within the individual, or the cultural construction of psychological states, and ignore the interface between individual and culture. However, we contend that C&L's approach needs to be extended and made more precise in order to fulfill its explanatory potential. Two issues in particular are in need of elaboration: The first issue pertains to the relation between structure and genesis, and the second to the concept of criteria.

C&L provide a genetic account of the development of social understanding in general, and theory of mind in particular. Their proposal, however, lacks any detailed description of the knowledge structure that characterizes different levels of social understanding. They briefly allude to three features that are required for the acquisition of a theory of mind: (1) the assumption of a stable, external world; (2) the importance of the realization that there is access to information through seeing; and (3) attentional capacity. None of these features, however, clarifies how understanding of, say, false beliefs differs from understanding of, say, the concept of seeing, or why the former is acquired at a later age than the latter. To the extent that C&L focus on the developmental mechanisms that lead to the acquisition of a theory of mind, their proposal is, in fact, compatible with a number of proposals that focus more on the knowledge structure involved in theory of mind. Other proposals have tied this knowledge structure to metarepresentation (Perner 1991), confronting of perspectives (Perner et al. 2002), the embedding of if-if-then rules (Zelazo & Frye 1997), working memory (Gordon & Olson 1998), inhibition (Carlson & Moses 2001), and mastery of sentence complements (deVilliers & deVilliers 2000).

Without a more detailed description of what is involved in a theory of mind, the specific forms of social interaction that may promote or impede the development of a theory of mind (Turnbull & Carpendale 1999a) remain underspecified. It is possible that different aspects of social interaction contribute to different aspects of the knowledge structure characteristic of theory of mind. For example, whereas the coordination of conversational turns may promote the increase of working memory, contrastive utterances may facilitate perspective-taking (Sabbagh & Callanan 1998). The forging of closer links between social interactions and the development of a theory of mind requires detailed description of what is involved in the acquisition of a theory of mind. In fact, the close linkage of structure and genesis is one of the main theses of Piaget's theory (1967, p. 147): "*Genesis emanates from a structure and culminates in another structure*" (emphasis in original).

C&L suggest that mental state terms are learned by observing "the patterns of activity that are criterial for the use of such mental state terms – that is, the pattern of interaction for which we use these words" (sect. 3.2, last para.). Following Wittgenstein, they reject the notion that mental state terms point to inner objects. However, the same arguments against the view of words as correlated with things also apply to the view of words as correlated with events, that is, "patterns of activity." Lila Gleitman and colleagues have cogently presented the case that words are not simply mapped onto events in the world (Gillette et al. 1999; Gleitman 1990; Landau & Gleitman 1985). If a learner were to try to match a single word to its contingencies in the world, the possible hypotheses of the word's meaning are, if not infinite, certainly intractable, especially for verbs. Mental state terms would be particularly difficult to learn through word-to-world matching, as psychological states are not directly observable.

In other work, Carpendale argues that in order to understand the role of talk in the development of theory of mind, one must set aside the traditional "code model" of language (Turnbull & Carpendale 1999a). We would argue here that although "talk-as-interaction" is crucial to the development of theory of mind, the language code itself is also important and must be integrated into an overall account of social interaction and theory of mind. The structure of language is as important for learners as the way language is used.

Consider the verb *to think*. The number of "patterns of activity" that could reasonably occur in social interactions at the time when an adult utters the word *think* is huge. What common elements could be extracted from those situations and taken to constitute the criteria for the use of *think*? Worse yet, thinking is going on all the time, yet talking about thinking is not. L. Gleitman and colleagues (e.g., Gillette et al. 1999) have suggested that the child can solve these difficulties by using, among other sources of information, the structure of the sentences in which mental state terms appear as a cue to their meanings. For instance, mental state terms and communication terms take propositions as arguments. By noting the range of sentence structures in which a verb appears, the child can gain crucial information about its meaning, for example, that mental states relate to propositions.

As C&L point out, "language, or communicative interaction, is the means through which children learn about other people's experience and so develop a more complete set of criteria" (sect. 3.2, para. 9). That set will not be complete unless it includes the sentence structures in which mental terms appear. We are very much in sympathy with C&L's approach to the study of theory of mind. We suggest that a first step in moving the approach forward is a more elaborated understanding of the relation between structure and genesis, and consideration of both the linguistic and nonlinguistic contexts in which mental state terms are used.

Being able to understand minds does not result from a conceptual shift

Peter Mitchell

School of Psychology, University of Nottingham, University Park, Nottingham NG7 2RD, United Kingdom. **peter.Mitchell@nottingham.ac.uk**
http://www.psychology.nottingham.ac.uk/staff/plm/home.html

Abstract: If anything, Carpendale & Lewis's (C&L's) target article could have gone even further in challenging the view that a radical conceptual shift equips children with a theory of mind. Also, the authors should have elaborated on why their social constructivist account is more plausible than nativism. Their argument against simulation theory is perhaps the least-developed part of their thesis, and does little service to their cause.

Carpendale & Lewis's (C&L's) thought-provoking target article offers a compelling account of the development of an understanding of the mind, and will be welcomed as a refreshing and attractive alternative to the rather ubiquitous "theory-theory" and modular accounts. On finding myself broadly in agreement with most of the views expressed in the article, I shall confine comments to matters of emphasis and the few areas of disagreement.

First, though, the most significant aspect of the article deserves to be highlighted. The authors provide a convincing argument on the gradual character of development in this important sphere of human functioning. On face value alone, it seems much more plausible than the popular claim from theory-theory that children undergo a singular radical conceptual shift. As Chandler and Hala (1994) persuasively argued, there are much more important and interesting changes that occur both before children begin passing a traditional test of false belief, and indeed afterwards. This brings into focus a detrimental consequence of theory-theory's dominating position as the mainstream account: Attention has concentrated so heavily on what happens at four years of age that it has effectively blinded many researchers to developments in understanding the mind that occur both before and after this time. If C&L stimulate attention to developments taking place at these other times, it will have done a great service. Indeed, they could have been even more ambitious and ventured further into the territory of development beyond the age of four years.

Another aspect of the article that needs to be highlighted is the much-welcomed critique of Wellman et al.'s (2001) claim to have discovered the truth about false belief. C&L correctly say that these authors set up a straw person as an alternative to their (Well-

https://doi.org/10.1017/S0140525X04450031 Published online by Cambridge University Press

man et al.'s) favoured conceptual change account. Here, C&L show restraint, for they could have pointed out that Wellman et al. were highly selective in stating developmental trends that would be predicted by rival accounts. Of course, it came as no surprise to find that children begin systematically giving incorrect judgments in a test of false belief and then gradually change over a period of months such that the probability of giving a correct judgment increases monotonically. In this context, C&L should have pointed out two obvious things:

1. Anyone who predicts sharp conceptual change should not be predicting a monotonic trend (as Wellman et al. curiously did), but an S-shaped function. That is, children should be predicted by this brand of theory-theory to begin consistently giving an incorrect judgment, and then they should suddenly shift to giving correct judgments, and, on reaching that plateau, continue thereafter with few or no errors.

2. Those theory-theorists who believe in a radical conceptual shift seem not to have a satisfactory account of children's systematically incorrect judgments in a test of false belief (but see Perner 1988; Wimmer & Hartl 1991). This is something that C&L also neglect, though in fairness the phenomenon does not threaten their account.

To get a sense of how problematical it is for an advocate of conceptual change, one need only look at the way Wellman and colleagues struggle to provide a description of children who perform below ceiling level. The trouble is that a theory-theorist is compelled to say that a child who performs below-ceiling lacks competence. But then Wellman and colleagues find they need to acknowledge two kinds of incompetence. One is the incompetence that prevents some children from responding systematically (i.e., they are correct about 50% of the time), and the other is the incompetence that afflicts even younger children in a way that leads them to be *systematically* incorrect. Now, if children are responding systematically (albeit incorrectly), then, according to the principles of theory-theory, it surely implies that they are acting upon a strategy. Acting upon a strategy seems to be more advanced with respect to theory-theory than not acting upon a strategy; therefore, a theory-theorist should predict that being correct 50% of the time, where there is no evidence of strategy, should developmentally precede being correct systematically less than 50% of the time, where there is evidence of (incorrect) strategy. This kind of U-shaped development is what Wellman et al. *should have predicted.* But if they had done so, then they would have to face a disappointing refutation when looking at the results of their meta-analysis.

C&L focus on aspects of early social interactions and how these are vital for children to construct an understanding of the mind. This well-formulated thesis deservedly takes centre stage in their account, but some of the evidence pointing to the level of proficiency in children's early social functioning could be interpreted as a sign that they are even more able than C&L recognize. The authors interpret the proficiency as a precursor of later developments; they see these abilities as being necessary ingredients for quality social interactions, and, in turn, the ensuing interactions will supply the grist from which children construct a better-developed understanding of the mind. Another possibility, though, is that these are signs of an early understanding of the mind rather than precursors. In other words, although C&L do an excellent job of challenging theory-theories that are premised on conceptual change, perhaps their arguments against accounts of early competence are somewhat less elaborated.

Similarly, their argument against simulation theory is a lesser feature of their article, being premised on the straw person of introspectionism. Actually, simulation theory can posit that in placing yourself imaginatively into another person's (e.g., John's) perspective, you orient outward from that vantage point to see how the world appears (e.g., Currie & Ravenscroft 2002; Heal 1996). On finding that the world looks like X, you then use an ascent routine: I believe X. Then you step out of the imaginative mode and can impute John with belief X. Clearly, this process does not comfortably fit the description, "introspection."

In summary, C&L do an excellent job of championing an account of gradual development. Their account is refreshing and compelling in its focus on the value of early triadic relationships. I think that their account would have been even more powerful if some of the emphases had been slightly different, but notwithstanding, they have done a great service in generating a cogent alternative perspective to the mainstream.

Challenging theory-theory accounts of social understanding: Where is the social constructivist advantage?

Derek E. Montgomery

Department of Psychology, Bradley University, Peoria, IL 61625.
montg@bradley.edu

Abstract: Carpendale & Lewis (C&L) contend that correlations between sociolinguistic factors and theory-of-mind performance indicate that social knowledge develops from social interactive processes. However, theory-theory proponents also regard these correlations as compatible with their view of how mental concepts develop. A more fruitful distinction lies in the differences of both accounts in explaining how mental concepts acquire meaning.

Carpendale & Lewis (C&L) provide a welcome alternative to individualist and enculturation accounts of the development of social understanding. They argue that children's mentalistic concepts, at the center of social understanding, are neither passively acquired conventions nor theoretical postulates individually constructed through inference and introspection. Instead, these constructs originate in the crucible of everyday social activities and exchanges.

Two issues in this area stand out as fundamental: (1) to what extent mental states are understood by young children as theoretical entities with causal properties, and (2) the mechanisms by which children develop an understanding of the mind. Regarding the second issue, C&L conclude that mentalistic knowledge develops largely through interpersonal rather than intrapersonal mechanisms. Consequently, they see the correlations between sociolinguistic factors and theory-of-mind task performance as clearly playing to the advantage of social constructivist theories (see, especially, sect. 4.2). This advantage, however, may be based to an extent on an incomplete picture of the theory-view. At one point C&L write, "children's social knowledge is based on action; it is not theoretical in the sense of a set of laws *formed on the basis of observation* to explain the doings of other people" (sect. 3, para. 4) (emphasis mine). This is slightly misleading since the theory-view does not explain theories as forming simply from observation. Instead, the child's social activity presents a data set which influences the development of mental concepts. Bartsch and Wellman (1995), for instance, regard conversations about causality and about conflicting desires as being directly related to the development of a theory of mind because these conversations help children to grasp that mental states are subjective causal entities. Theory-theory proponents, like social constructivists, regard sociolinguistic influences on individual differences in theory-of-mind understanding as being complementary to their own view. Wellman and Gelman (1998, p. 542) claim quite plainly that children "who are exposed to very different amounts of mental state data should acquire mental state understandings on different timetables."

The first of the two fundamental issues mentioned earlier – how children regard the ontological status of mental state concepts – is the fault line where social constructivist and theory-theory accounts most clearly divide. Theory-theory accounts assume that

https://doi.org/10.1017/S0140525X04450031 Published online by Cambridge University Press