

dynamics of their blood and heart, not of their nerves: “Helacy! hoe mijn bloed In heuverende angst, mijn laffe hert doet beven” (Alas! how my blood, in shivering fear, makes my cowardly heart quiver) (Rodenburg, 1616). Sparkles were felt, but in the heart, or bursting out through the mouth and nose (“Vuur springt uit myne ooggen! En Neus en Mond!... heb toch mêedogen!” [Fire springs from my eyes! And nose and mouth... Have some pity, please!]) (Frese & Schaaf, 1746)).

Only later in the 18th century, when the fascination with electricity is building up, is the concept of love connected with lightning, sparkles, tension, and nervousness. Then, the muscles become the locus of affective tension: “ze schijnt mijne ziel nieuwe kracht, mijne spieren een nieuwe spanning te geeven” (“she appears to supply my soul with new power, and my muscles with new tension”).

With the development of Digital Humanities, we can now get some quantitative results for this kind of questions. The digital text repository Nederlab ([www.nederlab.nl](http://www.nederlab.nl)) provides 9,000 literary texts from the 13th century up to now. Searching this portal brings us over 500 different texts that use the word “spanning” (tension) one or several times. Graph 1 clearly indicates the growing frequency of the term since the 1760s, and it shows that at exact the same time, the interest in “spieren” (muscles) is exploding.

So to conclude, I would state that emotion metaphors do not so much reflect what is happening in our brain or in other parts

of the body: they reflect what people think or thought is/was happening in and outside their body.

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## Comment: Acquiring metaphors

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### Abstract

Lakoff (2016) describes an account of conceptual representation based in part on metaphor. Though promising, this account faces several challenges with respect to learning and development.

### Keywords

concepts, emotion, language acquisition, metaphor

In “Language and Emotion,” Lakoff (2016) describes four decades of research into the cognitive representation of concepts in general and emotions in particular. In this work, he

has documented striking patterns in how we talk about different concepts. For instance, an angry person is often described analogously to a container of hot fluid (*she is boiling, fuming, and letting off steam*), whereas love may be described as a journey (*they are going different directions, are on the rocks, and are spinning their wheels*; Lakoff, 1990, 2009, 2016).

These phenomena motivate a theory where concepts are embedded in cognitive schemas (e.g., a schema for hot fluid in a container). Many schemas are derived from others through processes such as metaphoric and analogical extension, such as the ANGER-AS-HOT-FLUID-IN-CONTAINER and LOVE-AS-A-JOURNEY schemas. Importantly, schemas may overlap and conflict: In addition to the anger schema based on hot fluids, there is one based on dangerous animals.

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The empirical phenomena uncovered by Lakoff are important and must be addressed by any theory. His theory of conceptual knowledge is provocative and should be of interest to any psychologist and to scholars of emotion in particular, where questions of representation are at the fore (Barrett, 2006; Ekman, 1999; Russell, 1980).

Nonetheless, many key predictions have not yet been tested and so the theory's empirical status remains uncertain. Next, I focus on three issues pertaining to learning and development.

## Can All Schemas Be Built From Basic Schema?

Lakoff's (2016) theory posits a set of basic schemas that are grounded in sensory and perceptual representations and from which all other schemas for all other concepts are derived. Whether all schemas can be so built remains an open question. Worked examples (e.g., LOVE-AS-JOURNEY) typically involve derivations from abstract, nonbasic schemas (LOVE and JOURNEY). How these schemas themselves were derived still requires explanation.

This is no minor concern. Famously, the classical theory of concepts—on which complex concepts like BACHELOR decomposed into UNMARRIED and MAN, which themselves decomposed down to perceptual/motor primitives—was challenged in part because researchers were unable to identify full decompositions for many if any words (Fodor, 1975; Laurence & Margolis, 1999).

Although Lakoff's (2016) theory provides more powerful mechanisms for creating new concepts, rigorously testing it requires first identifying a full list of basic schema, which itself requires empirical methods for identifying basic schema. For instance, Lakoff (1990, p. 272) proposes that we could ground a basic schema for CONTAINER by experience with our bodies as containers and as things in containers. It is not immediately clear how to test that claim. To be sure, similar problems arise for all theories of concepts, and remain a major challenge for the field. Here, neuroscientific evidence may be informative (cf. Gallese & Lakoff, 2005).

## Finding Metaphors

By hypothesis, new, nonbasic schemas are motivated either by association (intimacy correlates with physical proximity, giving rise to the INTIMACY-AS-PHYSICAL-PROXIMITY schema) or by structural similarity (similarities between preexisting schemas for love and journeys motivate a LOVE-AS-JOURNEY schema). A familiar problem with associative learning is that the world is full of correlations, and the ones needed to explain cognitive development are far from the majority (Frank, Goodman, & Tenenbaum, 2009; Mintz, Newport, & Bever, 2002; Pinker, 1984; Quine, 1960). Intimacy correlates with physical closeness but also with similar hair color, arguments, lines outside the bathroom in the morning, and shared bank accounts. None of these other correlations gave rise to new schemas (e.g.,

INTIMACY-AS-LINE-OUTSIDE-BATHROOM). Perhaps these correlations are less robust or are less readily detected, but this must be assessed empirically. Learning via structural similarity raises similar challenges: The schema for love overlaps heavily with that for journeys, but it may well overlap with other schemas even better. Or perhaps not. Answering this question requires a rigorous accounting of the schemas available to the child learner.

Of course, children also hear adults talk about love in terms of journeys and anger in terms of containers of hot liquid, etcetera, which may help address some of the developmental issues. However, the question of how those schemas got into the language in the first place would still remain.

## Constraining Generalization

A key test of any theory is that it not only explains the data we see but also explains why we do not see the data we do not see. In fact, understanding how children avoid overgeneralization is a central topic in developmental psychology, especially in language acquisition (Ambridge, Pine, Rowland, & Chang, 2013; Bowerman, 1988; Pinker, 1989).

As already noted, a crucial test for Lakoff's (2016) account is whether it can predict the nonexistence of schemas like INTIMACY-AS-LINE-OUTSIDE-BATHROOM. A related question is why attested schemas motivate certain expressions but not others. Agnes can sizzle with anger but not fry or broil. Her relationship with Bartholomew may be on the rocks, but it is not delayed due to inclement weather, nor does it need to be towed to the shop. Though interpretable and apparently based on the same metaphors, these unattested expressions seem much clumsier than the familiar ones. Perhaps this is due to familiarity, but that only shifts the problem: Why did the familiar expressions become popular?

## Conclusion

Lakoff's seminal work on metaphor and concepts was motivated in part as a reaction to difficulties in the classical theory of concepts. Similar concerns have inspired other proposals that bear interesting similarities and differences to Lakoff's theory. Theory Theory's theories share much with Lakoff's schema, but allow for abstract concepts that are ground in the theory rather than directly in perceptual/motor representations (Gopnik & Meltzoff, 1997). Hierarchical Bayesian models allow representations in different domains to share structure without one being derived from the other (Tenenbaum, Griffiths, & Kemp, 2006). Understanding the differential developmental consequences of these theories should profitably inform our understanding of conceptual representations.

In summary, while Lakoff's (2016) account is compelling, determining its empirical status will require more investigation. However, even should the theoretical proposal prove incorrect, the patterns uncovered by Lakoff and colleagues in how we talk about emotion are striking and must be addressed by any theory.

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## Comment on “Language and Emotion”: Metaphor, Morality and Contested Concepts

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### Abstract

The nature of emotion concepts and whether there are any that are universally “basic” remains controversial, as acknowledged in the article “Language and Emotion.” The suggestion that some emotions are embodied through a process of association between neural networks for bodily sensations (e.g., raised temperature) and neural circuitry dedicated to linguistic metaphor is interesting, but speculative. However, it is a hypothesis that risks relegating speakers of languages that lack sophisticated metaphors to a lower level on some scale of linguistic evolution.

### Keywords

categories, concepts, emotion, language, metaphor

Many researchers have questioned the relationship between human experience and language, and Lakoff’s (2016) contribution adds to the debate. Languages vary both in content (words for “shame,” “democracy,” or “purple”) and structure (information about tense or grammatical gender) and such differences are potentially indicative of different ways of conceiving and experiencing the world (Gentner & Goldin-Meadow, 2003; Slobin, 1996). In his article, Lakoff concludes that “There is no one correct, classical definition of ‘emotion.’ There are real emotion phenomena that can be precisely studied, and language is an important area to look at for such phenomena” (Lakoff, 2016, p. 269).

Few researchers would argue with the notion that emotion “is a contested concept that depends on the interests, skills, and academic ideology of the emotion researcher” (Lakoff, 2015, p. 4) or

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