BBS COMMENTARY ON: Shanker & King: The Emergence of a New Paradigm in Ape Language Research

The Vygotskian Advantage in Cognitive Modeling: Participation Precedes and thus Prefigures Understanding

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ABSTRACT:
S&K's proposal is consistent with a Vygotskian model of development which assumes that cognition is first social and visible, and only later internalized and invisible. Rather than slipping into positing "epistemic operators" like understand or intend as generative of behavior during language learning or theory of mind tasks, this approach profits from keeping its focus on charting the ontogeny of embodied interactions.

S & K are to be lauded for taking on the daunting task of applying the dynamical systems model to cognitive phenomena, and they do a commendable job grappling with the subtleties of the argument. Their reinterpretation of ARL research makes clear how such efforts can yield rich dividends in revealing insights heretofore hidden in existing data and in generating a host of new questions to address. Even so, like most of us, they were no doubt originally trained to think of cognition as the invisible, individual events responsible for behavior, and of its study as essentially an inferential science. Such training is difficult to overcome, and undertaking its revision demands that we challenge each implicit assumption that may lead to a confounding of the models that S&K are attempting to contrast.

As one case in point consider their use of the quote from Tomasello's (1999) Cultural Origins of Human Cognition : "…sounds become language for young children when and only when they understand that the adult is making that sound with the intention that they attend to something." (p. 101 - italics mine). Given that Tomasello has done more than perhaps any other contemporary investigator to advance our understanding of the relation between culture and cognition (although see D'Andrade 1980; Cole 1996), citing him in a discussion of the interactive nature of language development is highly appropriate. And yet the particular quote they chose represents, to my mind, the one aspect of Tomasello's approach that runs counter to the model that S&K are advocating. That is, suggesting that some kind of shared understanding is a prerequisite for linguistic behavior places what is "inside the head" as the source and cause of that which is observable, rather than emphasizing that behavior - or, more accurately, interaction - is the source and cause of what ultimately must end up "inside the head". What makes this difference in emphasis significant enough to merit treatment in BBS is its consequences for how science is done - both in terms of the methods that are employed and the interpretations that are supported.

Adopting the stance that cognition is best studied as an observable, distributed event (e.g. Vygotsky 1978, Wertsch 1985, Hutchins 1995a; Johnson 2001), rather than as an invisible, mental one, need not prevent us from recognizing that positing the latter may be necessary to a complete account of human - or ape - cognition. However, positing mental states and then designing experiments to discriminate the behaviors required to confirm them has lead both human and comparative cognitive research down many a garden path. For example, since our working definitions of mental states have tended to be based on adult introspection and language use, they are often rendered in the shorthand mentalese (e.g. "know", "desire", "intend" etc.) that adults adopt after years of experience with interpersonal and environmental interactions. In the "theory of mind" literature, for example, subjects - usually children or nonhumans - are typically hypothesized to "know" (or "not know") what another person "knows" or "does not know". Furthermore, it is this mental state of knowing that is presumed to endow each subject with the capacity to perform correctly on a critical experimental task. However, this presumption becomes suspect when we realize that adults can, and do, experience a variety of mental states, at different times and sometimes simultaneously, while engaging in such tasks. These can range from explicit propositional reasoning involving terms like "know", to cued heuristics (like an expression of puzzlement predicting prolonged searching behavior), to intuitive affect-laden biases that are not readily articulated or experimentally assessed. Similarly, implementing such research has demonstrated that context (e.g. the particular phrasing of the experimenter's question, the use of 3D dolls vs. drawings, etc.) can have significant effects on, for instance, the age at which a child is likely to succeed (see Astington et al. 1988). In addition, the performance of nonhuman primates on related tasks are replete with complex ambiguities (e.g. Heyes 1993, Povinelli 1994) that, together with the above, suggest that such models and methods may obscure, more than reveal, the role of ontogeny and phylogeny in the emergent adult abilities.

In contrast, one of the great advantages of S&K's approach is its integration of the Vygotskian insights that cognition is first social and visible, and only later internalized and invisible, and that the study of changes in the relative contributions of

novice and expert (observable in, for example, detailed video analysis of interactions over time) best capture cognitive development. As a result, this approach can inform models of mental representation by charting its ontogeny through embodied interactions in the infant and its caretaker (e.g. Fogel 1993), the juvenile and its cohorts (e.g. Rogoff 1990), and the adult and its society (e.g. Hutchins 1995a,b). In this view, "theory of mind" shifts from being a 'representation of the representations of others' to being a complex set of propensities and sensitivities in a range of related contexts. That is, for example, in the first few years of life, a child participates, with more proficient others, in an array of interactions in which attention, and especially co-attention, directed at an object early in the interaction tends to correlate later with efficient searching for that object, while the movement of that object without the accompanying co-attention correlates with circuitous and often unsuccessful searching (see Karmilov-Smith 1992). As the child becomes more of an active agent in such interactions – e.g. taking on the roles of mover or searcher – as well as engaging in a variety of other co-attention-mediated activities, its sensitivity to the relevant cues, the timing and relevance of its actions and associated affect, and the range of contexts in which it can appropriately participate, improves. From this perspective, what the child who succeeds at a "theory of mind" task has learned is not what others know or don't know, but the nature of effective (and ineffective) coordination for any player in that class of interactions (see Wittgenstein 1953).

More than a substitution of one set of jargon for another, such a restructuring reveals aspects of cognition that are not liable to be detected under the traditional approach. S&K's analysis of Kanzi's performance, for example, highlights many qualities of his coordination during language interactions – e.g. that he can attend to multiple partners, respond in and to a variety of media, scaffold the activities of more novice participants, etc. – that have been little noted in the ARL literature and yet open a whole vista of important research questions that beg further investigation. However, even as they strive to explain that "epistemic operators" like understand or intend are best used to refer, not to mental states, but to sets of behavior, I fear that S&K's frequent use of such terms may only make it harder for us to focus as we should on the stuff that we can actually see. Until we get better at doing systemic cognitive analyses of embodied interactions, I recommend that we limit our use of such terms. If we confine ourselves to using them only when we must, it should, in time, become clearer to us all what they mean.

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