



## THE DIALOGIC MIND: A DIALOGIC APPROACH TO THE HIGHER MENTAL FUNCTIONS

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**Abstract**—Drawing on the work of Vygotsky, Bakhtin, Wertsch and others, I outline a framework for the study of the higher mental functions that views them as dialogic processes derived from interpersonal activity. According to this view, the higher mental functions develop through the progressive internalization of semiotically manifested perspectives on reality, such that mature functioning involves the simultaneous coming-into-conflict of differing internalized perspectives. I suggest that such an approach goes some way to account for the open-ended and unconstrained nature of higher mental functioning. I also consider some implications of this approach for current research in developmental psychology, with particular reference to the role of care-givers in mental development, the emergence of perspective-taking and mentalizing abilities in early childhood, and the deficits associated with early childhood autism. Copyright © 1996 Elsevier Science Ltd.

### INTRODUCTION

In the collection of essays published in 1978 under the title *Mind in Society*, Vygotsky distinguished between two types of mental function and two lines of mental development. The *higher mental functions*, which include such phenomena as voluntary attention, mediated memory and concept formation, are under voluntary control and are accessible to consciousness. The emergence of these functions in the context of social activity constitutes the *cultural* line of development. Because these functions have their origin in social activity and consequently share many of the properties of social interaction, they differ fundamentally from the *elementary mental functions*, which are involuntary, unconscious and “totally and directly determined by stimulation from the environment” (Vygotsky, 1978, p. 39). The development of these latter functions constitutes what Vygotsky called the *natural* line of development. Central to Vygotsky’s theory is the assumption that these two lines of development, together with the two forms of mental functioning to which they give rise, will require fundamentally different kinds of explanation. In other words, a scientific theory of the higher mental functions will be based upon different assumptions to those underlying a theory of the elementary mental functions.

The aim of this paper is to outline a framework for such a theory of the higher mental functions. This framework departs from modern “information processing” approaches to mind in considering how the higher mental functions develop within the context of interpersonal activity. I suggest that one of the main reasons the information processing approach is inappropriate to the study of the higher mental functions is that it fails to do justice to the dialogic nature of such processes. My use of the term “dialogue” is derived from the work of Bakhtin (1981, 1984, 1986; Voloshinov,\* 1929/1986) and will require some elaboration. However, my first task is to sketch

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\*Works attributed to Voloshinov are widely considered to have been the work of Bakhtin (Holquist, 1990; Wertsch, 1991).

the main features of the broadly Vygotskian “sociocultural” approach to mind, upon which my examination of mental dialogue is based.

### THE SOCIOCULTURAL APPROACH

The sociocultural approach to mind (Wertsch, 1990, 1991; Wertsch & Kanner, 1992; Rogoff, 1990) takes the three main themes of Vygotskian theory as the basis for an investigation into how human mental functioning is located within cultural, historical and institutional contexts. Briefly, these themes are: a reliance upon a “genetic method”, in considering how mental functioning develops from more primitive forms; the assumption that the higher mental functions have their origin in and, therefore, share important features with interpersonal activity; and the claim that inter- and intra-mental activity is mediated by signs (Wertsch, 1985).

Vygotsky provides us with a useful illustration of this approach in his distinction between two types of memory system. He suggests that *natural* memory is characterized by “the nonmediated impression of materials, by the retention of actual experiences as the basis of mnemonic (memory) traces” (Vygotsky, 1978, p. 38). As such, natural memory is an example of an elementary mental function. In contrast, *mediated* memory is not dependent upon simple mnemonic impressions, but is organized by culturally derived sign systems. On this view, the act of tying a knot in a handkerchief to help oneself remember constitutes an example of “self-generated stimulation, that is, the creation and use of artificial stimuli which become the immediate causes of behavior” (ibid., p. 39). The culturally specific nature of such signs means that the development of these processes is rooted in cultural, or interpersonal, practices. Leont’ev’s (1932) classic “forbidden colors” experiment, which demonstrated children’s developing ability spontaneously to use colored cards as aids to memory, provides an example of the ontogenetic transition between elementary and higher mental functioning.

The recent resurgence of interest in Vygotsky’s theory has led to his ideas being extended and modified in a number of important ways. For example, Wertsch (1991) has argued that Vygotsky’s notion of the sign as “psychological tool” does not do justice to “the diversity of mediational means available to human beings” (p. 93). The modification of Vygotsky’s metaphor to that of the “toolkit” allows us to make sense of contextual differences in individual demonstrations of ability (Donaldson, 1978; Rogoff, 1990; Rogoff & Lave, 1984). For instance, there is now evidence that children’s performance on Piagetian tasks such as perspective-taking depends crucially on the context within which the task is presented (Donaldson, 1978). In this case, it makes no sense to speak of a particular age-group as “having” a particular concept or ability while another does not. Rather, the toolkit analogy accommodates the possibility that different contexts trigger different usages of a range of psychological tools.

One way in which Wertsch has attempted to understand the “heterogeneity” (Tulviste, 1987) of thinking is in terms of the work of Bakhtin (1981, 1984, 1986), whose notion of the “speech genre”, or socioculturally situated mode of speaking, illustrates how different ways of speaking about a situation can account for differences in performance across contexts. For example, Wertsch (1991) shows how the difference between a teacher and child in their manner of talking about an object can be described in terms of the difference between a “scientific-concept” speech genre (speaking about the object in terms of standardized taxonomies and binary oppositions) and an “autobiographical” speech genre (speaking about the object in terms of its relation to one’s own experience). The introduction of increasingly sophisticated speech genres in a pedagogic context is essential to the development of “heterogeneity” in thinking.

Bakhtin's notion of the speech genre would seem to be useful for our understanding of how the higher mental functions emerge from interpersonal activity. Of particular importance for the present discussion is Bakhtin's idea that the word in living contexts is socioculturally situated: that is, it betrays the belief and value system, or "ideology"\* (Bakhtin, 1981) of the speaker. The Bakhtinian notion of "voice", therefore, furnishes a link between individual mental functioning and the sociocultural context within which it is situated (Wertsch, 1991). In internalizing forms of social interaction in a Vygotskian sense, the individual takes on the voices of others. The beginning of this process thereby constitutes an important step in the "socialization" of the intellect (Piaget, 1923/1926; 1977/1995; Vygotsky, 1978).

Bakhtin developed his concept of "voice" as part of a wide-ranging investigation into the phenomenon of dialogue. Each "voice" is a manifestation of a particular ideology, or set of attitudes to reality. Dialogue is the phenomenon whereby different ideologies, manifested in language, come into conflict. Every utterance, as well as being a manifestation of the ideology of the speaker, is also addressed to someone who may or may not be present in the immediate speech situation. "This addressee can be an immediate participant-interlocutor in an everyday dialogue, a differentiated collective of specialists in some particular area of cultural communication, a more or less differentiated public, ethnic group, contemporaries, like-minded people, opponents and enemies, a subordinate, a superior, someone who is lower, higher, familiar, foreign, and so forth. And it can also be an indefinite, unconcretized *other*" (Bakhtin, 1986, p. 95, original emphasis).

Central to this notion of the dialogicality of the utterance is the assumption that the meaning of an utterance depends upon its relationship to other utterances. Put simply, the communicative import of an utterance depends upon the perspectives of both speaker and addressee, so that meaning is determined both by the utterance itself and the potential response to the utterance. Any utterance can, therefore, manifest more than one perspective or "ideology" at the same time. Bakhtin's (1981) example of such a "multivoiced" utterance is provided by a sentence from Dickens' *Little Dorrit* (1857/1967, p. 621):

"But Mr Tite Barnacle was a buttoned-up man, and *consequently* a weighty one" (emphasis added).

The main part of this sentence is expressed in the voice of "common opinion", whereas the word *consequently* appears to represent an interjection or "response" by the voice of the author. This interjection consists of a comment on the logic of so-called "common opinion". A single sentence, therefore, contains "two utterances, two speech manners, two styles, two 'languages', two semantic and axiological† belief systems" (Bakhtin, 1981, p. 304).

It would seem, then, that the individual, in internalizing the "voice" of the other, takes on more than just a way of speaking. Specifically, internalizing another's voice means internalizing some aspect of their perspective on reality (or, in Bakhtin's terms, their "ideology"). If Vygotsky's view of internalization is correct, it makes sense to think of higher mental functioning as an ongoing interplay between semiotically manifested perspectives on reality. That is, the higher mental functions, insofar as they are derived from semiotically mediated interpersonal interaction, are fundamentally dialogic in nature.

My purposes in what follows are to be as specific as possible about what a dialogic theory of

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\*As Holquist notes in his glossary to Bakhtin's (1981) *The Dialogic Imagination*, the term "ideology" in Russian has none of the political overtones of its English cognate. Rather, it represents the instantiation of a particular perspective on the world, together with each of its ontological, axiological, conative and motivational elements. "Every word/discourse betrays the ideology of its speaker . . . every speaker, therefore is an ideologue and every utterance an ideologeme" (Holquist, 1981, p. 429).

†That is, pertaining to the value systems of the individual or the culture.

the higher mental functions might look like and to explore some of the implications of such an approach for current research in developmental psychology. I will be considering what the dialogic approach can contribute to our understanding of the role of care-givers in development; the emergence of perspective-taking and mentalizing skills in early childhood; and implications for abnormal development, with particular reference to the syndrome of early childhood autism.

## A THEORY OF THE DIALOGIC HIGHER MENTAL FUNCTIONS

To claim that the higher mental functions are fundamentally dialogic in nature is to make more than a metaphorical turn. Ideas about the dialogic nature of mental functioning stretch back at least as far as Plato (undated/1953), resurface in Hegel (Bibler, 1975/1984), and continue with the work of Bakhtin and colleagues in the early 20th century (Fernyhough, 1994). Among psychologists, Mead (1934), Vygotsky (1934/1986) and Piaget (1977/1995) all made reference to the dialogic nature of certain mental processes, a theme that has been picked up more recently by a variety of authors (e.g. Bråten, 1988, 1993; Hobson, 1993a; Tomasello, Kruger and Ratner, 1993; Wertsch, 1991).

Despite all this interest, there has to date been no thorough consideration either of what a dialogic theory of the higher mental functions might look like, nor of its possible implications for research in developmental psychology. In this section, I will begin by saying what the dialogic higher mental functions are *noted*, before setting out some more positive criteria.

Firstly, they are not *monologic*. As a number of authors have noted (Hamlyn, 1990; Saranson, 1981; Wertsch, 1991; Wertsch & Tulviste, 1992), the overwhelming tendency within modern psychology is to view mind as an information processing system, co-extensive with the biological organism, enjoying no contact with other such systems except through linguistically and gesturally mediated information flow. In contrast, the dialogic view takes account of how mind “extends beyond the skin” (Geertz, 1973) in characterizing higher mental functioning as an ongoing dialogue between differing “perspectives” on the world. As with the Bakhtinian notion of “ideology” (see Holquist, 1981), these perspectives are derived from those held by actual people with actual positions in the world, along with all their ontological, axiological, conative and motivational elements.

One characteristic of the dialogic higher mental functions is, therefore, their capacity to accommodate multiple orientations to reality. In contrast, monological mental functions (a class of functions I will assume to correspond to Vygotsky’s “elementary” mental functions) show no such capacity to accommodate alternative perspectives. To give some examples, parsing a sentence, in being entirely driven by environmental stimulation, would count as a monologic function, while adopting a strategic approach to a problem (by considering, for example, alternative possible first steps) would require the recruitment of dialogic resources.

Secondly, mental dialogue is not necessarily a *dialectic*. That is, to say that higher mental functioning involves the simultaneous accommodation of multiple perspectives is not to claim that thinking necessarily involves a Hegelian progression from thesis to antithesis to synthesis. Rather, the perspectives in dialogue are derived from actual orientations to the world that come into unresolved, open-ended conflict. Mental dialogue is, therefore, nonhierarchical in that it involves interplay between equally “correct” orientations to reality. Furthermore, these perspectives are manifested in sign systems and are therefore semiotic in a way that is not characteristic of dialectic. For example, Riegel (1973) suggests a dialectical interpretation of concrete operational children’s ability to consider simultaneous change in two dimensions. As will be seen later,

the dialogic approach attributes this ability, and children's consequent success on tasks such as conservation, to their developing ability to coordinate alternative, semiotically manifested perspectives on the task in a dialogic manner.

We can now begin to specify some of the positive characteristics of dialogic higher mental functioning.

(1) *Mental dialogue involves the simultaneous accommodation of multiple perspectives on reality.* According to the present account, mental dialogue is involved whenever it is necessary to "view" the same element of reality in different ways at the same time. I will be presenting a number of examples of situations requiring dialogic thinking throughout this paper.

(2) *These perspectives are manifested in culturally derived sign systems.* These "ways of taking the world" are manifested just as they are in interpersonal activity—that is, in words (spoken and written), gestures and other signs.

(3) *These perspectives are derived from experience of interaction with other people.* In an earlier examination of mental dialogue, Bråten (1988, 1993) proposed an "innate dialogic circle", which ensures that social interaction is dialogic from the earliest days of life. In contrast, my assumption is that alternative perspectives on reality can only be experienced and, therefore, internalized by experience with the people who hold them. It is beyond the scope of this paper to consider how infants are first drawn into social relationships through their involvement in gestural and linguistic exchanges (Hobson, 1993a; Vygotsky, 1934/1986; Wertsch, 1991), although later I consider how a paucity of such experience might in some cases hinder the development of dialogic modes of thought.

(4) *These perspectives are internalized, such that higher mental functioning involves a constant interplay between differing, often conflicting, perspectives.* Mental dialogue is, therefore, an internal version of the interplay of perspectives that takes place between individuals on the external plane.

(5) *These perspectives are not necessarily beliefs.* To say that the individual is able to take on the perspectives of others is not to say that he or she automatically makes a commitment to their truth. Beliefs about the state of the world are fixed by the information delivered by input systems (Fodor, 1983)\* and are thus determined by the individual's position in the world. The claim here is that the beliefs that are held by the individual exist in a dialogic relationship with a range of other, often contradictory beliefs made available to the individual through experience of other perspectives.

(6) *These perspectives are not exclusively perceptual.* As well as taking on perspectives on physical reality, dialogic interaction with others involves taking on various other aspects of the other's perspective. As with the Bakhtinian notion of "ideology" (Holquist, 1981), this includes ontological, axiological, conative and motivational elements (see Hobbs [1990] for a similar notion of a cognitive agent's "belief system"). Later I consider Wertsch's (1984) notion of "situation definition" as a particular example of an ideology, consisting of a set of beliefs about how a particular problem should be construed.

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\*In his assessment of the extent to which the mind can be seen to consist of independent processing modules, Fodor (1983) came to the conclusion that there was a class of cognitive process that did not fit the criteria for being modular in nature and was consequently less well understood. In contrast to the modular "input systems", which are domain-specific, innately specified, hardwired, autonomous and unanalyzable into lower-level functions, the central systems are not limited to any particular informational domain. According to Fodor, it is this "global" nature of the central systems that sets them apart from the environmentally determined input systems. Given my characterization of the higher mental functions as open-ended and unconstrained, I suggest that this distinction maps reasonably neatly onto Vygotsky's distinction between the higher and elementary mental functions.

(7) *The temporal patterning of external dialogue is not always preserved.* Earlier I suggested that Bakhtin's achievement was to demonstrate the "dialogicality" of an utterance, such as the quotation from *Little Dorrit*, even in the absence of any clear structural markers. The two voices that are heard in this utterance do not form the alternating lines of a dialogue, but are present simultaneously in the utterance. Dialogue, as conceived by Bakhtin, involves the simultaneous coming-into-conflict of differing perspectives on reality, and thus does not always manifest the temporal patterning of conversation. The dialogic nature of the higher mental functions stems from their ability to accommodate a "*simultaneous unity of difference*" (Holquist, 1990, emphasis added), rather than from any necessary structural resemblance to the "give and take" of conversation.

Another way in which the dialogic higher mental functions extend beyond conventional notions of verbal thought as a "conversation in the head" lies in the extent to which the dialogue is abbreviated. Vygotsky (1934/1986) characterized the development of inner speech as involving a continuous process of syntactic abbreviation, particularly the development of "predicativity" (whereby the "psychological subject" of an utterance is gradually eliminated, while the "predicate" is preserved). One can see how, in the dialogic higher mental functions, the process of abbreviation might have progressed to such an extent that the alternative perspectives that have been brought into conflict are present more or less simultaneously, such that the individual, having initially been able to consider alternative perspectives in turn, becomes able to adopt them *at the same time*.\*

(8) *Mental dialogue is open-ended.* My argument for the dialogic nature of mental functioning hangs upon the assumption that human intelligence has specific properties that set it apart from other forms. For Bakhtin, an essential feature of dialogue is that it is "open-ended", and I wish to suggest that higher mental functioning is similarly open-ended and unconstrained.

The key to understanding the open-ended nature of dialogue lies in its characterization as an ongoing conflict of perspectives. At the heart of Bakhtin's writing is the assumption that, for any participant in a dialogue, there will be some aspect of the other's perspective that remains unknowable. Such, after all, is the basis of communication: there would be no point in communicating if you already knew everything your interlocutor knew.† Taking on the perspective of others, through internalizing the manifestation of their perspective in a particular interaction (i.e. their "voice"), is, therefore, a process that is never completed. I suggest that it is because of the constant necessity to accommodate alternative viewpoints that mental functioning is open-ended.

This open-ended quality of higher mental functioning takes on particular importance when we come to consider the development of self-regulation. One recurrent problem for monologic views

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\*Although it is somewhat beyond the scope of this paper, one might briefly consider the relationship of mental dialogue to consciousness. It seems clear that there are many occasions where we would regard ourselves to be "thinking" without being aware of any explicit internal conversation. Rather than conceiving of the higher mental functions as being *accessible* to consciousness (in the way that we think of inner speech as being accessible to, or at the forefront of, consciousness), it may be more appropriate to think of mental dialogue as being *constitutive* of consciousness. By this I mean that consciousness requires at least the ability to "see" an element of reality in different ways at the same time. Whether this involves a partially abbreviated "internal conversation" or an implicit interplay of perspectives bearing no structural resemblance to the give and take of conversation, the ability simultaneously to adopt multiple orientations to reality will remain as a key feature of dialogic thought.

†This is not to say, as Sperber and Wilson's (1987) theory of "relevance" implies, that all communication must involve the transmission of information. Instead, the Bakhtinian view of communication holds that dialogue, which would be impossible without differences in perspective between the participants, is guaranteed by the fact that every speaker occupies a unique position in space and time.

of mental functioning has been how to explain individuals' ability to regulate their own behavior. To take an example, Norman and Shallice's (1980) theory of the attentional control of action postulates the existence of a Supervisory Attentional System responsible for directing the activity of lower level "action schemata". I suggest that the best way of understanding the self-regulatory function of such a system, without taking recourse to an even higher-level supervisory system, is in terms of the sort of dialogic process described above. Why? Because dialogue is, by definition, a self-regulating phenomenon. For instance, in explaining the progress of a conversation between two speakers, there is no need to postulate a separate supervisory system responsible for directing the flow of conversation. It may be this ability to be continually taking on alternative perspectives and using them to regulate their own activity that determines the manner in which humans perform strategic operations (Wertsch, 1980).

Another way of thinking of this open-ended quality of dialogue is in terms of humans' availability to suggestion. Consider, for example, Maier's (1931) classic "pendulum" problem, where subjects had to work out how to tie together two strings that were hanging too far apart to be reached at the same time. The most effective solution was to tie an object to one of the strings and set it swinging, so that it could then be caught while holding the other string. Maier found that, after the experimenter (apparently accidentally) brushed one of the strings and thereby set it swinging, subjects were more likely spontaneously to produce the pendulum solution, even though they often appeared not to notice the "clue" given by the experimenter. I suggest that this availability to suggestion reflects the dialogic nature of the processes involved in this kind of problem solving.

A similar interpretation can be given to the phenomena of analogical reasoning and creativity. In this case, what distinguishes human thought is the fact that anything from the individual's knowledge system can be used as an alternative perspective on a situation. To give a scientific example, Rutherford's model of the structure of the atom is reputed to have been based on an analogy with the structure of the solar system (Gentner, 1980). Once again, I would suggest that this example of availability to alternative and, in some cases, internally derived perspectives is a manifestation of the general open-ended quality of human thought.

It would seem, then, that a dialogic account of higher mental functioning can go some way towards capturing the open-ended, self-regulating quality of human thought. It is the ability to see an aspect of reality from more than one perspective at the same time that distinguishes mature human thought from, for example, the functioning of the average desktop computer. If I could only see the world from one perspective at a time, I would not be thinking; I would be *calculating*. In the next section I will consider how the open-ended, dialogic nature of human thought can be seen as a direct legacy of the process through which it develops: in other words, the experience with alternative perspectives given to us by care-givers who are sensitive to our current levels of understanding and ability.

The dialogic approach can now be summarized as follows: the higher mental functions develop through the progressive internalization of semiotically manifested perspectives on reality, such that mature functioning involves the simultaneous coming-into-conflict of differing internalized perspectives. As these perspectives are derived from interaction with actual people with actual positions in the world, they include ontological, axiological, conative and motivational elements. By taking on the voice of the other, the individual also takes on the perspective manifested by that voice, resulting in a form of mental functioning that consists of an ongoing dialogue between differing perspectives on reality.

In the remainder of this paper, I wish to consider the implications of this approach for current research in developmental psychology, particularly our understanding of the role of care-givers

in mental development, the development of perspective-taking and mentalizing abilities in early childhood, and the deficits associated with early childhood autism.

## IMPLICATIONS

### *The role of care-givers in the development of the higher mental functions*

Any “internalization” theory must deal with the problem of how to define the conditions for successful internalization. This is an issue addressed both by Vygotsky (see Rogoff & Wertsch [1984] for discussions of the “zone of proximal development” in this context) and by Piaget (1977/1995), in his consideration of the conditions necessary for successful cooperation. My purpose in this section is to consider which features of the interpersonal context, particularly those relating to the behavior of caregivers, are important in ensuring that internalization is successful and thus allowing the development of internal dialogue.

Because of their conscious, voluntary and mediated nature, the higher mental functions correspond roughly to those processes we refer to as “thinking”. The type of thinking with which I will be concerned here can broadly be defined as problem solving (Rogoff, 1990). Put simply, a problem involves a determinate initial state, a determinate goal and an indeterminate “problem space” (Newell & Simon, 1972). The assumption in what follows is that the main way in which individuals develop strategic skills is by entering into a process of “guided participation” (Rogoff, 1990), whereby alternative perspectives on a task that direct the exploration of the problem space are presented by the care-giver in such a way that they can be readily assimilated and internalized by the child.

A more specific formulation of what I mean by a “perspective on a situation” is provided by Wertsch’s (1984) notion of *situation definition*, or “the way in which a setting or context is represented—that is, defined—by those who are operating in that setting” (p. 8). The example given by Wertsch is that of an adult and child collaborating in the construction of a jigsaw puzzle by copying a model. In such situations young children will frequently put the puzzle together in their own way without once consulting the model. One can say that such children have not *defined* the task in the same way as the adult. In particular, they have not taken into account the fact that the copy puzzle must be made identical to the model.

The role of care-givers in this situation is to present their situation definitions in a way that can be understood and assimilated by the child.\* This might involve an utterance such as “This puzzle needs to look like that one”. Such an utterance would form part of the external dialogue between adult and child, but may also recur in the child’s subsequent internalized dialogue, particularly that which is expressed as private speech (Tomasello *et al.*, 1993; Fernyhough, 1994).

One of the requirements made of adults during this kind of interaction is that they be sensitive to the child’s current situation definition, so that they can “pitch” their own situation definition at an appropriate level. The adult, therefore, has a critical role in establishing and maintaining intersubjectivity (Trevarthen, 1980; Wertsch, 1984). This does not necessarily demand a perfect match between the situation definitions of adult and child, but it does require a certain amount of agreement on how the task is to be construed. The establishment and maintenance of intersubjectivity is assumed to be semiotically mediated, manifested as an external dialogue between verbally expressed situation definitions. As Wertsch (1984) has suggested, the adoption of a new sit-

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\*One can liken this process to the phenomenon of “headfitting” described by Brown (1979).

uation definition involves a fundamental qualitative shift, mediated by dialogue, rather than a mere accretion of knowledge. It requires an ability both to adopt a different orientation to the task and to maintain through dialogue the relationship between the new perspective and the preexisting one.

Another way in which the adult is responsible for presenting alternative perspectives on a task concerns the exploration of the problem space. This may involve drawing the child's attention to a particular aspect of the task, such as the pieces on the model puzzle that have not yet been copied. A typical utterance in this situation might be, "Which pieces haven't we found yet?", which may in turn become part of the child's internalized dialogue. In the case of a task with a more significant strategic component, this may involve a suggestion about enumerating all the possible first moves, rather than focusing exclusively on one particular beginning. In each of these situations, interaction between care-giver and child involves the verbal expression of differing perspectives on the shared situation. It is this dialogic exchange that is internalized by the child and forms the basis of his or her ability to adopt alternative perspectives on a range of similar situations.

We may, therefore, think of care-givers as having three main roles in the process whereby "instruction creates the zone of proximal development" (Vygotsky, 1956, p. 450). Firstly, they must present alternative perspectives on a shared situation in a way that makes these perspectives readily assimilable. Examples of such perspectives are situation definitions and possible first steps towards solving a strategic task. Secondly, care-givers must establish and maintain intersubjectivity by being sensitive to children's situation definitions and current level of understanding and ability, and adapting their own orientation to the task accordingly. This will also involve monitoring the effectiveness of their own interventions and adjusting the specificity of their intervention in accordance with the child's needs (Wood & Middleton, 1975). Thirdly, given the assumed importance of collaboration in the internalization of differing perspectives, they must allow children to begin to participate in a process that they will only later come to understand.

Support for this conception of the role of care-givers comes from research into the phenomenon of "scaffolding" (Wood, Bruner & Ross, 1976). Using a complex pyramid construction task, Wood and Middleton (1975) showed how some mothers were able to take responsibility for one or more of the task functions, allowing their children to focus on particular aspects of the task in turn. Wood *et al.* (1976) showed how a trained tutor was able to structure the task in such a way as to bring it within the child's "region of sensitivity to instruction" (Wood & Middleton, 1975). The optimal level of intervention was found to lie just above the child's current level of functioning, with instruction proving relatively ineffective if the task was made too easy or too difficult for the child. Care-givers' use of scaffolding on collaborative tasks reliably improved solo post-test performance on the same task (Wood & Middleton, 1975), suggesting that the transfer of interindividual functioning is facilitated by particular patterns of dyadic interaction (Pratt, Kerig, Cowan & Cowan, 1988; Wertsch & Stone, 1978).

Other evidence about the effect of individual differences in the quality of interpersonal interaction has come from studies of attachment behavior. Recent studies have attempted to relate security of attachment to care-givers' proclivity to present readily assimilable alternative perspectives on a problem situation. In one such study (Meins, 1996), mothers and their three-year-old children were observed interacting on a difficult box construction task. Mothers of children who had received secure attachment classifications in infancy appeared more sensitive to their children's level of understanding of the task, made more appropriate adjustments to the specificity of their intervention in response to feedback from the child, and were more likely to tailor their interventions to the child's individual needs.

In a separate study, differences were found between securely and insecurely attached children in their ability to incorporate an experimenter's suggestion into a sequence of pretend play (Meins & Russell, 1996). Although there was no difference between the two groups in the level of sophistication of play before the experimenter intervened, securely attached children were significantly better at adapting their sequence of pretend play to accommodate the different perspective of the experimenter. It may be that these individual differences are best accounted for by differences between mothers in their proclivity to present their children with readily assimilable alternative perspectives on reality.

The findings of another recent study might be taken to support such a suggestion. Fonagy, Steele, Steele, Higgitt and Target (1994) have shown that mothers of securely attached children score more highly on a "reflective self scale" (Fonagy, Steele, Moran, Steele & Higgitt, 1991), which provides a measure of individuals' inclination to invoke mental states in describing the behavior of others. Although these findings were derived from mothers' responses to the Adult Attachment Interview (George, Kaplan & Main, 1985), it is reasonable to assume that such differences in the use of mental state terms will carry over to mothers' interaction with their infants. In this way, "[t]he caregiver reflects upon the infant's mental state and re-presents it to him, translated into the language of gestures which the infant can understand" (Fonagy *et al.*, 1994, p. 248). As well as presenting the child with alternatively framed perspectives on his or her own reality, this kind of "re-presentation" of mental states might be expected to lead to a superior understanding of the mental orientations of others and the beliefs and desires that direct and motivate behavior.

This suggestion was recently tested by giving children a range of "mentalizing" tasks at ages four and five (Fernyhough, Meins & Russell, 1995). It was found that securely attached children performed better on a version of the "unexpected transfer" false belief task (Wimmer & Perner, 1983), where subjects are required to predict where a protagonist will look for an object after it has secretly been moved from one location to another. These differences were not due to general differences in cognitive ability. I suggest in the next section that such tasks require dialogic thinking, in that it is necessary to hold two conflicting orientations to reality at the same time. It also seems possible that securely attached children's apparent superiority on such tasks is due to a history of having been presented with readily assimilable alternative perspectives on reality, and a consequently greater ability to use such internalized perspectives in dialogic thinking.

### *The emergence of perspective-taking skills in early childhood*

Given my characterization of the dialogic higher mental functions as involving the interplay of semiotically mediated perspectives on reality, one would expect the emergence of such functions to be constrained by the development of linguistic or other semiotic abilities (Vygotsky, 1978), as well as by interpersonal experience. Furthermore, the mediated nature of such functions leads us to expect that contextual factors will play a major part in determining whether dialogic thinking occurs in a given situation. Rather than involving any abrupt revolution in mental organization, the transition to dialogic modes of thought occurs at different rates in different domains.

In characterizing the mental activity of the young child as monologic rather than dialogic, I intend something similar to Piaget's distinction between "egocentric" and "socialized" thought (Piaget, 1923/1926; Piaget, 1977/1995). According to Piaget, the young child's relative lack of facility in adopting alternative perspectives means that he is "rooted in his own viewpoint" (Piaget & Inhelder, 1956). This feature of preoperational children's thinking was demonstrated by the classic "three mountains" task (*ibid.*), where children were required to adopt another individual's perspective on a three-dimensional display. On the dialogic account, failure on this task does not necessarily mean that children are unable to distinguish their own viewpoint from that

of another, but rather that they are relatively incompetent at adopting the perspective of the other and entering into a dialogue with it. One advantage of the present account is that it allows us to see how the process of “decentration”, particularly as it relates to the non-physical world, depends directly upon experience with other perspectives. That is, it is through the experience of other perspectives provided by social interaction that children are ultimately able to decenter from their own viewpoints, overcome the unconscious constraint of egocentrism (Piaget, 1977/1995) and so achieve an objective, “scientific” understanding of the world.

Another example of a task that requires a dialogic understanding of perspective is the false belief task (Wimmer & Perner, 1983) described above. Success on this task requires dialogic thinking because it requires the individual to hold two contradictory orientations to reality *at the same time*. In other words, one must be able to represent simultaneously both the protagonist’s naive perspective (“The chocolate is in the red box”) and one’s informed perspective (“The chocolate is in the white box”). A similar argument applies when the task requires an understanding of informational access; for example, where a subject is asked whether a naive other will know what is in a picture when only a small nondescript part of it is visible (Taylor, Cartwright & Bowden, 1991). Success on such a task is not a case of forgetting what one already knows is in the picture, but rather one of adopting an alternative perspective (i.e. that of the naive other) at the same time.

This account of the development of mentalizing abilities is in line with those that see such abilities as emerging roughly simultaneously at around the fourth birthday (Astington, Harris & Olson, 1988; Moore & Frye, 1991; Perner, 1991). In particular, it is consistent with the claims of Tomasello *et al.* (1993) that children’s ability to add to their own knowledge by taking on the perspectives of others is determined by their developing conceptions of persons. The conception of the other as a “reflective agent”, assumed to emerge at around six years, allows the development of collaborative learning, whereby individuals must understand their collaborator’s orientation to themselves in constructing a representation of the situation that includes the perspectives of both individuals. The result of this “attunement to the attunement of the other” (Barwise & Perry, 1983), which depends upon the ability simultaneously to adopt both one’s own perspective and that of a collaborator, is the kind of thought process that I have characterized as dialogic and open-ended.

As some authors have noted (Barresi & Moore, 1993; Hobson, 1993b), one problem with Tomasello *et al.*’s account is that it appears to place particular social–cognitive skills before the corresponding social interaction. The present assumption, which finds clearest expression in Hobson’s theory (Hobson, 1993a), is that the conception of a person as, for example, a mental agent depends upon a particular kind of experience of such agents and their mental states. That is, *experience* of persons as mental agents must precede (or at least emerge in parallel with) *conceptions* of persons as such mental agents. It is for this reason that I would follow Hobson’s emphasis on the importance of early social interaction (particularly that which involves caregivers presenting children with readily assimilable alternative perspectives on reality) in the development of the understanding both that there *can* be differing orientations to reality, and how such orientations are determined by individuals’ access to information about the world. In the section that follows, I consider how certain obstacles to the development of such early interpersonal relatedness might have repercussions for the emergence of the higher mental functions.

### *The case of autism*

Wing (1981) characterized early childhood autism in terms of a “triad” of impairments in social interaction, linguistic communication and imagination, typically accompanied by stereo-

typic or repetitive behavior. This characterization captures Kanner's (1943) original conception of the autistic child as suffering from "an innate inability to form the usual, biologically provided affective contact with people" (p. 250). Research into autism has focused on the social (O'Connor & Hermelin, 1963), affective (Hobson & Lee, 1989), linguistic (Tager-Flusberg, 1993) and cognitive (Baron-Cohen, Leslie & Frith, 1985) aspects of the disorder. Although there is universal agreement that people with autism suffer from some deficit in interpersonal understanding, there has been rather less agreement on the relationship of such a deficit to these other areas of dysfunction. For those working within the cognitivist tradition (see, for example, Leslie, 1991), the social and communicative aspects of the syndrome are secondary to the cognitive impairment. For others (see, for example, Hobson, 1990, 1993a), cognitive and communicative dysfunctions are developmentally determined by a profound impairment in the "individual's experience of affectively patterned, inter-subjectively co-ordinated relations *with* other people" (Hobson, 1993a, pp. 4–5, original emphasis).

According to Hobson's theory, severely limited experience of other people and their externally manifested attitudes to the world, resulting from deficits in normal innate socioaffective responsiveness, will prevent the individual from coming to understand that the world can be taken in different ways. In support of Hobson's theory, there is evidence that autistic people have problems in engaging in joint attention with others (Loveland & Landry, 1986; Mundy, Sigman & Kasari, 1990). Such difficulties are assumed to affect the autistic individual's capacity for flexible symbol use (Charney, 1981; Hammes & Langdell, 1981; Lewis & Boucher, 1988), as well as leading to the well-documented deficiencies in understanding people as "objects with minds" (see, for example, Baron-Cohen *et al.*, 1985).

My suggestion here is that the problems of autistic people can usefully be characterized in terms of a disruption in the transition from monologic to dialogic modes of thought, resulting from the lack of affectively patterned interpersonal relations. Such a view would be consistent both with the relative inflexibility of autistic people's thought noted by Kanner (1943), and with the evidence for autistic people's difficulty in adopting differing orientations to reality at the same time.

I have already noted that young children's failure on the standard false belief task, a task that is consistently failed by the majority of autistic people (Baron-Cohen *et al.*, 1985) and proves difficult even for high-functioning autistic individuals (Frith, 1989), might be due to a failure simultaneously to accommodate alternative orientations to reality in a dialogic manner. Such a deficit would be expected to carry over to other areas of cognitive functioning. For example, Yirmiya, Sigman, Kasari and Mundy (1992) found that, contrary to expectation, autistic subjects performed significantly worse than normal children on a standardized conservation task. If one accepts that what is difficult about conservation tasks is the requirement to consider simultaneous change in two dimensions (Russell, 1978; Tomasello *et al.*, 1993), a characterization of the behavior of the autistic subjects in terms of a deficit in dialogic thinking would seem plausible.

Such an interpretation would also lead to the prediction that autistic individuals would have problems with self-regulation. There is growing evidence that autistic people have difficulty with self-regulation, particularly the inhibition of pre-potent responses such as reaching for a salient object (Hughes & Russell, 1993; Russell, Mauthner, Sharpe & Tidswell, 1991). On a Vygotskian interpretation, the ability to disengage from a salient object might be taken to require internal self-regulating dialogues of the sort assumed by Tomasello *et al.* and Hobson to be deficient in autistic subjects. Although the evidence on the private speech\* of autistic people is scarce (Tager-

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\*Private speech (Flavell, 1966), first described by Piaget (1923/1926), is defined as speech that appears to have no communicative function except to the extent that it is directed to the self. Private speech was held by Vygotsky (1934/1986) to be involved in verbal self-regulation and to form the basis of inner speech.

Flusberg, 1981; Tomasello *et al.*, 1993), such individuals' difficulties with flexible symbol use (Charney, 1981; Hammes & Langdell, 1981; Lewis & Boucher, 1988) might constitute a further reason why they fail to develop the internal self-regulatory dialogues carried out by normal adults (Baltaxe & Simmons, 1977; Berk, 1992).

At a more general level, the characterization of autistic thought as "monologic" has a certain degree of plausibility (Hobson, 1993a). If autistic people ever develop sophisticated skills, they tend to be of a similar flavor. For example, there are cases of highly developed mnemonic ability, date computation, subitization, musical technique, etc. (Frith, 1989), all of which have more in common with calculation than with thought. There is little evidence that people with autism ever develop the ability routinely to adopt multiple and simultaneous orientations to reality, which suggests that their thinking will never develop the dialogic, open-ended character that distinguishes normal adult thought.

## TOWARDS A SCIENCE OF THE HIGHER MENTAL FUNCTIONS

An acceptance of the present framework would, I believe, have considerable implications for our psychology. I have already noted how Vygotsky's distinction between the natural and cultural lines of development carries the implication that a science of one developmental line will be founded on different assumptions to a science of the other. In particular, monologic "information processing" approaches to mind, while entirely appropriate to the study of the modular input systems (Fodor, 1983), would seem unable to do justice to the dialogic nature of the higher mental functions. Specifically, it is the "open-ended" nature of internalized dialogue, the mind's continual orientation towards an alternative, partially understood perspective, that makes important demands upon any potential theory of such processes.

The most important of these demands is that the theory be a developmental one. As I suggested in my analysis of the development of self-regulation, the emergence of strategic activity depends crucially upon individuals' participation in activities which they only later come to understand (Wertsch, 1980). A fundamental assumption has been that, despite the obvious importance of endogenous changes in processing speed and capacity for intellectual development, dialogic thinking can only develop from dialogic interaction.

My purpose in this paper has been to present a framework for the study of these functions that makes certain assumptions about how they emerge from experience with others and how they continue to reflect features of that interaction. As I have attempted to show, such a framework can go some way towards generating testable hypotheses about the role of social interaction in the development of the self-regulating thinker, as well as providing interpretations of the evidence that are in tune with our intuitions about the dialogic nature of higher mental functioning.

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## REFERENCES

Astington, J. W., Harris, P. L. & Olson, D. R. (1988). *Developing Theories of Mind*. Cambridge: Cambridge University Press.

- Bakhtin, M. M. (1981). Discover in the novel. In M. Holquist (Ed.), *The Dialogic Imagination: Four Essays by M. M. Bakhtin* (C. Emerson and M. Holquist, Trans., pp. 259–422). Austin: University of Texas Press.
- Bakhtin, M. M. (1984). *Problems of Dostoevsky's Poetics* (C. Emerson, Trans. and Ed.). Minneapolis: University of Minnesota Press.
- Bakhtin, M. M. (1986). *Speech Genres and Other Late Essays* (C. Emerson and M. Holquist, Ed.; V. W. McGee, Trans.). Austin: University of Texas Press.
- Baltaxe, C. A. M. & Simmons, J. Q. (1977). Bedtime soliloquies and linguistic competence in autism. *Journal of Speech and Hearing Disorders*, **42**, 376–393.
- Baron-Cohen, S., Leslie, A. M. & Frith, U. (1985). Does the autistic child have a “theory of mind”? *Cognition*, **21**, 37–46.
- Barresi, J. & Moore, C. (1993). Sharing a perspective precedes the understanding of that perspective. *Behavioral and Brain Sciences*, **16**, 513–514.
- Barwise, J. & Perry, J. (1983). *Situations and Attitudes*. Cambridge, MA: MIT Press.
- Berk, L. E. (1992). Children's private speech: An overview of theory and the status of research. In R. M. Diaz & L. E. Berk (Eds.), *Private speech: From Social Interaction to Self-Regulation* (pp. 17–53). Hove: Lawrence Erlbaum Associates.
- Bibler, V. S. (1975/1984). Thinking as creation: Introduction to the logic of mental dialogue. *Soviet Psychology*, **22**, 29–54.
- Bråten, S. (1988). Dialogic mind: The infant and adult in protoconversation. In M. Carvallo (Ed.), *Nature, Cognition and System* (Vol. 1, pp. 187–205). Dordrecht: Reidel.
- Bråten, S. (1993). Social-emotional and auto-operational roots of cultural (peer) learning. *Behavioral and Brain Sciences*, **16**, 515.
- Brown, A. L. (1979). Theories of memory and the problems of development: Activity, growth, and knowledge. In L. S. Cermak & F. I. M. Craik (Eds.), *Levels of Processing in Human Memory* (pp. 225–258). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Charney, R. (1981). Pronoun errors in autistic children: Support for a social explanation. *British Journal of Disorders of Communication*, **15**, 39–43.
- Dickens, C. (1857/1967). *Little Dorrit*. London: Penguin Books.
- Donaldson, M. (1978). *Children's Minds*. London: Fontana Press.
- Fernyhough, C. (1994). Social and private speech as determinants of early cognitive functioning. Unpublished doctoral dissertation, University of Cambridge.
- Fernyhough, C., Meins, E. & Russell, J. (1995). The influence of security of attachment on young children's understanding of other minds. Paper presented at British Psychological Society Developmental Section Annual Conference, Glasgow, September.
- Flavell, J. H. (1966). Le langage privé. *Bulletin de Psychologie*, **19**, 698–701.
- Fodor, J. A. (1983). *The Modularity of Mind*. Cambridge, MA: MIT Press.
- Fonagy, P., Steele, M., Moran, G. S., Steele, H. & Higgitt, A. C. (1991). The capacity for understanding mental states: The reflective self in parent and child and its significance for security of attachment. *Infant Mental Health Journal*, **13**, 200–216.
- Fonagy, P., Steele, M., Steele, H., Higgitt, A. C. & Target, M. (1994). The Emmanuel Miller Memorial Lecture 1992: The theory and practice of resilience. *Journal of Child Psychology and Psychiatry*, **35**, 231–257.
- Frith, U. (1989). *Autism: Explaining the enigma*. Oxford: Basil Blackwell.
- Geertz, C. (1973). *The Interpretation of Cultures: Selected Essays*. New York: Basis Books.
- Gentner, D. (1980). The structure of analogical models in science. B. B. N. Technical Report No. 4454. Cited in Eysenck, M. W. & Keane, M. T. (1990). *Cognitive Psychology: A Student's Handbook*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- George, C., Kaplan, N. & Main, M. (1985). The Berkeley adult attachment interview. Unpublished protocol, Department of Psychology, University of California at Berkeley.
- Hamlyn, D. W. (1990). *In and Out of the Black Box: On the Philosophy of Cognition*. Oxford: Basil Blackwell.
- Hammes, J. G. W. & Langdell, T. (1981). Precursors of symbol formation and childhood autism. *Journal of Autism and Developmental Disorders*, **11**, 331–346.
- Hobbs, J. R. (1990). *Literature and Cognition*. Stanford: Center for the Study of Language and Information.
- Hobson, R. P. (1990). On acquiring knowledge about people and the capacity to pretend: Response to Leslie (1987). *Psychological Review*, **97**, 114–121.
- Hobson, R. P. (1993a). *Autism and the Development of Mind*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Hobson, R. P. (1993b). On acquiring the concept of “persons.” *Behavioral and Brain Sciences*, **16**, 525–526.
- Hobson, R. P. & Lee, A. (1989). Emotion-related and abstract concepts in autistic people: Evidence from the British Picture Vocabulary Scale. *Journal of Autism and Developmental Disorders*, **19**, 601–623.
- Holquist, M. (1981). Glossary to Bakhtin (1981). In M. Holquist (Ed.), *The Dialogic Imagination: Four Essays by M. M. Bakhtin* (C. Emerson and M. Holquist, Trans., pp. 423–434). Austin: University of Texas Press.
- Holquist, M. (1990). *Dialogism: Bakhtin and his World*. London: Routledge.
- Hughes, C. & Russell, J. (1993). Autistic children's difficulty with mental disengagement from an object: Its implications for theories of autism. *Developmental Psychology*, **29**, 498–510.
- Kanner, L. (1943). Autistic disturbances of affective contact. *Nervous Child*, **2**, 217–250.
- Leont'ev, A. N. (1932). Studies on the cultural development of the child. *Journal of Genetic Psychology*, **40**, 52–83.

- Leslie, A. M. (1991). The theory of mind impairment in autism: Evidence for a modular mechanism of development? In A. Whiten (Ed.), *Natural Theories of Mind* (pp. 63–78). Oxford: Basil Blackwell.
- Lewis, V. & Boucher, J. (1988). Spontaneous, instructed and elicited play in relatively able autistic children. *British Journal of Developmental Psychology*, **6**, 325–339.
- Loveland, K. & Landry, S. (1986). Joint attention in autism and developmental language delay. *Journal of Autism and Developmental Disorders*, **16**, 335–349.
- Maier, N. R. F. (1931). Reasoning in humans II: The solution of a problem and its appearance in consciousness. *Journal of Comparative Psychology*, **12**, 181–194.
- Mead, G. H. (1934). *Mind, Self and Society from the Standpoint of a Social Behaviourist*. Chicago: University of Chicago Press.
- Meins, E. (1996). Security of attachment and maternal tutoring strategies: Interaction within the zone of proximal development. *British Journal of Developmental Psychology*, in press.
- Meins, E. & Russell, J. (1996). Security and symbolic play: The relation between security of attachment and executive capacity. *British Journal of Developmental Psychology*, in press.
- Moore, C. & Frye, D. (1991). The acquisition and utility of theories of mind. In D. Frye & C. Moore (Eds.), *Children's Theories of Mind: Mental States and Social Understanding* (pp. 1–14). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Mundy, P., Sigman, M. & Kasari, C. (1990). A longitudinal study of joint-attention deficits in autism. *Journal of Autism and Developmental Disorders*, **20**, 115–128.
- Newell, A. & Simon, H. A. (1972). *Human Problem Solving*. Englewood Cliffs, NJ: Prentice Hall.
- Norman, D. A. & Shallice, T. (1980). Attention to action: Willed and automatic control of behaviour. University of California at San Diego CHIP Report 99.
- O'Connor, N. & Hermelin, B. (1963). Measures of distance and motility in psychotic children and severely subnormal controls. *British Journal of Social and Clinical Psychology*, **3**, 29–33.
- Perner, J. (1991). *Understanding the Representational Mind*. Cambridge, MA: MIT Press.
- Piaget, J. (1923/1926). *The Language and Thought of the Child*. London: Kegan Paul, Trench, Trubner and Co.
- Piaget, J. (1977/1995). *Sociological Studies* (L. Smith, Ed.). London: Routledge.
- Piaget, J. & Inhelder, B. (1956). *The Child's Conception of Space*. London: Routledge and Kegan Paul.
- Plato (undated/1953). *The Dialogues of Plato* (Vol. III) (B. Jowett, Trans. and Ed.). Oxford: Clarendon Press.
- Pratt, M. W., Kerig, P., Cowan, P. A. & Cowan, C. P. (1988). Mothers and fathers teaching 3-year-olds: Authoritative parents and adult scaffolding of young children's learning. *Developmental Psychology*, **24**, 832–839.
- Riegel, K. F. (1973). Dialectic operations: The final period of cognitive development. *Human Development*, **16**, 346–370.
- Rogoff, B. (1990). *Apprenticeship in Thinking: Cognitive Development in Social Context*. Oxford: Oxford University Press.
- Rogoff, B. & Lave, J. (Eds.) (1984). *Everyday Cognition: Its Development in Social Contexts*. New York: Oxford University Press.
- Rogoff, B. & Wertsch, J. V. (Eds.) (1984). *Children's Learning in the "Zone of Proximal Development": New Directions for Child Development* (No. 23). San Francisco: Jossey-Bass.
- Russell, J. (1978). *The Acquisition of Knowledge*. London: Macmillan Press.
- Russell, J., Mauthner, N., Sharpe, S. & Tidswell, T. (1991). The "windows task" as a measure of strategic deception in preschoolers and in autistic subjects. *British Journal of Developmental Psychology*, **9**, 331–349.
- Saranson, S. B. (1981). An asocial psychology and a misdirected clinical psychology. *American Psychologist*, **36**, 827–836.
- Sperber, D. & Wilson, D. (1987). *Relevance: Communication and Cognition*. Oxford: Basil Blackwell.
- Tager-Flusberg, H. (1981). On the nature of linguistic functioning in early infantile autism. *Journal of Autism and Developmental Disorders*, **11**, 45–56.
- Tager-Flusberg, H. (1993). What language reveals about the understanding of minds in children with autism. In S. Baron-Cohen, H. Tager-Flusberg, & D. J. Cohen (Eds.), *Understanding Other Minds: Perspectives from Autism* (pp. 138–157). Oxford: Oxford University Press.
- Taylor, M., Cartwright, B. S. & Bowden, T. (1991). Perspective taking and theory of mind: Do children predict interpretive diversity as a function of differences in observers' knowledge? *Child Development*, **62**, 1334–1351.
- Tomasello, M., Kruger, A. C. & Ratner, H. H. (1993). Cultural learning. *Behavioral and Brain Sciences*, **16**, 495–552.
- Trevarthen, C. (1980). The foundations of intersubjectivity: Development of interpersonal and cooperative understanding in infants. In D. Olson (Ed.), *The Social Foundations of Language and Thought: Essays in Honor of Jerome Bruner* (pp. 316–342). New York: Norton.
- Tulviste, P. (1987). L. Lévy-Bruhl and problems of the historical development of thought. *Soviet Psychology*, **25**, 3–21.
- Voloshinov, V. N. (1929/1986). *Marxism and the Philosophy of Language* (L. Matejka and I. R. Tirunik, Trans.). Cambridge, MA: Harvard University Press.
- Vygotsky, L. S. (1934/1986). *Thought and Language* (A. Kozulin, Ed. and Trans.). Cambridge, MA: MIT Press.
- Vygotsky, L. S. (1956). *Izbrannye psikhologicheskie issledovaniya* [Selected psychological investigations]. Moscow: Izdatel'stvo Akademii Pedagogicheskikh Nauk. Cited in Wertsch (1985).
- Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Mental Processes*. (M. Cole, V. John-Steiner, S. Scribner & E. Soubberman, Eds.). Cambridge, MA: Harvard University Press.

- Wertsch, J. V. (1980). The significance of dialogue in Vygotsky's account of social, egocentric and inner speech. *Contemporary Educational Psychology*, **5**, 150–162.
- Wertsch, J. V. (1984). The zone of proximal development: Some conceptual issues. In B. Rogoff & J. V. Wertsch (Eds.), *Children's Learning in the 'Zone of Proximal Development': New Directions for Child Development* (No. 23). San Francisco: Jossey-Bass.
- Wertsch, J. V. (1985). *Vygotsky and the Social Formation of Mind*. Cambridge, MA: Harvard University Press.
- Wertsch, J. V. (1990). Dialogue and dialogism in a socio-cultural approach to mind. In I. Marková, & K. Foppa (Eds.), *The Dynamics of Dialogue* (pp. 62–81). Hemel Hempstead: Harvester Wheatsheaf.
- Wertsch, J. V. (1991). *Voices of the Mind: A Sociocultural Approach to Mediated Action*. Hemel Hempstead: Harvester Wheatsheaf.
- Wertsch, J. V. & Kanner, B. G. (1992). A sociocultural approach to intellectual development. In R. J. Sternberg, & C. A. Berg (Eds.), *Intellectual Development* (pp. 328–349). Cambridge: Cambridge University Press.
- Wertsch, J. V. & Stone, C. A. (1978). Microgenesis as a tool for developmental analysis. *Quarterly Newsletter for the Laboratory of Comparative Human Cognition*, **1**, 8–10.
- Wertsch, J. V. & Tulviste, P. (1992). L. S. Vygotsky and contemporary developmental psychology. *Developmental Psychology*, **28**, 548–557.
- Wimmer, H. & Perner, J. (1983). Beliefs about beliefs: Representation and constraining function of wrong beliefs in young children's understanding of deception. *Cognition*, **1**, 103–128.
- Wing, L. (1981). Language, social and cognitive impairments in autism and severe mental retardation. *Journal of Autism and Developmental Disorders*, **11**, 31–44.
- Wood, D. J. & Middleton, D. (1975). A study of assisted problem-solving. *British Journal of Psychology*, **66**, 181–191.
- Wood, D. J., Bruner, J. & Ross, G. (1976). The role of tutoring in problem-solving. *Journal of Child Psychology and Psychiatry*, **17**, 89–100.
- Yirmiya, N., Sigman, M. D., Kasari, C. & Mundy, P. (1992). Empathy and cognition in high-functioning children with autism. *Child Development*, **63**, 150–160.