UNDERSTANDING OTHER MINDS

Perspectives from Autism

Edited by

SIMON BARON-COHEN
Senior Lecturer in Developmental Psychology, Institute of Psychiatry, London

HELEN TAGER-FLUSBERG
Developmental Psycholinguist and Associate Professor, Department of Psychology, University of Massachusetts

and

DONALD J. COHEN
Director, Child Study Center, University of Yale

Oxford New York Tokyo
OXFORD UNIVERSITY PRESS
1993

16

The role of imitation in understanding persons and developing a theory of mind

ANDREW MELTZOFF AND ALISON GOPNIK

So soul into the soul may flow, though it to body first repair—John Donne

Normal adults share a network of ideas about human psychology that are often described as 'common-sense' psychology. Although we directly observe other people's behaviour, we think of them as having internal mental states that are analogous to our own. We think that human beings want, think, and feel, and that these states lead to their actions. Our ideas about these mental states play a crucial role in our interactions with others and in the regulation of our own behaviour.

Deepening our understanding of mind is a lifelong enterprise (Bruner, 1990); but recent research has shown that by the age of five years, children operate with many of the key elements of a common-sense psychology. By five years old, children seem to know that people have internal mental states such as beliefs, desires, intentions, and emotions. Moreover, they understand that a person's beliefs about the world are not just recordings of objects and events stamped upon the mind, but are active interpretations or construals of them from a given perspective. This allows five-year-olds to realize that people can have mental states that are different from their own, and that people act according to their mental representations of the world, rather than according to the way the world actually is.

Such a model explains a lot of otherwise baffling human behaviour; it allows children to predict and comprehend many events within the interpersonal sphere. This model of the way people work has been referred to as a 'representational model of mind' (Forguson and Gopnik 1988). Although there is some debate about details of timing, there is a consensus that such a model develops somewhere between three and six, and supplants an earlier 'non-representational' understanding of mind (see Gopnik 1990; Flavell 1988; Perner 1991; Wellman 1990; Whiten 1991).

Understanding the way other people's minds work, and knowing how those minds are similar to or different from your own mind, is crucial if you want to interact with people. A particularly dramatic example of this is the suggestion that the pervasive social-communicative impairments of

people with autism are rooted in an inability to develop this kind of psychological understanding (Baron-Cohen *et al.* 1985). Autism has been likened to a kind of 'mindblindness' (Baron-Cohen 1990), in that autistic children seem unable to conceptualize another person as an entity with interpretative mental states.

The principal goal of this chapter is to inquire about the earliest developmental history of the *normal* child's understanding of the mind. How does common-sense psychology ever get off the ground? One way of putting this might be to say that we are interested in the earliest precursors of the child's 'theory of mind'. What sorts of things in infancy set the normal child on a developmental trajectory for eventually thinking of people as having interpretative minds—the level of psychologizing that seems so natural for five-year-olds, and so out of reach for most children with autism?

If we want to find the origins of common-sense psychology a good place to look might be in infant interactions with and understanding of persons. We will argue that the bedrock on which a commonsense psychology is constructed is the apprehension that others are similar to the self. Infants are launched on their career of interpersonal relations with the primary perceptual judgement: **'Here is something like me.'** One of the aims of the chapter is to explore the basis and cascading developmental effects of this sort of judgement.

It is sometimes held that normal infants are innately endowed with a special attentiveness to the human facial pattern. This may be so, but we will argue that this is not the only, or even the most critical basis for the 'like me' judgement. Such pattern detectors might direct visual attention, but in themselves they do not provide a link between the self and the other. The infant might see the adult as a particularly interesting entity; but because infants cannot see their own facial features, why should they think of the adult as relating to themselves? Similarly, others have seen the roots of intersubjectivity in the early temporal co-ordination of infant and adult behaviour, the 'conversational dances' that infants and care-takers perform. But again there seems no clear reason why these behaviours, by themselves, should lead the infants to think of other people as similar to themselves in deep ways. Infants, for example, also engage in temporally contingent interplay with objects.

We propose that infants' primordial 'like me' experiences are based on their understanding of bodily movement patterns and postures. Infants monitor their own body movements by the internal sense of proprioception, and can detect cross-modal equivalents between those movements-as-felt and the movements they see performed by others. Indeed, we will suggest that one reason normal infants preferentially attend to other people is the perceptual judgement that those entities are 'like me'. Without such a judgement, other humans might have interesting visual or temporal characteristics, but they would not have the unique place they do in our world.* It is this fundamental relatedness between self and other that we wish to explore in this chapter.

Until comparatively recently, there was no reason to suppose that young infants could apprehend cross-modal equivalences between body-movements-as-felt in the self and body-movements-as-seen in others. Indeed, classical theories of infant development explicitly denied this capacity to young infants, portraying the infant as 'solipsistic', 'radically egocentric', and so on. Among the recent experiments that served to change this view are those showing that normal infants are more proficient *imitators* than was previously thought. As we shall see, these findings suggest that infants can, at some basic level, process the correspondence between self and other (Meltzoff 1985).

The news is not just that infants imitate, for that has been known for some time (Baldwin 1906; Piaget 1962), but that they can imitate facial movements at an early age. Why is early facial imitation so important for developmental theory, and particularly for accounts of the ontogenesis of common-sense psychology? One reason is that it informs us about the 'starting state' of social cognition in normal infants. A second reason derives from the unique nature of facial imitation itself. Facial movements are special because infants cannot make a direct visual comparison between their own faces and those of adults. We will argue that early imitation is relevant to developing theories of mind because it provides the first, primordial instance of infants' making a connection between the visible world of others and the infants' own internal states, the way they 'feel' themselves to be.

Early imitation also provides a mechanism for infants' learning about other people and distinguishing them from things. In order for a common-sense psychology to get off the ground infants must make a basic cut between people and things, and respond to them differently. What is a person for a young infant, for a newborn? How would a newborn recognize one when he or she sees one? For the youngest infants, persons may not be defined solely in terms of salient facial features like the presence/absence of eyes. We suggest that infants at first rely on more functional rules (Meltzoff and Moore, 1992). We suggest that for the youngest infants, persons are: 'entities that can be imitated and also who imitate me', entities that pass the 'like me' test. Such a rule would be effective in sorting the world into people versus things, and could be operative in the opening weeks of life—because the data show that infants imitate at birth.

* This reverses the standard developmental relation; but it is as easy, perhaps easier, to see how a primordial 'like me' apprehension might determine the direction of perceptual preferences than how raw looking preferences in and of themselves would ever lead to a means of making the 'like me' connection of interpersonal relatedness. We return to this issue in the conclusions of this chapter.

Moreover, as increasingly complex imitative interactions take place, this basic knowledge may be extended. In particular, at least by nine months of age or so, infants will not only imitate pure body movements but will also duplicate specific object-manipulations, and will do so after extended delays. Such deferred imitations provide an important source of information about objects in the world and the shared relation to those objects that people can hold. As we will show, imitation is not only an indicator of early common-sense psychology, but may itself be a mechanism for developing and elaborating this framework.

Imitation in infancy also runs in the reverse direction: parents mimic their infants as well as infants imitating parents. Why should this be so enjoyable to both parties? Trevarthen (1979), Bruner (1975, 1983), Stern (1985), and others have shown that infants seem to take pleasure in the temporal aspects of early interactions; the interactions can be likened to gestural dialogues, because of their turn-taking nature and overall rhythm. Without denying these temporal characteristics, we want to highlight a different aspect of the gestural dialogues. In particular, we will focus on a subset of interactive games that are imitative in nature. Mutual-imitation games may be an especially meaningful avenue of early communication because both partners can recognize the common acts—the self–other equivalences that exist when the body movements of one person match the other. We will suggest that over and above turn-taking and temporal factors, infants take special pleasure in mutual-imitation episodes because the adult's acts become more 'like me' in their form. Mutual-imitation games ratify the identity between adult and child.

BODY AND SOUL

The kind of 'like me' equivalences that we have discussed so far all involve equivalences between the child's *body* and the body of others. In contrast, the aspect of common-sense psychology that has attracted so much recent attention is the development of the understanding that people have *mental* states of a certain character. Is it helpful to think of infants' understanding of bodily movements as the bedrock for 'like me' judgements, and this in turn as being connected up to the ascription of 'like me' human minds? Quite apart from the infant data, there are philosophical reasons for thinking that some understanding of a 'like me' equivalence, indeed one centred on body equivalences, is wrapped up in our ascription of mind. Although 'philosophy of the body' has always been a neglected area of inquiry, several philosophers have suggested that such abstract mentalistic notions as reference may have their origins in the perception and understanding of bodies (for example Evans 1982). From this viewpoint it makes sense that infants are engaged in mapping out 'like me' equivalences in the bodily realm as the first step toward understanding persons.

Two aspects of the psychology of early imitation are particularly relevant here. First, the child maps externally perceived behaviour on to a set of *internal* bodily impressions. Second, the mapping is not only to internal states alone, but also to motor intentions and plans. We suggest that both internal proprioceptive sensations and motor intentions may be interesting half-way stations between behaviour on the one hand, and mental states on the other.

In common-sense psychology, one classical characteristic of mental states that distinguishes them from physical states is their spatial location. Mental states are located inside the skin (or the head or the body), while physical objects, including the bodies of others, are located outside it. In Wellman and Estes' (1986) work, this 'inside/outside' distinction is one of the first children use in differentiating the mental and the physical. Similarly, the paradigmatic example of behaviour is the body movements of others. The work on early imitation shows that even newborn infants recognize some equivalences between externally perceived behaviour—that is, perceived body movements—and literally internal proprioceptive states. Moreover, such proprioceptive sensations, in addition to being spatially located 'inside', would seem to have much of the character of mental states. In particular, they are not publicly observable, and are private experiences. Indeed, on many philosophical accounts, pains and other internal sensations, which are phenomenologically similar to proprioceptive sensations, are *the* quintessential mental states *par excellence*.

Moreover, in order to imitate, infants must not only recognize the similarities between externally perceived bodily movements on the one hand and internal proprioceptive sensations on the other, they also must map those externally perceived movements on to intentions of a sort. The child must not only know that this visually perceived movement maps on to that motor plan, but also know how to go about producing the motor plan in question; and in the case of deferred imitation the child must produce this motor plan in the absence of any visual guidance from the model.

These motor plans, like the internal proprioceptive sensations themselves, are an interesting midpoint between the physical and the mental. It seems difficult to draw a hard and fast line between such simple motor plans and, say, 'simple desires', which themselves are viewed in the theory of mind literature as providing legitimate instances of very early and primitive mentalism (Wellman 1990; Astington and Gopnik 1991). The new findings on imitation strongly imply that motor plans and intentions are mapped on to the behaviour of others from the start. It is as if children, in the case of simple desires, immediately recognize that the other person's behaviour implies desires similar to their own. This would be grounds for