

intentional psychology; rather, she possesses a set of cognitive mechanisms whose proper function is to sensitise her to possibilities for intentional engagement with her surroundings. As a result of this engagement, the normal child will develop the concepts of intentional psychology.

I take it Carpendale & Lewis (C&L) would agree with this characterisation; however, their approach does not lead to any deeper understanding of either the mechanisms which initially sensitise the child to her social environment, or those which subsequently lead to the type of conceptual understanding tested in false belief and other “theory of mind” (TOM) tasks. There are two reasons. First, they endorse Wittgenstein’s argument that cognitive competence is mastery of a practice best understood as a skill rather than an intellectual or theoretical achievement. Second, the authors do not connect their account of social understanding to the understanding of autism. The two issues are related.

Wittgenstein gives no explanation of the way social interaction produces social understanding. This is because he regards it as an essentially unanalysable skill which, once acquired, allows the subject to perceive mental states directly. His reasons for rejecting intellectualist accounts of skill acquisition (fast, fluent, and flexible responses cannot be governed by rules understood as algorithmic reductions of theoretical inferences) combine with his conceptual analysis of the concept of an intentional state. The *folk concept*, properly analysed, of an intentional state is not that of a covert cause of overt behaviour. Social understanding *feels* like immediate and non-theoretical recognition of mental states exhibited in overt behaviour, and that is because the cognitive process involved is a skill and not a theoretical inference (Wittgenstein 1953/1968).

This may be so, but this is no recipe for developmental psychology, which is, quite rightly, concerned with the neurocognitive processes involved in concept acquisition. For example, it would not do simply to say that after a period of social interaction certain aspects of the child’s linguistic environment (prosody, changes in amplitude) become “criterial” for language understanding. Some explanatory hypothesis is required about the nature of the cognitive processes implemented in developing neural architecture. Is the child processing phonology or syntax? How is the relevant information represented and manipulated? It seems uninformative to say that as a result of social interaction children acquire the ability to hear sentences as meaningful, but that is precisely what Wittgenstein said. The best way to comprehend the process is via a metaphor “Light dawns over the whole.” But it is simply not true that the psychological explanation of concept acquisition is exhausted by analysis of its phenomenology. And it is doubtful that the philosophical understanding is, either.

Early cognitivists reconstructed these questions as questions about the construction and confirmation by the developing child of theories of the linguistic domain, implemented ultimately in neural architectures. Perhaps this is slightly over-intellectual, but the issue of what information is relevant to cognition of a particular domain and how it is computed is still essential. Furthermore, that is a question about what is going on *in the mind of the individual* who acquires a language. Putting it this way does not exclude social interaction but it allows us to say why certain aspects of social interaction are more significant than others and why some children rather than others develop the relevant concepts in response to that interaction.

Without such a theory, a linguist would be forced to say that children with, say, Specific Language Impairment (SLI) do not acquire language normally because their linguistic interactions are abnormal. True, but is this because they lack acoustic or phonological information? The ability to process it? Or do they lack some form of grammatical processing? One cannot say that one is concerned only with normal development, because the adequacy of a model of normal development is evidenced by its ability to predict and explain characteristic developmental abnormalities. Similarly for other psychological capacities: much, if not most, of our knowledge of normal function depends on abnormal cases.

The same is true of social understanding. Indeed, the TOM hy-

pothesis was originally advanced to explain the difference between normal and autistic children. Perhaps the TOM idea is overly intellectual and perhaps (as the authors argue persuasively) TOM is not a cognitive monolith. In that case autism is unlikely to be a monolith either. But we are then left with the idea that there is a multiplicity of cognitive mechanisms involved in social understanding that reciprocally interact in a developmental cascade in both normal and abnormal cases. Such a view seems entirely consistent with methodological individualism, which is just the attempt to find out what it is about cognitive architecture that enables the normally developing child, first, to become embedded in her social world and, second, to scaffold her development using social interaction. Social exchanges, evidenced in gaze monitoring, social referencing, emotional responses, protodeclarative and imperative pointing, pretence, play, and conversation, all play a role, but the nature of that role is opaque without an understanding of the cognitive mechanisms on which it depends.

The rejection of methodological individualism reflects a debate in cognitive science over the explanation of skills (of which intentional understanding certainly is one). Some argue that “know-hows,” the fundamental capacities on which skills depend, should be identified with socially acquired dispositions. Others argue that the acquisition of those dispositions itself depends on some fundamental capacities that are essentially computational and internal to the mind of the individual acquiring the skill. For almost any skill, it turns out that its ultimate explanation is the computational one: Think of recognising faces, catching a ball, learning a language, or playing at dressing up. Furthermore, the phenomenology of skill acquisition is a poor guide to the nature of those computational processes. For this reason, we should be sceptical of any account that is essentially nothing more than an elaboration of phenomenological insights.

The role of executive function in constructing an understanding of mind

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Abstract: Adopting a constructivist stance is not irreconcilable with executive function accounts of emerging social understanding. The executive function view allows for a gradual transition in theory of mind, while specifying the underlying cognitive processes that push that development forward. Executive function abilities can be seen as an important interactional component in the epistemic triangle.

Carpendale & Lewis (C&L) have done the field a great service in reminding us that the development of social understanding does not take place in a social vacuum. They point out, quite rightly, that the question of importance should not be whether early competence in social understanding exists; rather, the central focus should be turned towards the processes that allow for the emergence of social understanding. The authors propose an alternative constructivist account that promises to bridge the current dichotomy that exists between those who adopt an individualistic developmental approach versus those who subscribe to an enculturation view. The inclusion of Chapman’s (1991) “epistemic triangle” helps to further extend Piaget’s constructivist theory to the social realm.

Although C&L’s proposal is highly laudable, nevertheless, as was the case with Piaget’s original account, important aspects of the developmental process remain underspecified. That is, saying that development is a constructive process tells us little about the exact nature of the cognitive functions that also contribute to development of social understanding. The authors offer coherent objections against three prominent theories that seek to explain

the emergence of a so-called “theory of mind” in young children: theory-theory, simulation, and modularity accounts. They neglect, however, to address how a constructivist account might be related to a newer, rapidly maturing, alternative theoretical perspective – the executive function account.

The term “executive function” broadly refers to those cognitive functions that underlie goal-directed behavior and that are thought to be mediated by the prefrontal cortex (e.g., Welsh et al. 1991). A growing number of researchers maintain that gains made in executive function abilities in the preschool years contribute significantly to theory-of-mind performance (e.g., Carlson & Moses 2001; Carlson et al. 1998; 2002; Frye et al. 1995b; Hala & Russell 2001; Hala et al. 2003; Hughes 1998; Russell 1996; Zelazo et al. 1997). As children increase their capacity to control and direct their own actions, they become able to view alternative courses of action – including actions based on beliefs (Russell 1996).

In contrast to the theories criticized by C&L, an executive account can readily incorporate the notion of a more gradual onset of social understanding. Development of both executive control and social understanding begin early and emerge over an extended period of time. Indeed, the precocious performance found in many “modified” false belief and deception tasks (which the authors highlight as increasing personal or social activity) may be explained in terms of reductions in the executive demands of the tasks.

To illustrate: typical false belief tasks draw on at least two executive demands: (1) working memory (of where the object was in the beginning or what the child thought was in a box) combined with (2) inhibitory control (inhibit pointing to the spot where the object is now known to be or reporting what one now knows is really in the box). Recent research has confirmed that those executive tasks that combine both working memory and inhibitory control are most strongly related to theory-of-mind performance (Carlson et al. 2002; Hala et al. 2003). Reducing one or both of these executive demands may result in improved performance. For example, Freeman and Lacroh e (1995) found that having children “post” a picture of what they thought was in a box helped them later to recall their own false belief in a contents task. Although personal activity is certainly increased in this version, at the same time so are the executive demands reduced (in this case, working memory). Similarly, reducing the inhibitory demands of deception tasks also results in improved performance (Carlson et al. 1998; Hala & Russell 2001), whereas simply removing the opponent – and hence reducing the social demands – does not (Hala & Russell 2001). The reverse pattern is also found. That is, increasing the inhibitory demands of theory-of-mind tasks detracts from performance (Leslie & Polizzi 1998).

Though I use these examples of modified tasks to illustrate that a more gradual onset of social understanding is consistent with an executive account, I am not claiming that it is simply information-processing complexities of specific tasks that stand in the way of young children and their supposed theories of mind. Instead, I, and others, suggest that there is a deeper relation between executive function and developing social understanding. Exactly what this relation is has yet to be specified. Development of executive function may make possible the emergence of a theory of mind (Moses 2001). Alternatively, it may be that a strong relation is consistently found between theory of mind and executive control, not because one is causally implicated in the other in a linear fashion, but because the two are interdependent in their development.

Admittedly, the bulk of the research on the relation between executive function and social understanding is of the individual-differences variety and has not, as yet, wed itself to charting the social interactions the child is surrounded by. In principle, however, the executive and constructivist accounts are not mutually exclusive. Interaction with others challenges children’s current executive abilities, and, in Piaget’s terms, adaptation in knowledge structures may result, leading to increased knowledge and flexibility in their thinking about their own and others’ mental lives. As chil-

dren grow in their executive function abilities, they become more adept at interacting with and understanding others.

Introducing executive function ability into the epistemic equation affords a view of the process of development as bidirectional. As has long been maintained by those who adopt a dynamic systems approach (e.g., Bronfenbrenner 1989; Gottlieb 1991; Scarr & McCartney 1983/1984), the characteristics of the child influence the response of the environment just as the environment influences the child. In this vein, children’s executive maturity will, at least in part, influence how their parents respond to them, which in turn will influence and further enhance their developing executive control and social understanding.

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Understanding self and other

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Abstract: Interpersonal understanding is rooted in social engagement. The question is: How? What features of intersubjective coordination are essential for the growth of concepts about the mind, and how does development proceed on this basis? Carpendale & Lewis (C&L) offer many telling insights, but their account begs questions about the earliest forms of self-other linkage and differentiation, especially as mediated by processes of identification.

The article by Carpendale & Lewis (C&L) is an important corrective to contemporary misconceptions about the development of interpersonal understanding. The authors analyse distortions introduced by individualistic “theory of mind” perspectives that purport to show how children might derive concepts (even concepts of mind) without appropriate forms of interpersonal engagement, and they highlight the equally devastating limitations of simulationist accounts that presuppose understanding of one’s own mind as a basis for understanding the minds of others. The arguments they marshal from Wittgenstein and Chapman in particular are, in my view, decisive. As C&L indicate, a theory in which social exchanges are constitutive of understanding does not lead to cultural relativism. On the contrary, it is only through involvement with others that human beings are in a position to accord objective reality the status it deserves, and only when objective reality is conceived as such do concepts such as “belief” gain a purchase. Moreover, mutual interpersonal relations that entail communication and reference vis-à-vis a shared external world provide a necessary basis for uniquely human ways of (1) acquiring knowledge about that world; (2) understanding what it is to be a person with alternative psychological perspectives on that world; and even (3) thinking symbolically and creatively about people and things and constructing concepts with which to think.

How, then, should we frame our account of early human development if we are to elucidate how all this is possible and how development proceeds from its starting point? Here I wonder whether C&L are sufficiently radical in their revamping of theory.

Consider how concepts of “self” and “other” are integral to concepts of mind. There is a paradox at the heart of any attempt to reconcile developmental accounts of self-other understanding that focus on the individual’s cognitive endowment, on the one hand, and social influences, on the other. The paradox is that an individual has to have bedrock experience of the social *as* social in order to build upon this to construct progressively elaborated understandings of minds as connected and differentiated centres of consciousness. Without some primitive modes of experiencing self *as* self in relation to others, and of others *as* others in relation to self, it is difficult to see how concepts of self and other could be derived. (Note: this does not mean that infants, even infants at the