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DURKHEIM'S THEORY OF MENTAL CATEGORIES: A Review of the Evidence

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■ **Abstract** Durkheim hypothesized that basic categories of thought are based on society as their model, and that these mental representations arise from participation in society's totemic rites. This proposition is evaluated in light of recent research on the cognitive architecture of newborns and infants. The evidence suggests that presocialized infants possess mental representations of not only the physical world but also the minds of others and even the sui generis quality of collectivities. This review concludes that the Durkheimian theory of the social origin of mind has little empirical support and suggests that the sociology of mental life needs to be radically retheorized.

INTRODUCTION

> As everybody who has attended scientific conferences, read technical journals, or monitored the popular media knows, modern research has discovered that young children know more at earlier ages than had been predicted by classical theory. These new findings led to the gradual weakening, and finally the collapse of, classical Piagetian theory (Meltzoff 1999, p. 252).

The question I raise is whether such research on infant cognition also weakens classical sociological theory. That is, do presocialized infants possess the basic categories of thought that Durkheim hypothesized arose primarily from participation in ritualized social practices? To answer this question, I review relevant evidence from the cognitive science and infant development literatures.

DURKHEIM'S THEORY OF MENTAL CATEGORIES

What Durkheim called the "framework of the intelligence" we would probably refer to today as our cognitive architecture, which would include what he called the "essential ideas" that "appear to be nearly inseparable from the normal working of the intellect" (Durkheim 1965, p. 21).

> At the roots of all our judgments there are a certain number of essential ideas which dominate all our intellectual life; they are what philosophers since Aristotle have called the categories of the understanding: *ideas of time, space, class, number, cause, substance, personality, etc*. They are born in religion and of religion; they are a product of religious thought" [emphasis added] (Durkheim 1965, pp. 21–22).

In effect, mental "classifications. . .have taken the forms of society as their framework" (Durkheim 1965, p. 170). Durkheim argued that this is because contents of cognitions are "vague and fluctuating images," whereas their "framework" is a "definite form, with fixed outlines" that can be "applied to an undetermined number of things, perceived or not, actual or possible" such that "the contents cannot furnish the frame into which they fit" (Durkheim 1965, p. 172). Durkheim was not a British empiricist, nor a follower of behaviorist learning theory in which, it is theorized, unique sensory events can, through a process of induction, give rise to their own categorical frame. Instead he followed Plato, Descartes, and Kant and assumed an a priori nature of categories of thought. He did not, however, think such classificatory frameworks were a product of Descartes' religious notion of the soul nor Platonically given eternal ideas, nor did he believe cognition that framed sensory input was biologically innate.[1] This, of course, raised the question of exactly how humans thought up the concept of classes or categories of things in the first place. "In all probability, we would never have thought of uniting the beings of the universe into homogenous groups, called classes if we had not the example of human societies before our eyes," he reasoned, and he concluded that "it is hard to see where we would have found this indispensable model except in the spectacle of the collective life" (Durkheim 1965, p. 172).

Durkheim then famously theorized that it is our experience in totemic religious rites that instills a sense of the group, which begins as an externally induced experience and goes on to become a mental representation. "[R]ites are a manner of activity which take rise in the midst of the assembled groups and which are destined to excite, maintain or recreate certain mental states in these groups" (Durkheim 1965, p. 22). For Durkheim, these mental states are the mind's basic categories of thought. Such assembled groups were in the middle, constituting a universal template for cultural objects above and mental objects below. Although we usually do not think of mental categories as collective representations, in Durkheimian theory this is exactly what they are. They are cultural collective representations (CCRs), which he theorized originate through reflection theory, as cultural forms purportedly mirror social forms, and mental collective representations (MCRs), which he hypothesized arose through social imprinting or internalization theory at the

[1]Interestingly, G.H. Mead (1933), at about the same time across the Atlantic, had similar ideas, but he only worked on the micro end of the puzzle. He would substitute social interaction (language use, actually) as the distinctly sociological origination point for the mental structure he wished to explain (mind and self).

moment of participation in totemic religious practices. One set of representations is external and macro (culture), the other internal and micro (mental categories).

His reasoning seemed so clear: Corporate groups cause things, and humans are not born with ideas of cause, so what better place for them to attain such an idea than from their group experience; groups also have a collective reality as a sort of social substance, and humans are not born with the idea of substance, so what better place for them to acquire this than from their group experience. Soon Durkheim believed that much of what was our basic mental architecture, those "categories of the understanding," as he called them, were socially acquired. Again, once you make the blank slate hypothesis, and if you reject Platonic eternals or Cartesian souls as a priori origin sources of mental categories, the way is open to hypothesize society as the latest origin of mind.

This hypothesis has continued in sociology ever since (Rawls 1996) and is based on the assumption that we are born with a very unorganized mind. From Mead and Cooley to the present, sociological theory endlessly repeats the hypothesis of a lack of significant cognitive structure before socialization. Consider a few quotes as illustrative:

> "The mental experience of a new-born child is probably a mere stream of impressions. . ." (Cooley 1962, p. 8).
>
> ". . .an active unorganized infant is born" (Stryker & Statham 1985, p. 327).
>
> ". . .biology or our own nature gives little direction to our lives, so we have to develop our own guidelines, and we do so in the course of our interactions with one another" (Griswold 1994, p. 54).
>
> ". . .for man, what are innately given are extremely general response categories . . .undirected by culture patterns—organized systems of significant symbols—man's behavior would be virtually ungovernable, a mere chaos of pointless acts and exploding emotions, his experience virtually shapeless" (Clifford Geertz quoted in Griswold 1994, pp. 20–21).
>
> ". . .to exist in a state of nature is to be unconscious, nonreflective, and nonsymbolic. In such a state the organism is propelled directly by the forces of nature, which include internal physiology and the external environment" (Kollock & O'Brien 1994, pp. 53).

These hypotheses are canonical in sociological theory: Humans are not born social; we have to be socialized. We have to learn what it means to be human. Which particular aspect of society performs this work varies by preference of theorist: Durkheim emphasized totemic rites; G.H. Mead, symbolic interaction; Talcott Parsons, primary socialization through the family; Bourdieu, habituated social behaviors; Gramsci, worldviews; Althusser, the ideological state apparatus; Foucault, bodies of institutionalized knowledge; and so forth. What is in the mind is what society has put there. And this does not mean just content but also essential categories of thought as most clearly articulated by Durkheim 100 years ago. But since then, and particularly in the last 30 years, there has been an explosion of

research about what we know and, importantly for sociological theory, when we know it.

But is this so? Is it the case that the mental representations he mentions do not arise until participation in totemic religious rites? To answer this question, I review research findings that shed light on whether presocialized infants seem to possess the mental categories mentioned by Durkheim: *space, number, cause, substance*, *personality*, and *social* categories. There are, no doubt, other mental representations that purportedly have a social origin, but because of space limitations I only deal with these six. Also, the cognitive science literature is quite large and expanding, and so only a portion of this field is covered in this review. Finally, for some of these mental representations the evidence is more direct, and for others more indirect. I begin with ideas about external physical reality (space, number, cause), then turn to whether presocialized infants already possess psychological notions (impute motives, intentions, and dispositions to others), and finally to whether distinctly collective ideas (the sui generis idea of a collectivity as a unitary actor) are present before socialization.

WHAT DO THE PRESOCIALIZED KNOW?

Space

One of the earliest findings in the studies of presocialized infants was that babies seem to possess mental representations of space. In the classic study of Walk & Gibson (1961) babies were placed on a Plexiglas sheet with a checkerboard pattern below. At a particular point the pattern drops down a yard and then continues. At only a few months of age, babies crawl to the "edge" and stop, suggesting that "from the earliest months, babies possess a sufficiently detailed perception of space to recognize depth and to avoid falling off the edges of things" (Mehler & Dupoux 1994, p. 37). Similarly, there is evidence that babies only a few hours old have a mental representation of direction as they purse their lips in the direction of a human voice (Alegria & Noirot 1982). One-month-old babies also show anxiety if they see their mother in one direction and hear her voice coming from another (Alegria & Noirot 1978). "Their perceptual space, therefore, already seems to be organized into a unified representation of the environment where different stimulations converge giving data on the position and movement of exterior objects" (Mehler & Dupoux 1994, p. 80).

Number

A breakthrough in infant research is the discovery that infants tend to look longer at unexpected events, which provides a methodological technique to estimate preverbal cognitive competence. Wynn (1992) showed 4- to 5-month-old infants a toy, put a screen in front of it, and then placed a second toy behind the screen. The infants never saw more than one toy at a time. The infants then saw two trials: in the first, the screen was lifted to reveal the two toys, and in the second, only one

toy. The infants looked longer at the trial in which only one toy remained. When they saw both toys were still there, they got bored and did not look as long, which suggests that this was the outcome they expected. The researchers concluded that the infants expected $1 + 1 = 2$. These results have been repeated (Wynn 1998), leading researchers to suspect that infants may possess presocialized representations of not only numbers but also arithmetic, as they seemed puzzled when the incorrect addition was performed. When shown two toys put behind the screen, and then shown one taken away, infants looked longer when the screen was lowered and both toys were still there. When they saw the correct subtraction ($2 - 1 = 1$) they were less interested and looked away sooner than when they saw the incorrect math ($2 - 1 = 2$). These results seem quite robust. When the shapes, colors, and spatial location of the objects are different, infants still tend to look longer at the wrong number of objects (Koechlin et al. 1998, Spelke 2003, Simon et al. 1995). Infants also seem able to individuate and enumerate object actions (the number of times a toy falls down) and numbers of sounds as well (Lipton & Spelke 2004, Sharon & Wynn 1998, Spelke 2003). Such addition and subtraction abilities were also detected with slightly older infants who did manual searches of boxes or crawled toward one box or another (Feigenson et al. 2002, Van de Walle et al. 2001).

Cause

Presocialized infants also seem to possess a sense of cause and effect. In one set of experiments, a cylinder rolls down a ramp and hits a toy bug on wheels, pushing the toy forward. Adults see how far the toy rolls when hit by a medium-sized cylinder; they expect it to roll further if hit by a larger cylinder and roll a shorter distance if hit by a smaller cylinder. Baillargeon (2000, p. 203) reports, "5.5- to 6.5-month-old infants are surprised, after observing that a medium sized cylinder causes a bug to roll to the middle of a track, to see the bug roll further when hit by a smaller but not a larger cylinder. Such findings suggest that by 5.5 to 6.5 months of age, infants are aware that size of cylinder affects the length of the bug's trajectory." That is, infants appear to have not only a sense of cause and effect but also a sense of proportional effects given proportional causes. There are numerous other studies showing a sense of cause and effect in babies (see some of them in Gopnik et al. 1999, Mehler & Dupoux 1994).

Substance

One of the most researched areas involves infants' knowledge of material objects, which I consider a proxy for Durkheim's notion of substance (Baillargeon 1987, Baillargeon et al. 1985). As an example of this research, consider studies of infants' representations of the substance of objects.

For example, 4.5-month-old infants were habituated to a screen that rotated back and forth through a 180° arc, first away from and then back toward the infants (Baillargeon 1987). Next, a box was placed behind the screen, and the

infants saw two test events. In one, the screen rotated until it reached the hidden box (expected event); in the other event, the screen rotated through a full 180° arc, as though the box were no longer present (unexpected event). The infants looked reliably longer at the unexpected than at the expected event. This and control results suggest that the infants (*a*) represented the hidden box behind the screen, (*b*) expected the screen to stop against the box, and (*c*) were surprised when this expectation was violated (Luo et al. 2003, pp. B23–24).

In another set of experiments infants were shown a box supported by a platform beneath and "by 3 months of age, if not before, infants expect the box to fall if it loses all contact with the platform and to remain stable otherwise" (Baillargeon 2000, p. 197). Concludes Spelke (2003, p. 282),

> summarizing these and other studies, I have proposed that human infants represent objects in accord with three spatiotemporal constraints on object motion. . .. Infants represent objects as cohesive bodies that maintain both their connectedness and their boundaries as they move, as continuous bodies that move only on connected, unobstructed paths, and as bodies that interact if and only if they come into contact. Despite some controversy in the field, I believe these conclusions are well supported.

Personality

So far, evidence for the existence of presocialized mental categories has focused on the more nonhuman physical environment: space, numbers, cause, and substance (objects). But do infants, before socialization, also possess mental representations of human personality traits? ". . .[C]an babies identify their own kind? Or is the concept of being human gradually developed through contact with the social environment" (Mehler & Dupoux 1994, p. 95). For Durkheim, the answer was the social environment. Society, with its own set of goals and intentions, provides the idea of purposes and intentions that, once internalized, go on to provide a model of animating principles that lie behind human behavior—that is, for an idea of personality. There is evidence, though, that infants are already born with something like a rudimentary theory of human nature that includes the competence to recognize human faces and the outline of the human body, along with imputing motives and purposes to the acts of adults.

RECOGNIZING FACES Newborns seem equipped with a sense of the human face. In one set of experiments, infants are shown a stylized schematic face (eyes, nose, mouth), a scrambled set of such markings, and a blank face. When shown these three diagrams a few minutes after birth, they look longer at the schematic with the correct anatomic features (Mehler & Dupoux 1994, p. 104). Johnson & Morton (1991) suggest that infants are born with a device that directs them toward human faces. Also, when shown a number of pictures, babies can select the photo of their mother by their third month (Mehler & Dupoux 1994, p. 105), and other experiments have shown that at less than a week old babies can recognize their

mother's face (Busnell & Sai 1987, Field et al. 1984). "The mechanism for the recognition of the mother's face seems to be well established at an early age, while the orientation toward stimulations resembling faces is in place at birth. . .. Newborns do not have to learn what a face is. . .it is as if they already know in advance since they seem equipped at birth with a schema corresponding to the prototype of the face of their fellow humans" (Mehler & Dupoux 1994, p. 107).

IMITATING FACIAL GESTURES Babies can also imitate adult facial expressions, such as sticking out the tongue. This seems straightforward and self-explanatory. Babies imitate. But when you think about this, Meltzoff reasoned, it is not so obvious. How, for instance, do babies connect what they see in others (say, the sticking out of a tongue) with what is invisible to them (their own tongue)? How do they know that this red thing protruding from this external object is analogous to something they have but cannot see? "There are no mirrors in the womb: newborns never have seen their own face. How could they know whether their tongue is inside or outside their mouth?" (Gopnik et al. 1999, p. 30). "Such links were thought to be forged through postnatal learning. To eliminate such learning we tested imitation in newborn babies, the youngest only 42 minutes old. . .. The results demonstrated successful facial imitation. Apparently facial imitation is innate" (Meltzoff & Brooks 2001, p. 175). These researchers speculate that babies seem to have a mental representation of both themselves and others and to understand that these are the same conceptual blueprint. This of course sounds like a Meadian observation, but in a newborn 42 minutes old, this process can in no way be based on the use of significant symbols and the internalization of the identity of the other.

BODIES Babies seem to recognize and prefer the outline of the human body (Berthenthal et al. 1984). If you attach lights to eleven key human joints on a person in a dark suit and film her engaged in running and walking motions against a dark background, adults, solely on the basis of the lights, can differentiate the human motion of running versus walking. But so can 3- to 4-month-old babies. If the same number and intensity of lights are more randomly scrambled on the body, adults cannot tell a walk from a run and, interestingly, neither can babies. Finally, when a film of the lighted human body schema is turned upside down, babies cannot discern the set of movements that is walking from those for running. "At three months, the baby therefore links the moving points into a unified dynamic representation that only emerges when the points are derived from a human figure moving right side up—unless we dream up some really far-fetched alternative explanation" (Mehler & Dupoux 1994, p. 108).

INTENTIONS OF OTHERS Babies appear to have a sense of others' minds and, more specifically, assume that others have goals and intentions. For instance, it has been observed that when one-year-olds encounter a toy, they look over at a parent as if to check out what they think. If the adult smiles while gazing at the toy, the baby

proceeds toward it; if the adult frowns, the baby stops. This observation has also been verified with an experiment. A baby is shown two boxes. The experimenter opens one and smiles, then opens the other and shows shock and horror. The boxes are then placed in front of the baby, who opens and reaches inside the box that was smiled at. "The baby figures out something about what is inside just by looking at the experimenter's face. . .. The baby doesn't just understand that the other person feels happy or disgusted, but also understands that she feels happy about something and disgust about others" (Gopnik et al. 1999, p. 33).

Woodward (1998, 1999) has also studied an infant's ability to identify purposeful behavior. Nine- and 5-month-olds are familiarized with two toys side by side on a stage, along with an experimenter's arm that reaches in to grasp one of the toys. The toys' positions on the stage are then switched and the babies see two experimental events: the arm shows either a change in motion, such as reaching a different place, or it grasps a different toy. Do infants react to the gross behavioral change of the arm's motion, or to the seeming intention of the arm—grasping a different toy. Researchers found that a different reach but for the same toy creates no interest. But the same reach for a different toy interests the infants. They look longer at this event. If babies at this age react only to gross physical movements, then reaching to a new place should be the unexpected event and they should look longer. But if they are concerned with the intention of the experimenter's arm, then grasping a new toy is the unexpected event. The baby looks longer when a new toy is grasped but not when the arm reaches to a new place.

Some researchers have suggested that anything that is perceived as self-propelled motion infants will construe as intentional (Baron-Cohen 1995, Premack 1990), and to test this, Woodward and coworkers (2001) used a mechanical arm with a claw to grasp the toys. But here "infants construed the hand events and the claw events differently. . .. 6-month-olds have begun to draw the line between animate and inanimate entities, interpreting motions of the former, but not the latter in terms of the relations between agent and subject" (Woodward et al. 2001, pp. 153, 155). Such infant knowledge of purposeful behavior does not seem limited to just the movement of a human hand. "Infants in one condition saw an actor grasp one of two toys that sat side by side on a stage. Infants in the other condition saw the actor drop her hand facing up onto one of the toys in a manner that looked unintentional. . .. When they saw the actor grasp the toy, they looked longer on trials with a change in goal object than on trials with a change in path. When they saw the actor drop her hand onto the toy, they looked equally at the two test events" (Woodward 1999, p. 145). These results were found for 5-month old infants. There is also "evidence that the ability to use information about an adult's direction of the gaze and emotional expression to predict action is both present, and developing at the end of the first year of life" (Phillips et al. 2002, p. 53). Further, whether an experimenter's eyes are open or closed during the gaze appears to have an effect on infants' sense of the purposefulness of the behavior in question. The basic Woodward (1998, 1999) experimental design was repeated with an eyes-open and eyes-closed variation. "In the eyes-open condition, infants looked longer when the adult turned to look at the new toy (new target/old side) than when she turned to

look at the old toy (old target/new side). . .. In the crossed-eyes condition, they did the reverse and responded purely on the basis of the gross physical movements involved" (Meltzoff & Brooks 2001, p. 186).

In sum, infants without apparent socialization appear to have mental ideas about the intentions of others, and they also appear to be quite precise. Purposeful behavior is not just signified by an arm doing something, but a human arm; and not just a human arm making some contact, but one using the grasp behavior; and not just a hand grasping, because a gaze and an open eye is represented by infants as a sign of the intention of others. This is not to say infants possess a full theory of the personality of others, but it does suggest that they come with ideas concerning the intentions, goals, and purposive behavior of their fellow human beings. What remains to be considered is the final and perhaps most plausible of Durkheim's hypotheses: ideas of collectivities and groups of things arise from social experience and as such should not be found in infants.

Categories of Things

"Can infants construe a collective entity, consisting of multiple objects, as a unitary individual for enumeration purposes?" (Wynn et al. 2002, p. B56). This question is about presocialized infants' capacity to represent a collection of dots on a computer screen, but if we were to substitute individual persons for dots, would we not be talking about the capacity to discern social groups? Let us ask the Wynn question again with a sociological perspective in mind: Can infants construe a collective entity (a group, organization, community, society, etc.) consisting of multiple objects (different persons) as a unitary individual (a corporate collectivity, or a group with a life of its own)? If presocialized infants can make this determination, does that in turn suggest that knowledge of collectivities exists before experience with social groups, and does that suggest that elementary forms of collective knowledge may be mental frames that humans bring to, not take away from, their social participation? Although no one would argue that historically specific cultural substances of the mind's content are something we bring to social interaction, it may very well be that those Durkheimian mental categories with which the world is framed may originate in our mind/brain and not in our social experiences. Such a possibility is suggested by the research described below.

Following their research on infants' abilities to enumerate individual objects, Wynn and colleagues turned to collections of objects. Instead of toy objects placed behind a screen, infants are now shown a computer screen with moving sets of red dots. They move randomly in relation to each other but share common movements as groups of dots, and as groups of dots they move randomly vis a vis other groups of dots. It is quintessentially sociological: individuals with their own purposes, wills, intentions, and so forth, yet coordinated as a group. "Because the total area, summed lengths of the perceptual contours of the items, visual contrast, and item density were identical across our two test displays, infants' responses could not have been based on any of these perceptual attributes, but rather must have been based specifically on the *number* of collections in the displays. Our results

also support the proposal that infants' enumerative capacities are not restricted to objects; infants can individuate collective entities and treat a collection as an individual for enumeration purposes" (Wynn et al. 2002, p. B60). More specifically, 5-month-old infants were divided into two groups. Each saw a moving collection of red dots (about the size of a dime) on a computer screen. Half the infants saw 2 moving collections of 3 objects each, and the other half saw 4 moving collections of 3 objects each. After being familiarized (habituated) with these collections, they were then shown 2 moving collections of 4 objects each and 4 moving collections of 2 objects each. The number of objects was identical, 8. What differed was the number of groups they were divided into—2 versus 4.

The prediction was that those habituated on 2 moving collections would look longer at 4, and those habituated on 4 would look longer at 2. This is exactly what they found. "We report here a study showing that 5-month-olds can determine the number of *collective* entities—moving groups of items—when non-numerical perceptual factors such as contour length, area, density, and others are strictly controlled. This suggests both that infants can represent number per se, and that their grasp of number is not limited to the domain of objects" (Wynn et al. 2002, p. B55). In sociological terms it would appear that the presocialized bring a mental representation of the sui generis quality of group life to their social participation, which runs completely counter to Durkheim's hypothesis that such mental capacities derive from participation in group life.

The Duality of Person and Group

> Considerable evidence suggests that human infants are endowed with two distinct systems for representing numerosity. One system represents small numbers of persisting, numerically distinct individuals exactly and takes account of the operations of adding or removing one individual from the scene. It fails to discriminate between different sets of individuals. . .. A second system represents large numbers of objects or events as sets with cardinal values, and it allows for numerical comparison across sets. . .. This system, however, fails to represent sets exactly, it fails to represent the members of these sets as persisting, numerically distinct individuals. . .. Infants therefore represent both "individuals" and "sets," but they fail to combine these representations into representations of "sets" of "individuals" (Spelke 2003, p. 200).

Although Spelke is specifically speaking of infants' sense of numerosity, she could also be speaking as a sociological theorist, for as infants have the mental apparatus to distinguish between "individuals" and "sets" but not "sets of individuals," so do sociologists distinguish between individual actors and sets of actors (economic classes, organizations, communities, and so forth). And they do not speak of a "person/group" as a singular entity either. It is always the duality of person and group, or agency and structure, or individual and society, and so forth. That is, social theorists divide the world up the same way as presocialized infants, raising the question of whether this innate mental representational system that divides sets of individuals into individuals and sets also operates when social theory divides

groups of individuals into groups and individuals. Put another way, is the tension between individuals and the social groups they constitute a property of the external social world or a function of our innate mental machinery that can represent individuals and sets, but not sets of individuals?

Think for a moment about optical illusions. Take the classic drawing that is both a duck and a rabbit at the same time. When we see a face and two ears, it is a rabbit; but when we see the ears as a duck's bill, then it is a duck. Most interestingly, we cannot hold the mental representation of a "rabbit/duck" in our mind, as our brain flips back and forth between generating an image of a rabbit or a duck, but not a "rabbit/duck." Now think of society. We seem to have the same problem combining individuals and society into a unified image of something like an "individual/society" on analogy here with the unstable image of the "rabbit/duck."

Social theory can identify and enumerate individuals, as in Adam Smith's atomistic, individual decision making model of society as a division of individual labor or, as with Marxian theory, can see the group as mode of production, social class, class formation, and so forth. From the point of view of our mental representational system for collectivities, theory is always trying to derive the properties of the individual. According to the Marxian maxim, it is capitalism (whole) that makes individuals (parts) buy and sell. From the point of view of the mind's system that represents individual entities, theory is always trying to derive social aggregates. According to the Smithian maxim, individuals (parts) buying and selling makes capitalism (whole). The mind is able to represent either parts or wholes, but not "parts/wholes" as an essentialist singularity. As such, theory is constantly trying to bridge the limits imposed by the brain's two mental representational systems with hybrid mixtures of parts and wholes: ideas of internalized moral commitments, socialization, habitus formation, role playing, and so forth. According to another classic Marxian maxim, men make their own history but not under the conditions of their choosing.

There are two possibilities here: (*a*) that the stable theoretical existence of a person/group fusion is not a property of actually existing social life, where, somehow, there are separate persons who comprise singular groups at the same moment; or (*b*) that our mind/brain, as seen in the research, is comprised of a mental representational system for individual entities and for groups, but not for individual/group as a singular entity.

Although such speculations are clearly tentative, they are nonetheless based on grounded empirical research on the mental systems of infants. For example, Xu & Spelke (2000) showed two groups of 6-month-old infants two arrays of dots. One had 16 and the other 8 dots. The visual features of both arrays (color, total surface area, density of dots) were made as equal as possible. In the experimental condition they were shown two new arrays of 8 and 16 dots alternatively. If they could discriminate between such large groupings, they should look longer at the unfamiliar array, which is exactly what they did. The same result was found for 16 and 32 dots as well. Infants, though, could not differentiate between 8 and 12, or 24 and 32 dots (Xu & Spelke 2000). The groupness had to be about twice the size for the infants to differentiate between the arrays, which provides "evidence that

discriminability accords with Weber's law for infants, as it does for adults, and that the critical Weber fraction for infants lies between 1.5 and 2" (Spelke 2003, p. 286). The mental ability to discriminate between large groups of things seems quite robust, and it works for sounds as well. "Infants successfully discriminated between 8 versus 16 tones, presented with the same controls for the continuous variables of the duration and quality of sounds, and they failed to discriminate between sequences of 8 versus 12 tones" (Spelke 2003, p. 286).

The key point here is that this mental system is not just the aggregation of the earlier identified capacity to identify individual events as seen in Wynn's early work. "Representations of numerically distinct objects show a set size limit of about 3 for infants (4 for adults. . .). . .whereas representations of approximate numerosities are independent of set size. . .. [R]epresentations of large approximate numerosities show a Weber fraction limit of 1.5 and 2 for 6-month-old infants. . .and about 1.5 for adult humans. . .whereas numerically distinct objects do not: infants can discriminate 2 from 3 objects, even though the Weber fraction is below their threshold" (Spelke 2003, p. 297). These differences in the two systems of mentally representing individual and group entities also appear in sociological theory. Network models, for example, have a set size limit at which they work most effectively, and rational choice models always function best with a single individual (or very few individuals) making choices. In contrast, macro theory is somewhat free of worry about specific numbers of individuals: Marxian conflict theory is about oppositional economic classes, and the number of constituent members of each class is not a particular issue, nor is it for theories of social stratification, political party systems, or world systems. (In macro theory there are limits imposed by numbers, of course, but the general point is that macro theory is less sensitive to specific properties of constituent elements than micro theory). Finally, there are "the effects of variations in the properties of the items to be enumerated such as their size and spacing. . .. Human infants discriminate 8 from 16 items on the basis of numerosity when item size, dot density, filled area, and total area are varied. . .. In contrast, infants fail to discriminate 1 from 2 or 2 from 3 on the basis of numerosity under these conditions" (Spelke 2003, p. 298). Sociologically, this is Durkheim's notion of the independence of the group above its constituent members; it is the sui generis idea. Discerning the group is not dependent on variation in the specific characteristics of its constituent members, whereas more one-to-one, face-to-face interaction is affected by the specific properties of those individuals.

CONCLUSION

It has been suggested that infants possess something of an innate *folk physics* (Baillargeon 1995, Spelke 2003, Spelke et al. 1992); that is, infants come equipped with mental representations of the substances of objects, along with ideas about cause and effect, number, and so forth. Infant research also suggests humans come equipped with a naive theory of the minds of other persons, what has been called *folk psychology*, or in cognitive science "theories of mind" (see Baron-Cohen 1995,

Carruthers & Smith 1996). Finally, there is evidence that infants may come preequipped with knowledge of collective entities and hence the elementary forms of a sociological imagination. If infants can be said to possess folk physics and psychologies, they may also possess something like a *folk sociology*.

In this regard, there is little evidence to support the Durkheimian hypothesis that the basic categories of thought arise from social experiences such as totemic rites. The specific mental categories Durkheim mentioned all seem to show signs of being operative in newborns and very young infants, who have not, everyone would have to agree, been socialized or engaged in social interaction of a serious sort, let alone participated in totemic religious rites. At a minimum, the Durkheimian hypothesis should be discarded or discussed only in the light of actual evidence. Maximally, we need seriously to reconsider the society/mind interface in light of what is now known about the presocialized mental categories possessed by infants. Humans still acquire cultural material, but not because humans have a blank slate of a mind. There is just too much evidence that suggests the opposite. What remains to be done is to take what is known about our presocialized mind and factor that into a new sociological theory of enculturation and socialization.

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