermore, as selective attention focuses on the same kind of entity or event during situated action, the resulting sensory-motor memories become organized into a category associated with the corresponding word. As an individual interacts with an apple, for example, sensory-motor states associated with seeing, smelling, grasping, eating, tasting, and hearing apples become active in relevant sensory-motor areas of the brain and are then captured by relevant memory systems to establish an episodic memory of the experience (e.g., Chen, Papies, & Barsalou, 2016; Simmons, Martin, & Barsalou, 2005). As the same kind of entity or event is experienced over time—often in the context of situated action—the resulting population of multimodal memories becomes integrated to establish a conceptual representation of the category, often associated with a word for it (e.g., *apple*; Barsalou, 1999, 2020). Once established, this conceptual structure is sampled dynamically on specific occasions to produce representations of the category adapted to the current context (Barsalou, 1982, 1987, 2019, 2020).

Clearly, this process of establishing conceptual structures is empirical: The content of conceptual structures reflects information acquired during experience with the world. By no means, however, is this process solely empirical. No doubt, it is heavily constrained by biological constraints on sensory-motor systems and association areas in the brain (e.g., Barsalou, 2016a; Buckner & Krienen, 2013; Fernandino et al., 2015, 2022; Malt, 1995), as well as by constraints on situated habit learning in which many categories are embedded (e.g., Berridge, 2018; Dutriaux, Clark, Papies, Scheepers, & Barsalou, 2021; Hyman, Malenka, & Nestler, 2006). A variety of other biological constraints further shape the development of conceptual systems (e.g., Carey, 2009; Gelman, 2003; Spelke, Breinlinger, Macomber, & Jacobson, 1992).

3.2. Situated conceptual processing

The second assumption—conceptual processing is situated—also lies at the heart of grounded cognition (e.g., Aydede & Robbins, 2009; Barsalou, 2020; Brooks, 1991; Clark, 1998; Newen, Bruin, & Gallagher, 2018; Varela, Thompson, & Rosch, 1998/2016). Rather than being a standalone module for processing information decoupled from perception and action, cognition is embedded in the environment, the modalities, the body, and action, coordinating their interaction during goal pursuit. As a result, an individual's cognitive system becomes adapted to the specific situations where it develops and is used—it adapts to its ecological niche (Gibson, 1966, 1979).

As part of the cognitive system, the human conceptual system becomes situated as well (e.g., Barsalou, 2003, 2016a, 2016c). On the one hand, conceptual structures in the brain for specific categories contain multimodal content captured from the specific situations where their instances were encountered. On the other hand, when a concept is represented on a given occasion, it is represented in a context-dependent manner that supports processing the concept and its instances effectiv in the current situation (Barsalou, 1982, 1987, 1999, 2009).

3.3. Putting empirical learning and situated conceptual processing together

The situations experienced regularly in different cultures can vary radically in their components, including their natural environs, artifacts, technology, activities, education, institutions, social structures, languages, and so forth. If we couple this obvious observation about culture with the two core assumptions of grounded cognition, then cross-cultural differences in conceptual systems emerge naturally: As individuals experience the different situations associated with their cultures, they empirically acquire conceptual knowledge that reflects these different situations. After years of experiencing different situations, members of different cultures develop different conceptual systems.

Because grounded cognition researchers embrace these core assumptions, they naturally anticipate major differences in the form that grounded conceptual systems take across cultures and how they are instantiated in brains. Indeed, grounded cognition researchers would probably embrace these cross-cultural differences as further evidence for their core assumptions.

3.4. What about concepts researchers who take an amodal view?

Perhaps not surprisingly, researchers who adopt something along the lines of an amodal perspective are also likely to embrace these assumptions and their implications. Most of these researchers assume that empirical learning contributes to conceptual development and that different learning contexts result in different conceptual systems, at least to some extent (Atran & Medin, 2008; Gelman, 2003; Keil, 1981; Medin & Atran, 2004; Waxman et al., 2007). Thus, it is likely that these researchers, too, would deny that conceptual systems are constant across cultures, similar to their grounded cognition colleagues.

Perhaps radical nativists, such as Fodor (1998) and his sympathizers, are the only ones who insist that concepts are constant across cultures. Thankfully, though, this position appears to enjoy relatively little traction in the cognitive science and neuroscience communities.

4. Implications of grounded cognition for linguistic and cultural relativity

By reproaching grounded cognition researchers for cultural solipsism, Kemmerer's (in press) aim might have been to simply prod them into looking beyond the overlap issue—something that would no doubt be productive. Based on his target article, it is clear that "neglected implications" of grounded cognition for linguistic relativity are ripe for exploration. I am grateful to Kemmerer for drawing our attention to these issues and suggesting that we pursue them. How might we begin doing so?

One preliminary suggestion is to broaden the scope of analysis from linguistic relativity to cultural relativity. No doubt language influences grounded conceptual systems significantly, but language is just one facet of a much larger cultural milieu that shapes both language and conceptual systems. Once we broaden the perspective from language to culture, it becomes easier (for me at least) to see how core assumptions of grounded cognition lead to the conclusion that conceptual systems vary across cultures. It also becomes easier to see how we might study this variability.

Again, imagine that cultural variation reflects differences between cultures in features for the environs, artifacts, technology, activities, education, institutions, social structures, entertainment, and so forth. Further, imagine that when performing ethnographic analysis of the features in a culture, important situations of human activity emerge. Such situations, for example, might be associated with eating, childcare, education, food production, industry, social interaction, economic exchange, and political activity. Furthermore, assume that each situation can be specified as a combination of the cultural features it contains. Going out for a wee dram on a Scottish evening, for example, might typically occur at a pub in a smirr (environs), with tables, chairs, glasses, and whiskies inside (artifacts), with a television on the wall showing rugby (technology), with locals, neighbors, families, and tourists drinking and blathering (social structures, activities), sometimes discussing the merits of Scottish independence (institutions) or a recent Scottish crime series (entertainment). Other culturally important situations could similarly be characterized as different combinations of cultural features.

Once ethnographic analysis of a culture establishes important situations of activity, core assumptions of grounded cognition—empirical learning and situated conceptual processing—provide a natural bridge to a culturally specific conceptual system. As members of a culture pursue activities in culturally specific situations, empirical learning captures these experiences and incorporates them into culturally specific concepts that support operating in these situations effectively. As Barsalou, Dutriaux, and Scheepers (2018) propose, concepts develop that categorize and integrate features of these situations to support effective goal pursuit, communication, and social interaction in them. Examples include concepts for the environs ("smirr"), artifacts ("whisky"), activities ("blathering"), and so forth. Because many of these features are culturally specific, many of the resulting concepts that process them are culturally specific as well. Over time, as a situation repeats itself, the cooccurring concepts that process the situation become increasingly established in memory as a situational pattern, with thematic relations developing between concepts to coordinate their use (e.g., Barsalou, 1988, 2016b, 2016c; Barsalou et al., 2018; Conway & Pleydell-Pearce, 2000).

Additionally, a culturally specific linguistic system codifies what is important to communicate socially about these situated activities, thereby coordinating activity between agents and supporting cultural transmission to children. Because each culture's situated activities are at least somewhat unique, unique linguistic expressions develop to communicate about them (e.g., *smirr*, *wee dram*, *blather*). Although a language operates as a proximal force that shapes conceptual thought (linguistic relativity), the larger cultural milieu operates as a more distal force that shapes both language and thought (cultural relativity).

In this manner, combining ethnography and linguistics with the core assumptions of grounded cognition offers an interdisciplinary cognitive science approach for examining how a grounded conceptual system develops in a culturally specific manner. Through ethnographic analysis of a culture's important situated activities, it should be possible to understand and predict the conceptual structures that develop from participating in them. Following the overlap principle, these conceptual structures should contain sensory-motor information acquired via empirical learning from perceiving and acting in these situated activities. When entering a relevant situation, relevant multimodal conceptual structures become active to categorize the situation, predict what will happen, and guide effective action (Barsalou, 2009, 2020). Consistent with Kemmerer's (in press) message, grounded cognition offers a natural way to explore how cross-cultural differences in conceptual systems originate, along with how they support culturally specific activities in important cultural situations.

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