
The Body and the Self

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Infants' Understanding of People and Things: From Body Imitation to Folk Psychology

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Our interest is in the relation between the development of infants' understanding of physical objects and that of persons. We will suggest that the two are closely interwoven, so that infants' developing grasp of the nature of objects profoundly influences their idea of persons. We further suggest that newborns begin life with some grasp of people and of how people are like themselves.

Our approach to these issues is to study psychological development. Philosophers often consider abnormal patients and cultural universals as reference points in their analyses of mind. Infants have less often been considered. Nonetheless, infancy is a good place to look if one is interested in the origins of human knowledge. All adult minds were once infant minds. The nature of the infant's construal of the world and how it is revised to become the adult's conception should contribute to a fuller understanding of mind.

We suggest that accounting for infants' performance involving physical objects and persons requires that we recognize a progression through increasingly sophisticated concepts. This view stands in opposition to the idea that infants are born with adult concepts in full play (nativism) and to the idea that they start with only reflexes and have to bootstrap themselves up into anything remotely like our concepts (Piaget).

Although the idea of progression through increasingly sophisticated concepts has some intuitive appeal, the problem has always been to find the parameters to describe this development in ways that are both theoretically plausible and empirically valid. In what follows, we will first illustrate the parameters for explaining infants' progressive grip on the notion of a physical object. Then, through a consideration of imitation, we will show how there is, from the start, a special treatment of the movement of human bodies, and we will suggest parameters for describing infants' progressive grip on the concept of a person.

This essay has three major parts. First we analyze what infants understand a physical object to be. We examine the criteria infants use to maintain

object identity over successive perceptual contacts. We also examine infants' understanding of human bodies as a special case of physical objects and their grasp of the idea that their own bodies are like other human bodies. In the second part we analyze infants' developing conception of persons. We examine how infants distinguish human individuals and determine their particular identity. We also examine the development of infants' understanding of humans as bearers of psychological properties. In the third part we conclude by analyzing how the developments previously described might lead to a concept of the self as an entity in a world full of others and a concept of the other possessing a subjectivity as rich as the self.

1 Early Understanding of Physical Objects

Identity

How do infants interpret an object's entering into or exiting from their field of view as it moves, as their heads turn, or as they are carried from one place to another? The adult conception of "object" does that work for us. What is the infant's conception? There is reason to suggest that the infant's conception is quite different from the adult's. Our view is that (a) infants have concepts about objects, not simply lists of actions they perform on them, (b) these concepts undergo radical change, and (c) it is not a one-step, dichotomous change but rather successive cognitive restructurings that yield a causally related series of infant conceptions. This developmental view requires a careful use of language. Because the infants' earliest conceptions of objects are not the same as adults' but only early steps toward the mature attainment, we need a new word for object when it refers to the infant's conception. In this essay we call these "proto-objects."

These proto-objects do some of the work that the concept of an object does for adults, but they do not have all the properties of the adult's objects. Our use of the notion of proto-objects relates to certain philosophical considerations as to what it means to be a physical object or thing. In particular, Campbell (1993) has recently analyzed some distinctions between feature and object and between the internal causal connectedness inherent in objects and their spatiotemporal continuity. These distinctions seem to have some empirical reality in the world of infants. For example, we will show that infants can reidentify a proto-object as the same one across two encounters without their requiring that it followed a continuous space-time path between the encounters.

Our notion of proto-objects and how they relate to the mature adult notion differs from other psychological views of the "object concept" (as it is called in the psychological literature). It differs from that of Piaget (1954), who thought that there was no concept of object that remotely resembled

the adult notion during infancy (his theory focused on actions and the inseparability of objects from action), from that of Bower (1982), who thinks that young infants develop a concept of object but that only one important conceptual shift occurs (around 5 months of age), from that of Spelke (Spelke, Breinlinger, Macomber, and Jacobson 1992; Spelke and Van de Walle 1993), who thinks that infants innately hold the core adult conception of object with no significant change or overturning of this understanding, and from that of Baillargeon (1991, 1993), who attributes sophisticated knowledge about objects to young infants (like Spelke) but allows for cognitive development in certain aspects of physical reasoning to account for changes in performance.

For an adult, the flux of object appearances is organized by noting which of the many appearances are encounters with the same object. Thus an object seen at time t in place p may be identified as the same object when seen at t' in place p' by a rule for object identity. The identity referred to in this case is the object's unique or essential identity with itself and not featural sameness. No two objects, however exactly they may share the same features, are identical in this sense. Strawson (1959) calls this numerical or particular identity when it is the mature adult concept, and we call it "unique identity" when referring to the infant's less mature notion. We will argue that at different ages infants use different criteria for numerical identity, which suggests they are operating with distinct concepts of objects in development (hence the notion of proto-objects).

Three classes of events involving spatial transformations of objects seem to be significant for infants (Moore and Meltzoff 1978). Table 1 sum-

Table 1

Developmental levels in infants' understanding of unique (numerical) identity over spatial transformations of objects

Level	Age (months)	Description of level	Examples of events for which an object's unique identity is maintained
1	0-4	Identity is maintained for a steady state of the visual world.	Objects moving on a trajectory Objects staying at rest in a place
2	5-8	Identity is maintained for transformations of visible objects.	Objects in motion stopping Objects at rest starting to move
3	9-18	Identity is maintained for transformations producing occluded objects.	Objects disappearing in motion Objects disappearing at rest

