Theories behind Theories of Mind

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Key Words
Children's theories · Culture · Development · Theory of mind

Nelson et al. address the issues of where social cognitive knowledge comes from, what form it takes, and whether 'theory of mind' is an appropriate description of the social cognitive enterprise. In this commentary, I will situate their work, and will argue that we ought to get beyond the 'theory' issue, focusing instead on the sources of the knowledge used in interpreting others.

Context

Not so very long ago, when people discussed how children come to have a theory of mind, they claimed there were really only three theoretical games in town: the theory theory, innate modules, and simulation [Carruthers and Smith, 1996]. All three are part of the tide against behaviorism, in that they take stress away from the environment and put it within the child.

The theory theory's roots lie in Piagetian psychology, in claiming that children develop an understanding of others' minds primarily through reasoning processes [Gopnik, 1996; Perner, 1991; Wellman, 1993]. Children's initial theories (like 'behaviors are motivated by desires') are eventually challenged by counterevidence (as when behaviors cannot be explained by desires), and the child undergoes a process of theory change [Gopnik and Wellman, 1994; Wellman, 1990]. Assimilation and accommodation resound: the child can assimilate evidence to her theory until the counterevidence is too strong to maintain the theory (disequilibration), and finally the child's own cognitive structures accommodate to that information, resulting in a new theory. An example would be the birth of belief-desire psychology around age 4 [Wellman, 1990], brought on by the

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1 This work was supported by NSF grant No. DGE-9550152.
evidence that behaviors do not always accord with desires. Although data from the world support the theory, the child’s cognitive processes are the instigator of mentalistic descriptions of behaviors. The view that children’s early knowledge is a theory has of course become prominent in recent years across several domains [e.g., Wellman and Gelman, 1992, 1998].

Innate module theories stem mainly from the Chomskian concept of a language acquisition device [Chomsky, 1986], with information processing theories also at play [Baron-Cohen, 1995; Leslie, 1991]. These hold that general learning mechanisms do not account for social cognition, but rather, that specialized neural processors exist to handle this information. They come 'on line' as the child matures, allowing for more and more complex social reasoning. Environmental events, like an agent’s behaviors, are input to the processors, and social cognitive descriptions, like intentions, are output. Although the data are in the world, the concepts come from within, and they are automatically computed in a manner similar to how the child comes to use innate syntactic structures.

Simulation theory stems more from philosophical than developmental and linguistic traditions [Davies and Stone, 1995; Harris, 1995a]. In simulation theory, social cognition is said to arise via the process of simulating others’ circumstances, pretending to be the other person. When one pretends to be in the other’s shoes, one experiences the other’s internal states. One has access to one’s own (simulated) state, and can then apply it to the other person. This process seems largely internal, borrowing little from the outside [but see Harris, 1995b]. The skills of pretending, of adjusting one’s own representations of reality and taking on alternative roles, are at the heart of simulation.

For all three of the major theories, then, the process of developing social understanding primarily takes place within the child. Meanwhile, another tradition, the socio-cultural one, has been taking stronger hold. This tradition stems from Vygotskian theory, and gives the environment and social factors more of a role in development [Bruner, 1990; Cole, 1988; Rogoff, 1990; Wertsch, 1985]. This theory attends to how social forces help to shape children’s concepts, and how the child’s environs act (inextricably) in concert with internal factors to coconstruct the mind.

In recent years, several theorists have pointed out that attention to social and cultural influences is often missing from discussions of how children develop an understanding of mind [Asteingston and Olson, 1995; Bruner, 1995; Raver and Leadbeater, 1993]. Children do not acquire concepts in a vacuum; concepts are often passed from person to person, undergoing small changes here and there, within a culture. But at least until very recently [e.g., Bartsch and Wellman, 1995; Gopnik and Meltzoff, 1997; Harris, 1995b], the major theorists of developing understanding of minds have underemphasized social influences [for discussion, see Lillard, 1998a]. The fact that adults in different cultures have some different ideas about minds and mental states suggests culture does play an important role in development [Lillard, 1998b].

It is against this background that the present article was written. Nelson et al. argue that it is wrongheaded to see children’s understanding of minds as arising all from within the child’s own mind. Further, they argue that children’s social cognitive reasoning schemes are not rightly viewed as a theory, and question whether logical-deductive processes rightly characterize social reasoning. These latter two matters are now considered in turn.
Theories

Nelson et al. discuss throughout their paper the issue of whether knowledge about the mind should be considered a theory. This argument is problematic, because ‘theory’ can be used in a number of ways. Premack and Woodruff [1978] originally used the term to refer to imputing mental states. Because minds and mental states are unobservable entities, one can only hypothesize that they exist; indeed, some philosophers claim they do not [Stich, 1983]. A second reason for Premack and Woodruff’s [1978] choice of the term was that the mental states that are imputed form a system of inferences that is used to make predictions. Making predictions is a major role of theories, so such an inference system is rightly called a theory.

Bretherton et al. [1981] first applied the term in developmental psychology, asking when infants acquire a tacit and rudimentary theory of mind, for example by imputing knowledge to the parent when they communicate something to the parent. This implicit sense of ‘theory of mind’ is compatible with Premack and Woodruff’s [1978] use. However, Pylonsky [1978], in commenting on the Premack and Woodruff [1978] article, noted that we can be most comfortable attributing a theory of mind if that theory can be explicitly represented by its holder. Olson et al. [1988] took this meaning in the introduction to their groundbreaking edited volume (Developing Theories of Mind), and many experimental studies and theories conducted since have been aimed at explicit understanding of mind (see Flavell and Miller [1998] for a recent comprehensive review).

Also hearkening back to the commentaries on Premack and Woodruff [1978], Pylonsky [1978], Dennett [1978], and Bennett [1978] each argued that the true test of having a theory of mind was attributing false beliefs. Wimmer and Perner [1983] picked up on this in their seminal article showing that young children seem to lack this understanding. Hence the term ‘theory of mind’ is sometimes used only to refer to imputing a single aspect of a particular mental state: false belief.

‘Theory of mind’, then, is a term with many referents. Wellman [1990] explicated three senses in which it is a theory (it is coherent, makes certain ontological distinctions, and has a causal-explanatory framework), and portrayed a full-blown adult European-American theory, but also used ‘theory of mind’ to refer to ‘everyday naive psychology’ [Wellman, 1993, p. 10]. Retreating from both these complex views, many use the term merely to mean ‘false belief understanding’. Whether the term applies to children’s social cognitive inference system at any given point in development depends on which definition one uses.

When we do not know just what a domain looks like, and a term can refer to any of several views of that domain, it might be best to abandon the term altogether. However, the term is deeply entrenched and would not easily be abandoned, and in many ways serves us very well. It can be used to refer to simple infant interfacing of minds, or to complex adult understandings, or to anything in between. A ‘theory of mind’ is our body of knowledge about minds [Heider, 1958] at any point in development, and it is less sophisticated and systematic in infants than in adults. Because ‘theory of mind’ is so versatile, arguing over its suitability will probably not be productive. The crucial issue underlying these arguments for Nelson et al., however, and one more likely to result in productive discussion, is what sorts of knowledge characterize our musings about why people do things, what they will do next, what behaviors mean, and so on.
The Social-Cognitive Reasoning Process

The reasoning process is an important aspect of Nelson et al.'s concerns about whether our understanding of minds is a 'theory'. Scientific theories stem from science and scientific reasoning processes. Nelson et al. ask, Do we really use logical-deductive processes to figure out human behavior, or are we more apt to fall back on narratives, or interpretive schemes? What is the right way to characterize this reasoning system?

In introducing the concept of scientific reasoning, research methods texts often present some variant on five ways of knowing: tenacity, authority, intuition, rationalism, and empiricism [Graziano and Raulin, 1997; Nation, 1997; Smith and Davis, 1997]. Examining these may highlight issues of concern to Nelson et al. When we know by tenacity, it is because a belief has been repeated so often we believe it is true. Our current emphasis on children's positive self-esteem might be seen as one such belief: although there is little indication of causal relation between self-esteem and good outcomes, the belief is so often repeated that many accept it as true [Damon, 1993]. Another example in the folk psychology realm might be, for Americans, that if one wants something, one has a right to it and should go get it; for Hindu Indians, it might be that people act based on their duties [Sweder and Miller, 1985]. These beliefs are based on tenacity, and they take the form of platitudes.

Beliefs based on authority also take the form of platitudes. They are beliefs given to us by others who are higher in rank, for example belief in God's Ten Commandments. The third type, intuitive understandings, are those we just feel and therefore think we know. Perhaps products of simulation theory and innate modules (if they exist) would be of this type. The fourth type, rational beliefs, are based on logical syllogisms, such as: 'Theories are used to make predictions. This knowledge is used to make predictions. This knowledge is a theory.' In rationality, if the premise is true, then so is the conclusion. Finally, the fifth type, empiricism, is knowledge based on observations of the world. I can see that leaves fall from many trees in the fall, so I know that they do.

Science combines empiricism and rationalism, and comes up with theories which it tests. Inductive reasoning leads to the theories, and deductive reasoning takes us back to the data.

The question is which sorts of knowledge are used to arrive at social cognitive explanations and predictions? By the theory theory, social cognitive knowledge is arrived at via scientific reasoning. Children take data in from the world, form hypotheses, and then find supporting evidence or counter evidence. Is this a realistic view of how children reason?

Historically, scientific thinking of the sort Gopnik and Wellman [1994] espouse saw a brief spurt of popularity in Ancient Greece, was drowned out in the Dark Ages, and began to make a comeback in the Renaissance. In this century, universality across cultures is at issue. Researchers find that people in other cultures who are less exposed to European-American forms of schooling refuse to reason 'rationally' with logical syllogisms. For example, Luria [1976] found that rural peasants insisted that although all bears in the north are white, and a given bear was found in the north, they could not know if that bear was white unless they saw it with their own eyes (privileging empiricism over rationality). Students often find science courses difficult precisely because this sort of reasoning is involved. Developmentally, Siegler [1998] discusses several studies showing children's limitations in scientific reasoning, even at ages 9 and 10. For
these reasons, we have to question how well the scientific processes that theory theorists postulate characterize this development in children. Perhaps latching onto authority figures' explanations, or tenacious explanations, or drawing analogies from an n of 1, more often characterize children's thinking. More attention to such issues is needed. The important questions are what kinds of knowledge and reasoning are employed, and how frequently, in interpreting the social world?

Nelson et al. collected data from university undergraduates to determine the extent to which they use logical-deductive reasons in explaining behavior in the classic false belief task. The effort to use this task with adults is long overdue, although of course this is only a beginning. As one extension, future studies should use more than one story. Would the roughly 40% who reasoned interpretively reason logically on the next trial, or is this an individual difference dimension? That older subjects tended to reason interpretively suggests reasoning style might be consistent across trials, but then what is the nature of this individual difference dimension? Going back to Nelson's [1973] earlier work, might there be a reflective-expressive dimension here, with interpretive responses and expressive speakers going together? In what other ways do interpretive and logical responders differ (if these are consistent factors)?

If everyone becomes more interpretive with age, that might mean very young children are much more logical (scientific) than the younger university students that were polled. Or perhaps the data from a sample spanning a larger range of ages would fall in a U-shaped curve. Older subjects being more interpretive goes against Nelson et al.'s claims that logical-causal reasoning is a product of narrative approaches. The older subjects have had more experience producing narratives, so they should be further on their way to being logical-causal. Likewise, if schooling causes this change, the older subjects presumably have had about as much schooling as the younger ones, as they are all college undergraduates. These issues should be resolved.

Another extension would be to set the story in different contexts, including real life ones. The child literature, of course, rarely does this. Joan Miller [1984] asked children to generate a real behavior of someone they know, and then explain why the person did it. She coded the frequency with which children used external, behavioristic explanations, or internal, trait-like ones. One might take a similar paradigm and examine the extent to which these explanations appear to take the form of logical theories or experientially based narratives.

The issue of how frequently, and under what real life circumstances, children and adults actually do rely on mental state constructs and logical reasoning to explain behavior is an important one. Using mental state constructs to explain behavior might be much more prevalent in European-American cultures than in some others [Lillard, 1998b]. If there are cultural differences in this, then surely it is more a factor of socialization than the three major theories have usually acknowledged.

Conclusions

The study of how children understand minds has done a good deal to bring together different areas of development that were hitherto often disconnected: early language development, joint attention skills, metamemory, role taking, social referencing, pretend play, autobiographical memory and the sense of self, concept formation, imitation, and so on. Making our developmental theories more heterogeneous, considering not just
the internal mechanisms that bring development about, but also how the social context contributes to development, will further the service that this area can provide the field. By their article, Nelson et al. make much needed strides to that end.

References


