Conceptual Blending in Animal Cognition: A Comparative Approach

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Introduction

Are the differences between human and alloanimal cognition a matter of kind or of degree? This question continues to generate controversial arguments for the uniqueness of certain features of human cognition, with no clear consensus in sight (see, e.g., Hauser, Chomsky & Fitch, 2002; Suddendorf & Corbalis, 2007). To move the debate into fresh territory, this symposium develops a proposal from conceptual blending theory (CBT: Fauconnier & Turner, 2002; Turner, 2014) to argue that the differences in question are both a matter of kind *and* of degree.

CBT defines a suite of cognitive processes for integration of mental spaces by projecting those spaces as inputs onto an emergent blend space. The new blend develops structure beyond the input spaces alone, involving complex processes such as framing, analogy, and conceptual metaphor among others. CBT has been applied "in nearly every field that studies human affairs" over the past 20 years (Turner 2020), but hardly ever to the study of non-human animals. This is remarkable since CBT has long held that human blending capacities share an evolutionary history with non-human animals, evidenced in capacities for three out of four of the basic types of blending identified by CBT. While the human animal alone is capable of double-scope integration, both humans and other animal species are capable of simplex (role-value assignment), mirror (displaced transfer), and single-scope blending (source-target mapping).

The symposium considers what an animal concept might be and whether non-human animals exhibit conceptual innovation. The status of non-human animal concepts is an open question (Hofstedter & Sander, 2013; Fitch, 2020), however, empirical research and theoretical considerations alike make it unlikely that *no* animals besides humans use concepts (Newen & Bartels, 2007). With this in mind, our symposium aims to probe an open scientific question: what kinds of conceptual blending can other animals accomplish?

The symposium also takes up a line of inquiry initiated by Pelkey, who has proposed synthesizing CBT with related insights from Charles S. Peirce, Jakob Johann von Uexküll, and biosemiotics to build a stronger case for alloanimal blending. We bring together a diverse group of researchers to discuss human-unique cognitive abilities through the lens of CBT. **Turner** introduces CBT and outlines the cross-species cline of conceptual blending. **Pelkey** provides evidence for various types of blends in bats and discusses the conclusions of these analyses. **Leonardis, Semenuks, and Coulson** emphasize the importance of taking non-human perspectives in analyzing behaviors with CBT. **Adachi** discusses work on metaphorical and cross-modal mapping in primates. **Forster** serves as the moderator.

Together, the talks incorporate and interlace theoretical developments in CBT with insights from biosemiotics, linguistics, comparative psychology and primatology, philosophy, and neuroscience. By using multiple theoretical frameworks to analyze evidence from experimental and observational studies on primates, dogs, bats, cetaceans, rodents, songbirds, and other species, the symposium will synthesize an evolutionarily plausible trans-disciplinary perspective on what makes human thought unique.

The Cline of Blending (Turner)

Blending Theory was conceived in 1993 as an attempt to account for a range of unexplained phenomena in human higher-order cognition for which there is no robust animal model. It proposed, on the basis of evidence available at the time, that advanced blending, characteristic of human beings, was a development along a cline of blending abilities. This proposal was detailed explicitly in *The Way We Think* (2002) and *The Origin of Ideas* (2014), as well as a range of articles. Turner (2014: 29) writes, "Other mammals seem to be capable of various rudimentary forms of blending, such as blending individual events close in time and space into one event arc. But when it comes to the mental operation of blending, human beings go incomparably beyond them. We perform the most powerful form of blending, 'advanced blending.' *Advanced blending* occurs when two mental spaces have basic organizing structures that are in fundamental conflict, or the relations between them make a fundamental distinction, but they are nonetheless blended so that the blend has parts of each organizing structure and develops a new organizing structure of its own." *The Way We Think* explores many scientific domains in which a small change in causes can produce a dramatic difference in effects, and proposes that advanced blending, a dramatic difference, arises through relatively small causal changes along a cline. Of all the many hypotheses of blending theory, the existence

of this cline across perhaps all mammals has been the least explored and tested, despite its centrality to cognitive science. This talk will consider examples of blending in non-human animals and the current state of the hypothesis of the cline of blending.

Natural Propositions in Bat Chatter: Recent Evidence for Simplex, Mirror, and Single-Scope Blends (Pelkey)

Identifying a range of specific blend candidates in published studies of animal behaviour illustrates the leverage that CBT provides for differentiating and defining nested layers of alloanimal cognition. Paying closer attention to a unified set of examples can provide a more focused opportunity to test the theory's applicability and potential problems. Candidates for simplex, mirror, and single-scope blending are each identified in the findings of recently published studies on bat chatter. Chatter dialects that develop via social learning can be analyzed as simplex blending. The use of exaggerated timbre and pitch for pup-directed chatter can be analyzed as mirror blending. The use of chatter frequency to distinguish between topics can be analyzed as single-scope blending. The most basic blend type, simplex networks, consist of compositional role-value assignments that feature vital relations and truth-functional framing (e.g., 'Paul is the father of Sally,'x is the y of z'); as such, they also map onto Stjernfelt's (2014) "natural propositions" (based on the symbolic dicisign distinction in Peircean semiotics). And since each successively more complex blend type includes more basic integration networks, a reevaluation of blending in alloanimal cognition suggests the existence of truth values and propositions far beyond, and prior to, the emergence of linguistic signs.

What is Indexical and Iconic in Animal Blending? (Leonardis, Semenuks, & Coulson)

Blending should be analyzed relative to an animal's Umwelt, i.e. the way the world presents itself to the animal. When taking this into account, indexicality and iconicity - the precursors to complex blending and human language - become of primary interest (von Heiseler, 2020). Indexical signs such as pointing are sometimes considered to be unique to humans. However, behaviors like marking an object with alarm odor, sexual pheromone, or long range urine marks can be interpreted as indexical due to their deictic function of demarcating presence, location, dominance, and territory. Additionally, the smells of those marks bear resemblance to the organism which produced it, suggesting an iconic relation as well. These behaviors are easy to overlook due to the human overemphasis on vision and audition as primary modalities for representing concepts. With this in mind, we will examine behaviors from canines, kangaroos, dingos, tigers and primates as potential cases of blending with emphasis on the role of Umwelt-specific indexicality and iconicity in the evolution of communication and blending.

"High" vs "Low Status", "Top of the Heap", "Bottom of the Barrel" (Adachi)

Similar expressions are widely observed across cultures and languages. The cross-modal correspondence between the visuospatial domain (e.g. high or low) and an abstract domain (e.g. rank) has been described as a conceptual metaphor, a linguistic construction, and therefore uniquely human. A conceptual metaphor takes one concept and connects that to another concept to better understand that concept. The way we think and act is largely influenced by such conceptual metaphors, even without being aware of them. The question remains if conceptual metaphorical mapping is indeed uniquely human or if it appears in other primates and thus predates language. To address this question, we examined if non-human primates have conceptual metaphors as we humans do. In this talk, I will present the latest findings and discuss primate origins of cross-modal correspondences.

Acknowledgments

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