Carpendale & Lewis (C&L) provide a long-overdue treatment of the development of social understanding as influenced by social interactions. As such, their target article goes a long way in reconciling the ideas of Wittgenstein, Piaget, and Vygotsky. When removed from evolutionary considerations, C&L's arguments might lose considerable appeal. In an effort to place their work in a larger evolutionary context, and in the context of what the authors call the "lean interpretation" of joint attention, they cite some work suggesting that chimpanzees "do not appear to understand the psychological significance of gaze direction" (sect. 3.1, para. 8). Curiously, considering the authors' thesis that social interaction plays a major role in constructing understandings of mind, they fail to discuss the social matrix of the chimpanzees so referenced.

Povinelli and Eddy (1996) carried out a series of studies that appear very similar to the ones that C&L cite from Povinelli (1999). That is, the 1996 work included findings that, to quote C&L (sect. 3.1, para. 8),

> chimpanzees trained to beg with a hand-out gesture and given the opportunity to beg for food from one of two experimenters sitting side-by-side are initially just as likely to beg from someone with her eyes closed, with her head turned away, or even with her head covered by a bucket as they are to beg from someone with her eyes open.

These are some of the exact findings of Povinelli and Eddy (1996). Unfortunately, I have been unable to obtain reprints of the Povinelli (1999) report from his lab, so it is unclear whether he has replicated nearly our entire series of experiments (14 studies with chimpanzees and one with young children) or whether C&L are actually referring to Povinelli and Eddy (1996). Regardless of the answer to that question, the 1996 report brings to the fore an additional interpretation of the chimpanzee findings distinct from C&L's "lean interpretation," which has a direct bearing on one of the central ideas they raise.

Specifically, in the 1996 work, one of the interpretations of the chimpanzees' failure to take into the account the visual perception of others concerned the interspecific nature of the tasks. That is, the chimpanzees in those studies were required to reason about the visual perception of members of a different species (human experimenters). According to this interpretation, the chimpanzees in these studies might in fact show very different results if required to reason about the visual perception of other chimpanzees (rather than humans).

Because these studies have not actually been carried out, it is unclear whether the failure of the chimpanzees under these circumstances is because they lack the capacity to make attributions of visual perception to others (C&L's "lean interpretation") or because they have simply been asked to make attributions to member(s) of the wrong species. Given the human tendency to attribute mental states to some (but not all) animals (see Eddy et al. 1993), this becomes a distinct possibility when applied to chimpanzees.

Where would an acceptance of the "chimpanzees' failure due to the interspecific nature of the tasks" interpretation leave C&L's ideas concerning the development of children's social understanding? Probably not in a fundamentally different place from where it is now. Having said that, if explicit linkages between the development of differing (or similar) abilities in members of different species can be made with data that have singular (rather than multiple) interpretations, then such ideas could be placed squarely and firmly in our growing understanding of the relation between psychological phenomenon and evolutionary facts.

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More than a context for learning? The epistemic triangle and the dialogic mind

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Abstract: Theory-of-mind (TOM) competence is under-specified in Carpendale & Lewis's (C&L's) account. In the neo-Vygotskian alternative outlined below, TOM development is driven by the internalisation of dialogic exchanges which preserve the triadic intentional relations of interactions within the epistemic triangle. On this view, TOM competence stems from children's ability to operate flexibly with the multiple perspectives manifested in internalised dialogue.

Carpendale & Lewis (C&L) pull together an impressive range of findings on social-environmental influences on theory-of-mind (TOM) development, and set out a welcome new theoretical framework for understanding how such capacities might emerge within interpersonal interaction. Where their article is less satisfying is in specifying those cognitive mechanisms that might result from such developmental processes. That is, the authors give an interesting and plausible account of how TOM competence *develops*, but they never really say what it *is*. In particular, the authors are unclear about whether the epistemic triangle serves primarily as a context for learning the criteria for the correct application of mental state terms, or whether it goes on to play a role in children's subsequent solo reasoning about the mind. The authors hint that they have the latter in mind when they note that children's facility with mental state language, developing hand-in-hand with their understanding of the social contexts within which such language use is appropriate, allows them to become "able to think about situations abstracted from their practical context of interaction and . . . to anticipate and reason about situations such as the false belief task" (target article, sect. 4.1, para. 9). At the same time, this account leaves it unclear whether the end product of development, namely TOM competence, amounts to much more than the correct application of mental state terms and concepts in accordance with externally derived criteria for their use. In this case, an unsatisfactorily individualistic account of TOM competence appears to have slipped in through the back door, and one is left wondering what the C&L account can offer that the conventional theory-theory cannot.

It is here that the authors could have gone further with their interest in the work of Vygotsky. Although Vygotsky did not directly address the problem of TOM development as it has been characterised by researchers in this area, several aspects of his writings are potentially relevant here. First, Vygotskian ideas can be useful in an *enculturation* account of the sort that C&L discuss in section 2.1. Second, the idea of *naïve participation*, which sees infants being drawn into practices that they will only later come to understand (Vygotsky 1934/1987, Ch. 4), is central to C&L's conception of how an "initial, fragile social understanding" (sect. 4.1, para. 9) can become transformed into a fully fledged TOM. Third, Vygotsky's concept of the *zone of proximal development* (Vygotsky 1934/1987, Ch. 6) provides a framework for understanding how sensitive input from caregivers can "scaffold" children's acquisition of mental state terms and concepts (Meins et al. 2002). Fourth, Vygotsky's idea that language can be used as a *psychological tool* (Vygotsky 1930/1978) in augmenting pre-existing cognitive capacities suggests that private and inner speech may play important roles in mediating children's own reflections on the nature of mental states and processes (Meins et al. 2003). Finally, the Vygotskian notion of *internalisation* of semiotically mediated interpersonal activity (Vygotsky 1931/1997) may prove useful for our theorising about how children's developing TOM abilities are rooted in their experience of social exchanges.

I suggest that it is this latter aspect of Vygotsky's theory that can make the difference between an essentially individualistic account of TOM development based primarily on the learning of terms for

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mental state concepts, and an account that sees social understanding as genuinely and profoundly rooted in social experience. In a now-familiar set of arguments, Vygotsky proposed that higher mental functions such as mediated memory and self-regulatory inner speech are formed through the progressive internalisation and transformation of semiotically mediated interpersonal exchanges (Vygotsky 1934/1987, Ch. 4). In internalising dialogue with others, the child internally reconstructs the dynamics of that dialogue with, crucially, all of its triadic intentional relations intact. The essential thing about dialogue, for our purposes, is that it involves a simultaneous unity of *different* perspectives (Holquist 1990) on the element of reality to which the dialogue is intentionally related. The internalisation of dialogue, for which normal children are pre-linguistically prepared by the socio-affective responsivities and joint attentional capacities described in section 3.1, therefore involves children taking on a semiotic (usually natural-language) representation of the alternative perspective manifested in that dialogue (Fernyhough 1996; 1997).

It is this permeation of children's thinking by the different perspectives encountered within the epistemic triangle that forms the basis of their developing ability to operate with these perspectives, first in naturalistic social-cognitive reasoning contexts, and later in more formalised tests of TOM. The end result of internalisation is thus an ongoing interplay between different, simultaneously held perspectives on reality, represented first in private speech and ultimately in dialogic inner speech. To the extent that it requires the flexible and simultaneous co-ordination of multiple perspectives on an aspect of a task situation – such as the location of an unexpectedly transferred object or the phenomenal qualities of an item in the appearance-reality task (Fernyhough 1996) – TOM reasoning represents the pre-eminent example of dialogic thinking.

Allowing the epistemic triangle to become internalised would therefore provide C&L with a specific cognitive mechanism through which children could operate with the mental states of others and "coordinat[e] these often differing perspectives with their own beliefs" (sect. 4.2, para. 1). It would also provide a framework for making sense of the social-influences findings that went beyond the (admittedly important) issue of learning the correct use of mental state terms. For example, by focusing on how caregivers differ in their ability to construct dialogues with their children in which the intentional stance is taken (Garfield et al. 2001), the neo-Vygotskian approach is better placed to account for the evidence that very early differences in maternal mind-mindedness relate to individual differences in TOM several years later (Meins et al. 2002; 2003). Much more than a mere context for learning, the internalised epistemic triangle becomes an essential part of the child's solution to the moment-by-moment challenge of engaging with other minds.

The roots of social understanding in the attachment relationship: An elaboration on the constructionist theory

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Abstract: It is argued that constructionist theory provides only a partial account of how secure attachment leads to better social understanding. In addition to cooperative parent-child relations, the more efficient arousal and affect regulation system of secure infants, and developmental moderators of the processes of imitation, may play a part in explaining the association and offer clues as to how effective social understanding is generally acquired.

Carpendale & Lewis (C&L) make a strong case that past attempts at accounting for the influence of social interaction on the development of children's social understanding[1] within the confines of the three prominent models of theory of mind acquisition have been at best partial. They reject both the enculturation and the extant developmental propositions (maturation, theory-theory, and simulation) in favour of a model that assumes that social understanding is an emergent property of the child's experience of certain regularities in interaction with others. The "epistemic triangle" (i.e., referential interactions between infant and caregiver about the object) is assumed inevitably to generate the discovery that others sometimes have different beliefs about the world from one's own. If we, taking the point of view of the infant, assume the existence of a stable external world, the actions of others in communicative interactions can only be understood given the supposition that they have different beliefs about aspects of the world. Children achieve comparable levels of development at similar ages simply because of the commonalities of their experience. The corollary of this is that differences in the acquisition of social understanding are to be understood in terms of crucial differences in their experience of triadic interactions. For example, our results from the London Parent-Child Project (Fonagy et al. 1997) that children securely attached at one year were significantly more likely to pass the Belief-Desire reasoning test at five and a half years ($n = 90$, $p < .005$, OR = 3.8, CI: 1.5–9.9) may be understood in terms of attachment being a good marker for a cooperative parent-child relationship, which, according to constructivist theory, is the ideal context for the development of knowledge.

Although I do not fundamentally disagree with either the spirit or the details of the case advanced in the target article, there are important gaps in the model advanced by the authors. The target article is helpful in drawing attention to the common ground between Bowlby's (1980) and Piaget's (1945/1962) thinking, particularly in relation to Piaget's notion of schemes and Bowlby's assumptions concerning internal working models. However, how do secure-autonomous internal working models in the parent lead to the kinds of cooperative relationships "that might permit unrestrained communication, that allows participants to understand each other fully" (Habermas 1983/1990)? We have to assume a dialectic model of self-development (Hegel 1807) where the child's capacity to create a coherent image of mind is critically dependent on an experience of being clearly perceived as a mind by the attachment figure. The now overwhelming evidence for the transgenerational transmission of attachment security is consistent with this (van IJzendoorn 1995), and this may link to the emergence of mentalisation in the child (for a review, see Fonagy et al. 2002). Accumulating transgenerational evidence suggests that mothers who conceive of their own childhoods largely in mental state terms are more likely to go on to develop secure attachments with their children (Fonagy et al. 1991; Target et al., in press) and to have a more differentiated mentalised picture of their infant (Muzik & Rosenblum 2003; Slade et al. 2001), which in turn is associated with more mind-minded comments (Muzik & Rosenblum 2003) and infant security (Slade et al. 2001). As the work of Elizabeth Meins and colleagues (2001) suggests, mothers whose state of mind with respect to attachment may be described as secure (Main 2000) expose the infant to more mental state language, which in turn advances the child's social understanding.

Yet, more than mental state language, the coherence with which the child's mental state is perceived may be the critical variable. In a study by David Oppenheim (Koren-Karie et al. 2002; Oppenheim & Koren-Karie 2002), mothers were asked to narrate a videotaped playful interaction that they had just had with their infant. Mothers who were reflective in their narratives, able to see various experiences through the child's eyes and gain new insights as they talked, were far more likely to have securely attached infants than mothers who either had preset conceptions of the child which they appeared to impose, or disengaged from trying to understand what was on the child's mind. Most pertinent was the observation that disorganised attachment classification was associated with mothers who were incoherent, switching between the above categories and not fitting well into any of them. Thus,

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