Emergence, Action, & Representation

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Why is the nature-nurture conceptualization of developmental phenomena still used? The authors emphasize issues concerning communication for both students and the wider public. We agree that communication is part of the issue but would suggest two other reasons.

First, the nature-nurture framing is instrumentally useful for researchers to conduct experiments. Whether or not developmental research is focused on issues related to nature-nurture directly, it is often "convenient" for methodologies to presuppose that framing (e.g., accounting for variability with a "nurture" variable or a "nature" variable).
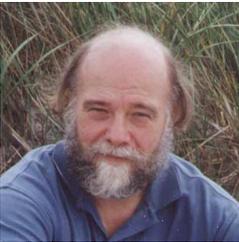
Second, we suggest that the nature-nurture framing is especially persistent in areas of developmental science that involve the "representational mind"—because that framing is intrinsic to a fundamental error regarding the ontology and origins of representation that is ubiquitous in the field. That is, the nature-nurture framework is presupposed in standard (false) background assumptions regarding cognition and representation.

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Many researchers believe that the problem with the nature-nurture framing only exists when the two ends of the frame are construed as mutually exclusive (i.e., when claims are made that development is caused by either nature or nurture but not both). Accordingly, the "obvious" resolution within this framing of the problem is for nature and nurture to be united through *interactions* such that development is caused by both nature and nurture. This alternative — the most prevalent in mainstream developmental psychology — fails to recognize that there is a more substantive problem.

A stronger claim is that the problem with the nature-nurture framing is that the frame is misguided or incoherent (Spencer et al., 2009). We agree, and suggest that the incoherence is a consequence of not having an adequate ontology for studying development — in particular, development as a *constructive process* of ongoing *emergence*. In accordance with this framework, a shift that has taken place in parts of developmental science has made use of Dynamical Systems Theory (DST) as a general theoretical framework for understanding self-organization and emergence. For DST, development is a self-organizing process with various parameters that have traditionally been labeled as nature or nurture, but these parameters do not *cause* developmental processes anymore than oxygen causes fire or land causes tornados.

From this perspective, finding variables that predict variance in developmental outcomes is a starting point for developmental explanation and modeling of ongoing processes — and moving beyond that *starting* point requires an adequate ontology for hypothesized models. Such an ontology will necessarily consider development as a dynamic system that involves multiple types and levels of emergence. But still more is needed to provide a complete alternative to the nature-nurture framing. In other words DST is itself necessary but not sufficient as an alternative to the nature-nurture framing.

The use of DST to understand development as a self-organizing process has been most beneficial in those areas that are *not* "representationally rich": Part of what is missing from this framework is an adequate model of representation. When the *nature-nurture* debate is restricted to representational issues it can be recast as the *nativist-empiricist* debate. Nativists and empiricists offer contrasting answers to the issues of origins in the sense of "where does knowledge come from?" For the nativist, basic knowledge is innate—it "comes from" evolution. For the empiricist, basic knowledge "comes from" the environment. However, just as nature and nurture do not cause development, knowledge does not "come from" anywhere. Instead, knowledge is *emergent* in the constructive processes of embodied systems. For an action perspective, knowing the world means knowing how to successfully interact with it. Piaget offered the best known model for how knowledge is emergent in action, and his action-based constructivism was an attempt to transcend the problem of assuming that knowledge *comes from* somewhere.

More contemporary versions of an action-based approach to knowledge exist with concomitant conceptual shifts in understanding the nature of learning and development (Bickhard, 2009). We have argued elsewhere that knowledge *must* be emergent in (inter)-action to exist at all (Allen & Bickhard, 2013), and that, through some sort of reflection process, new forms of knowing can develop. Emergence in general may be the key to transcending any foundationalist dichotomy (nature-nurture, nativist-empiricist, etc.) — without emergence, a foundationalism cannot account for its assumed foundation. We suggest, however, that an action-based model of the emergence of knowledge/representation in particular is a necessary further elaboration in developmental psychology.

Allen J.W.P. & Bickhard, M.H. (2013). Stepping off the pendulum: Why only an action-based approach can transcend the nativist-empiricist debate. Cognitive Development, 28, 96-133.
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