Vygotsky and the Social Formation of Mind

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To Mary

CHAPTER 6

Semiotic Mechanisms in Vygotsky's Genetic Law of Cultural Development

According to Vygotsky's general genetic law of cultural development, all higher mental functions appear first on the interpsychological plane and then on the intrapsychological plane. This claim is central to Vygotsky's approach, but the processes it entails have not yet been examined in any great detail. Vygotsky was most specific about it in connection with his account of egocentric and inner speech, where he analyzed the forms of semiotic mediation that make possible the transition from interpsychological to intrapsychological functioning. In that analysis, however, he focused almost exclusively on the latter. My concern here is with properties of interpsychological processes that make possible the transition to the intrapsychological plane.

An assumption that underlies everything I shall have to say on this topic is that interpsychological functioning is inextricably linked with intrapsychological functioning. This claim has emerged repeatedly in connection with the general point about the social origins of higher mental functioning in the individual. The specific point I have in mind here, however, is that in the transition from interpsychological to intrapsychological functioning, any change in the former involves a corresponding change in the latter. It is sometimes assumed that there is a sudden, clean shift from social to individual functioning—a child works with someone on a task and then begins to carry it out independently. But to characterize the transition in this way is to miss the main point about its dynamic, namely, that a series of changes typically occurs on the interpsychological plane and that each is reflected in a change in intrapsychological functioning. Of course, these changes are not always in the form of quantitative increments; many are qualitative.

The notion of situation definition—the way in which objects and events[1] in a situation are represented or defined (Wertsch, 1984)—is needed in the analysis of interpsychological functioning. It allows one to characterize the fact that interlocutors may differ and may change in their representations of the same set of objects and events. This difference may be particularly great in the kind of interpsychological functioning of primary interest to Vygotsky: adult–child interaction in the zone of proximal development. A child often does not understand the definition of the objects or the functional significance of behaviors that are assumed by an adult. In one sense the adult and child are in the same situation because the same concrete objects and events are perceptually available to both. In another sense, however, they are not in the same situation because they do not define these objects and events in the same way.

When interlocutors such as an adult and a child in the zone of proximal development approach a setting with dissimilar situation definitions, it may at first be difficult to see how they could carry on effective communication. After all, they represent many aspects of the setting in quite different ways. To understand this apparent problem, one needs to invoke the notion of *intersubjectivity*. Intersubjectivity exists when interlocutors share some aspect of their situation definitions. Typically this overlap may occur at several levels, and hence several levels of intersubjectivity may exist.

In discussing intersubjectivity I shall focus primarily on the work of R. Rommetveit and his colleagues (for example, Rommetveit, 1974, 1979a–1979g, 1985; Blakar and Rommetveit, 1979: Hundeide, 1985), since their position is compatible with a Vygotskian approach to interpsychological functioning.

The issue of how greater or lesser degrees of intersubjectivity between speaker and hearer are created, maintained, and reestablished lies at the foundation of Rommetveit's approach to the study of human communication. According to him, "Communication aims at transcendence of the 'private' worlds of the participants. It sets up what we might call "states of intersubjectivity" (1979c, p. 94).

Rommetveit's approach contrasts with many contemporary analyses

that begin with the implicit or explicit claim that when interlocutors come together in a speech situation, they share a fund of "background knowledge" that provides an agreed-upon foundation for communication. He argues that this assumption has led investigators to overlook the issue of how communicative behavior creates and transforms a situation and to focus instead on how an utterance simply adds to preexisting information.

Rommetveit has emphasized that any situation, event, or object has many possible interpretations and that speech serves to impose a particular interpretation and create a temporarily shared social reality. He sees the issue as one of how the "meaning potential" of linguistic units and structures provides a "rough draft of a contract" that can be defined or specified only by considering its role in the communicative context:

> The basic problem of human intersubjectivity becomes . . . a question concerning in what sense and under what conditions two persons who engage in a dialogue can transcend their different private worlds. And the linguistic basis for this enterprise, I shall argue, is not a fixed repertory of shared "literal" meanings, but very general and partially negotiated drafts of contracts concerning categorization and attribution inherent in ordinary language. (1979f, p. 7)

In Rommetveit's account, what any particular observer "sees" going on in a situation is an entirely private affair. However,

> it can be talked about and hence—at least under certain conditions and in some sense—become a temporarily shared social reality. The solitary observer may thus try to transform his "private" outlook on the situation into a social reality simply by telling some other person about it. Once the other person accepts the invitation to listen and engage in a dialogue, he leaves behind whatever his preoccupations might have been the moment "silence was transformed into speech" (Merleau-Ponty, 1962, p. 182). From that moment on the two of them are jointly committed to a temporarily shared social world, established and continually modified by acts of communication. (1979g, p. 10)

Among the illustrations Rommetveit uses to elaborate this point is the following:

> What is being said may . . . impose a definite structure upon what is seen or upon the situation in which it is being said . . . I may

be told, for instance, as I am watching a large and derelict building: "There was not enough profit from production." What I am not told at all—but yet am forced to assume in order to make sense of what I hear—is that the building in front of me is a factory or a business building of some sort. (1979b, p. 70)

Thus when interlocutors enter into a communicative context, they may have different perspectives or only a vague interpretation of what is taken for granted and what the utterances are intended to convey. Through semiotically mediated "negotiation," however, they create a temporarily shared social world, a state of intersubjectivity. The writings of Rommetveit and his colleagues show that there are many complex aspects to interlocutors' understanding of the speech situation. The issues involved can extend from basic trust in the other's communicative abilities and good intentions to the way a particular referent is categorized or understood.

Because an adult and a child operating in the zone of proximal development often bring divergent situation definitions to a task setting, they may be confronted with severe problems of establishing and maintaining intersubjectivity. The challenge to the adult is to find a way to communicate with the child such that the latter can participate at least in a minimal way in interpsychological functioning and can eventually come to define the task setting in a new, culturally appropriate way. During early phases of development, intersubjectivity usually cannot be created at the level of verbal formulations and abstract definitions of the task. Instead, communication typically must be grounded in context-bound signs. This communication, which operates on the basis of a minimal level of shared situation definition (that is, intersubjectivity), lays the groundwork for the transition to intrapsychological functioning.

The Transition from Interpsychological to Intrapsychological Functioning

The usefulness of the notions of situation definition and intersubjectivity for a Vygotskian approach can be demonstrated by some concrete examples. The setting that provides the basis for situation definitions in these examples is relatively simple. It involves using small objects (the "pieces") to construct one object (the "copy") in accordance with another (the "model"). My account of interaction in this setting will

focus on these objects and the goal-directed action in which they are embedded. It does not explicitly examine other aspects of the interaction, such as its affective dimensions.

The goal-directed action that is at the core of an adult's situation definition of this setting can be analyzed in terms of strategic steps. The number of steps is positively correlated with the level of detail used to analyze the action. My analysis, which will not go into great detail here, identifies the following three strategic steps:

1. Consult the model to determine the identity and location of the piece needed next.

2. Select the piece identified in step 1 from the pieces pile.

3. Add the piece selected in step 2 to the copy.

The strategic steps in this description of the goal-directed action are interdefined. An account of each presupposes the others in some way. In addition, the action (made up of the strategic steps) and the objects are interdefined. The objects are appropriately understood only if their roles in the action are specified, and the action can be fully described only by invoking information about the objects. Hence the situation definition in this setting involves the interrelated components of goal-directed action (with its strategic steps) and the objects (pieces, copy, model).

What I have said so far characterizes an adult's typical definition of the situation. Young children, however, often do not see the setting this way. They may agree with the adult only in certain minimal respects about how objects and actions should be understood. By identifying the points on which there is adult–child accord, one can recognize points of intersubjectivity in the zone of proximal development. Many such points can be found in the transition from interpsychological to intrapsychological functioning. For example, four points were identified in my study of American mothers interacting with their preschool children (Wertsch, 1979a). These points reflect four levels in the transition from interpsychological to intrapsychological functioning. The first level is characterized by the fact that the child's situation definition is so different from the adult's that communication is very difficult. The adult may attempt to direct the child through the strategic steps, but the child's understanding of the objects and goal-directed action is so limited that the child may not interpret the adult's utterances

appropriately. In one case the child's response to his mother's utterance about a puzzle piece depicting a truck window was to shift his attention to the real windows in the room where they were working. Even minimal agreement about the definition of objects in this setting seems to have been missing, thus leading to this misunderstanding. The issue of intersubjectivity about the goal-directed action never arose here since the adult and child differed in a fundamental way about the definition of the objects involved; communicating on the basis of the adult's situation definition was impossible.

At the second level of intersubjectivity, the adult–child interaction is not so restricted by the child's limited situation definition. The child at least seems to share the adult's basic understanding of objects in the setting, namely, that they depict pieces of a truck. However, the child does not yet understand the nature of the goal-directed action in which these objects are embedded and consequently often fails to make the inferences necessary to interpret the adult's other-regulative utterances. For example, the child may know that the truck pieces are to go in the copy puzzle but does not understand that the model must be matched. This level is generally characterized by the fact that the child is beginning to participate successfully in the task setting, but the child's understanding of the task situation is still far from being in complete agreement with the adult's. Thus communication problems arise because the child does not see all the implications of an utterance in other-regulation.

At the third level of intersubjectivity, the child can respond appropriately to other-regulation by making the inferences needed to interpret the adult's directives even when they are nonexplicit and rely on an adult-like situation definition. While the process is still carried out on the interpsychological plane, the fact that the child can make the appropriate inferences indicates that intrapsychological functioning is beginning to account for much of the child's performance. The adult no longer has to specify all the steps that must be followed in order to interpret a directive since the child can carry these out on the basis of a fairly complete situation definition. Indeed, in some cases it seems that the child is functioning independently and that the adult is simply providing reassurances that what the child is doing is correct.

At the fourth and final level identified by Wertsch (1979a) in the transition from interpsychological to intrapsychological functioning, the child takes over complete responsibility for carrying out the goal-

directed task. Egocentric speech may appear during and shortly after the shift to intrapsychological functioning. This self-regulative form of semiotic mediation typically shares many structural and functional properties with the communicative speech previously used by the dyad. This is a semiotic manifestation of the fact that the child has mastered the situation definition with which the adult originally approached the task. At this point there is almost complete intersubjectivity between adult and child on the situation definition, a fact that makes further other-regulation unnecessary.

While my focus here has been on interpsychological functioning, it is important to realize that each time I noted an increase in the level of shared situation definition, I was implicitly dealing with a transfer of responsibility for the task to intrapsychological functioning by the child. More and more of what had been accomplished on the interpsychological plane was therefore being carried out on the intrapsychological plane.

This reciprocal relationship has been examined in detail in several other studies (for example, Wertsch, McNamee, McLane, and Budwig, 1980; McLane, 1981; Rogoff, 1984; Sammarco, 1984; Wertsch, Minick, and Arns, 1984; Brown and Ferrara, 1985). All have been concerned with the ways in which responsibility for executing a task shifts from the adult–child dyad to the child. In several studies the situation definition was grounded in the goal-directed action (involving the three strategic steps) and the objects (pieces, copy, model) outlined earlier. The focus of these studies was on variation in the form and style of interpsychological functioning, but in all cases the correlated intrapsychological functioning was also reflected in the analysis.

J. McLane (1981) examined the difference between mother–child and child–child interaction; J. Sammarco (1984) examined mother–child interaction involving children both with and without language comprehension deficits; and Wertsch, N. Minick, and F. Arns (1984) examined mother–child and teacher–child interaction in rural Brazil. Many complex modes of social interaction were observed, with varying implications for the transition to intrapsychological functioning.

In these studies a multilevel analysis was used to examine the execution of each of the three strategic steps. This analysis concerned the distribution of task responsibility between the tutor and the tutee. The first level specified who physically carried out the step of looking at the model, picking up a piece from the pieces pile, or inserting the piece

in the copy. If (and only if) the tutee physically carried out a step, a second level of analysis assessed whether the behavior was self-regulated or other-regulated. Major differences appeared in the analyses of these two levels. For example, whereas middle-class American mothers and Brazilian teachers almost never physically carried out the steps of picking up or placing a piece, such behavior was not unusual for rural Brazilian mothers, American children acting as tutors, and American mothers working with children with language disorders. By picking up or placing the pieces, these latter sets of tutors gave almost no strategic responsibility to their tutees, thus minimizing the required intrapsychological participation on their part. Furthermore, when a tutee did execute a step, the use of other-regulation varied widely among the groups of dyads.

Even from the first two levels of analysis, it is possible to identify major differences among dyads' forms of interpsychological functioning. These differences exist between American mothers and five-and-one-half-year-old children when acting as tutors for three-and-one-half-year-olds (McLane, 1981) between mothers and teachers working with six-year-olds in rural Brazil (Wertsch, Minick, and Arns, 1984), and between mother–child interaction involving preschool children with and without language comprehension deficits (Sammarco, 1984; Wertsch and Sammarco, 1985). In none of these cases is there a claim that the unique pattern of social interaction is attributable to the tutor or tutee alone, but in some cases the findings suggest one or the other more strongly. For example, findings from a study by Arns (1980) indicate that the tutees could have functioned at a higher level than was allowed by the rural Brazilian mothers. The required level of the children's intrapsychological functioning seems to have been significantly determined by the tutors' behavior. Conversely, in the Sammarco (1984) study language comprehension disabilities on the part of the tutees seem to have had a major impact on the level of interpsychological and intrapsychological functioning. The overall point from the studies is that children may participate in quite different forms of interpsychological functioning, and these differences affect how a child participates on the intrapsychological level in a task setting.

While forms of interpsychological and intrapsychological functioning differ significantly, there seems to be at least one common tendency in how children in these studies come to master the situation definition of the task: they first participate in the execution of the goal-directed

task on the interpsychological plane, and only subsequently do they recognize and master the strategic significance of their behaviors. Rather than understanding the task and then doing it, the children seem to have done the task (as a participant in interpsychological functioning) and then understood it.

Perhaps the most revealing cases of how this developmental sequence works can be found in within-session, microgenetic transitions. Wertsch and Hickmann (in press) have analyzed several cases of mother–child interaction in a task setting of constructing a copy puzzle in accordance with a model and have documented some striking within-session transitions from interpsychological to intrapsychological functioning. Among the factors cited as encouraging this transition were (1) a cognitive readiness on the part of the child, (2) a willingness on the part of the adult to transfer strategic responsibility to the child, (3) adults' use of "reflective assessments" to inform the child of the significance of his or her behaviors (4) the explicitness of the adults' directives, and (5) the possibility for the dialogic structure of interpsychological functioning to be mastered on the intrapsychological plane through the differentiation of language functions. All five factors are presumably involved in ontogenetic as well as microgenetic transitions, but their relative contribution (especially that of the child's cognitive readiness) is more difficult to specify in ontogenesis.

These studies have viewed the transition from interpsychological to intrapsychological functioning in terms of how the child can master the situation definition that had guided interpsychological functioning. The process involves entering into interaction on the basis of primitive intersubjectivity with the tutor (usually an adult) and then going through one or more situation "redefinitions" (Wertsch, 1984) until a mature, culturally appropriate situation definition provides the ground for self-regulation.

My review of the research has stressed that a change on the interpsychological plane is necessarily coupled with a change on the intrapsychological plane. This finding belies any account that regards the transition as an undifferentiated period of interpsychological functioning followed neatly by an undifferentiated period of intrapsychological functioning. Furthermore, it highlights the fact that by characterizing interpsychological functioning in a task setting, one necessarily characterizes intrapsychological functioning. Indeed this procedure provides information about individual processes that often can be obtained in no other way.

Semiotic Mechanisms in the Transition

If a task is executed correctly and smoothly on the interpsychological plane, why should a transition to individual functioning occur? The problem of why transitions should occur is notoriously difficult for most theories of cognitive development, but in this case the solution may be relatively straightforward. It would seem to be grounded in the tendency of adults to encourage increasing participation or independence in task performance by children as an inherent aspect of socialization. As Arns (1980) has shown, the timing and procedures for encouraging independent functioning may vary widely depending on cultural and socioeconomic factors, but the transition is a necessary part of socialization anywhere.

Hence, one must deal with the specific mechanisms whereby individual competency is encouraged. An adult often cannot simply provide an explanation or one set of directives and then insist that the child begin to function independently. The nature of the transition is typically more subtle, gradual, and complex. Given Vygotsky's central theme about sign mediation, I shall focus especially on the semiotic mechanisms involved in the transition. Such a focus not only provides essential information about the eventual "quasi-social" processes in the individual; it also holds the key to understanding how and why the child is pushed along the path toward redefining situations in accordance with adult views and thereby comes to function as a mature member of the culture.

The two semiotic mechanisms I shall examine here are referential perspective and abbreviation. The former concerns ways of entering into interpsychological functioning; the latter seems to play a role primarily in making the transition to intrapsychological functioning. In both cases the mechanisms create and transform various aspects of intersubjectivity in a communicative setting where the interlocutors do not share the same situation definition.

Referential Perspective

To function effectively on the interpsychological plane, interlocutors must be able to direct one another's attention to specific objects and events. This behavior involves reference. For my purposes, I shall examine the case in which a speaker uses a sign (verbal or nonverbal) to identify a nonlinguistic referent in the speech situation. This mechanism involves extralinguistic indexical relationships (that is, relationships

between sign tokens or unique utterance events and nonlinguistic objects or events).

A fundamental fact about referring is that the same referent can be identified in a variety of ways (that is, by using different referring expressions). For example, assume the following object is the referent that a speaker wishes to identify: O. The speaker can choose from a variety of referring expressions, such as:

1–a. . . . the round thing . . .

1–b. . . . the white thing . . .

1–c. . . . the round white thing . . .

Although any one of these expressions may be used to identify the referent, they obviously differ in some important respects. The notion of referential perspective that I shall develop here is intended to account for this difference. The referential perspective, or "mode of presentation" (Frege, 1960), involved in an act of referring is the perspective or viewpoint utilized by the speaker in order to identify a referent. Referential perspective is necessarily involved in any act of referring. Furthermore, the perspective from which a referent is identified may vary. Thus in 1–a the object is identified in terms of a shape category; in 1–b it is referred to in terms of a color category; and in 1–c it is identified from a perspective that combines the two categories.

There may appear to be cases in which a speaker does not introduce a perspective when referring. For example, one might argue that it is possible to identify the referent in the example above by using nonverbal pointing and/or expressions such as the following:

2–a. . . . that . . .

2–b. . . . that one . . .

This line of reasoning assumes that such verbal and nonverbal means can be used to identify a referent but do not categorize it and therefore do not involve the introduction of a perspective. While I would agree with the claim that different levels and types of perspective exist, I would not agree that no perspective is involved in cases of nonverbal pointing and/or deictic expressions. The speaker's communicative act necessarily defines a referent in a minimal way—namely, in terms of relative spatiotemporal contiguity between the referent and the speaker, as in "that" versus "this."

The fact that a speaker introduces some perspective in any referring

act is only the starting point in my argument. The main questions I wish to address are concerned with how and why a speaker introduces a particular perspective. These questions lead to a consideration of the range of semiotic options available to a speaker when introducing a perspective into a speech situation and the reasons for selecting one of these options over another. My analysis is based on the fact that when identifying a referent, a speaker may introduce different amounts of information about referential perspective into the speech situation by choosing different types of referring expressions. In examining this issue I shall proceed from expressions that minimize the amount of information about a speaker's perspective introduced into the speech to expressions that maximize such information (Wertsch, 1980a).

One of the most important semiotic devices that allow speakers to identify an intended referent while minimizing information about their perspective is deixis. Deixis falls under the category of what Peirce (1931–1935) termed "indexical signs." The general analysis of indexical signs has been extended by Silverstein (1976). I shall be concerned here with what he terms "presupposing referential indexes." Deictics such as nonverbal pointing or "this" or "that" in English are perhaps the best examples of this kind of index. An appropriate use of deictics assumes that the referent already exists cognitively (that is, the referent is presupposed) for the interlocutors. Given that the existence and identity of the referent are presupposed and that a deictic referring expression serves simply to point out this referent, the use of such a referring expression introduces only a minimal amount of information about referential perspective into the speech setting. This is what Morris (1971) had in mind when he stated that "an indexical sign does not characterize what it denotes (except to indicate roughly the space–time coordinates)" (p. 102).

Thus a speaker who uses expressions such as "that" to identify the intended referent introduces very little information about a particular way of perceiving or thinking of the object. This fact does not mean that the speaker and listener cannot or do not think of the referent in some more complex way. It simply means that the speaker has not explicitly introduced such information into the speech situation.

A further point about referring expressions is that levels of indexicality rather than its simple presence or absence are involved in an overall account. Thus the use of nonverbal pointing alone, without an accompanying verbal utterance, to identify a referent may introduce even less information about referential perspective than does an utter-

ance such as "that" or "that one" because it may not signal relative proximity of the object to the speaker. Conversely, expressions such as "the round thing" and "the white thing," which rely more heavily on symbolic signs than "that" and "that one," still involve an element of indexicality due to the presence of "the."

A second way that a speaker minimizes the information about referential perspective that is introduced into a speech situation is to use a "common referring expression" (Wertsch, 1980a). This concept is borrowed from R. Brown's (1970) analysis of how a child is introduced to the way that everyday objects are identified in speech. Brown argued that while we can use a variety of expressions to refer to an object, there is typically a "most common name" (a categorization) in a speech community that is based on the function the object normally or most commonly has:

> The name of a thing, the one that tells what it "really" is, is the name that constitutes the referent as it needs to be constituted for most purposes. The other names represent categorizations useful for one or another purpose. We are even likely to feel that these recategorizations are acts of imagination, whereas the major categorization is a kind of passive recognition of the true character of the referent.   (p. 10)

In the case of the referent introduced earlier, "the round thing" or "the white thing" could be used as a common referring expression. In the case of any actual utterance event, one of these categorizations may indeed be most appropriate and informative for identifying the referent. The very definition of a common referring expression guarantees that the chances of this being true are fairly high. However, the use of a common referring expression typically is not maximally informative because the information it uses is redundant. The redundancy does not arise because the information is available in the spatiotemporal organization of the speech event. Rather, it is redundant because the common referring expression is the one that the listener would have been likely to choose if forced to make a choice with no additional contextual information. Thus to identify the referent above by using common referring expressions such as "the round thing" or "the white thing" is to add little new information since it categorizes the object in the same way that the listener would be most likely to categorize it.

There is also a third semiotic mechanism that allows a speaker to maximize the amount of information about referential perspective that is introduced into the speech context. This kind of referring expression can introduce a perspective that is informative about the specific way that the speaker views the referent in the speech event. This "context-informative" referring expression (Wertsch, 1980a) introduces more information into the speech situation than either a common or a deictic referring expression does in the sense that it categorizes the referent in a way that would not already be obvious to someone who does not understand the situation definition. The mother's use of the expression "window" at the first level in the transition from inter- to intrapsychological functioning is an example of a context-informative referring expression (Wertsch, 1979a).

Deictic and common referring expressions, with their associated perspectives, may serve as a "default" option vis-à-vis context-informative expressions. A default option can be used when a speaker wishes to identify a referent without introducing a context-informative referential perspective.

The ranking of these three types of referring expressions in terms of informativeness—from deictic to common to context informative—has several implications for their use in communication. In general, higher levels of intersubjectivity are associated with, but do not require the use of, more informative referring expressions. By incorporating an account of the three types of referring expressions into an analysis of adult–child interaction, it is possible to gain certain insights into a dyad's success at attaining intersubjectivity on a situation definition. In my 1980a study, mother–child interaction was examined in a setting where the interlocutors were to use puzzle pieces in order to construct one puzzle (the "copy") in accordance with another (the "model"). When properly completed, the copy puzzle depicted a truck that was identical to the one in the model.

In this study I compared the performance of a dyad involving a two-and-one-half-year-old with that of a dyad involving a three-and-one-half-year-old on one segment of the task, the segment having to do with the pieces depicting the wheels on the truck. In the case of the two-and-one-half-year-old, interpsychological functioning with his mother was at the first level (Wertsch, 1979a) and never really dealt with the goal-directed action of constructing the copy puzzle in accordance with the model. Rather, the interaction was constantly disrupted by the fact that the child seemed to categorize objects in the

task setting in a way quite different from his mother's. An excerpt from the discourse making up the interpsychological functioning reflects this lack of intersubjectivity:

3. C: Look it, crackers. Look. (C looks at the pieces pile; C picks up an inner wheel piece from the pieces pile; C picks up an outer wheel piece from the pieces pile.)

4. M: Crackers. They sort of look like crackers. (C puts the outer wheel pieces in his hand onto the pieces pile; C picks up an outer wheel piece from the pieces pile.)

5. C: Crackers. (C puts the inner wheel piece in his hand back onto the pieces pile.)

6. M: Mm–hm. (C picks up another outer wheel piece from the pieces pile.)

7. C: Look, look . . . Look at the crackers. (C picks up several additional nonwheel pieces from the pieces pile.)

8. M: They look like crackers. But they aren't crackers. But they aren't crackers. I think what we're supposed to do here is make this truck. (M pats the model puzzle.)

9. M: Can we do that? (M points to the empty frame where the copy puzzle is to be made.)

10. M: Make this truck (M pats the copy puzzle frame) to look like this truck. (M pats the model puzzle; C puts all the pieces in his hand back onto the pieces pile.)

11. M: Where are the wheels? (M points to the wheel pieces in the model puzzle; no response from C.)

12. M: I think we're supposed to leave this truck (M points to the model puzzle) all together and make a truck right here (M points to the empty frame for the copy puzzle) that looks like this one. (M points to the model puzzle.)

13. M: Let's find the wheels for this truck.

14. C: What's this? (C picks up the truck body piece from the pieces pile.)

A cursory examination of this excerpt reveals that the child was not very successful at "transcending his private world." He apparently never understood that the pieces represented wheels on a truck. It seems that throughout the interaction he viewed the pieces as circles or crackers rather than as wheels. Because of the child's constant inability to ne-

gotiate or "buy into" a situation definition that would be more appropriate for carrying out this culturally defined task, the adult was forced to adjust her communicative moves such that they could be interpreted within his alternative framework. One of the semiotic mechanisms that made it possible for the mother to interact with her child within the confines of his situation definition was referential perspective.

In the course of this dyad's entire problem-solving session, the mother used twenty-eight referring expressions in her attempts to refer to wheels (Wertsch, 1980a). The interaction was marked by the use of several different referential perspectives. She used four context-informative referring expressions (as in utterances 11 and 13), four common referring expressions, and twenty deictic referring expressions. Of the twenty deictic referring expressions four were instances of nonverbal pointing alone, and the remaining sixteen involved verbal expressions such as "they," "this," and "it."

In this interaction the pattern of the mother's choice of referring expressions provides particular insight into the problems the dyad was having in establishing a temporarily shared social reality, or intersubjectivity. At the beginning of the interaction the child understood or defined the wheel pieces in terms of "crackerness" rather than "wheelness" (as in utterances 3, 5, and 7). The mother attempted to impose a different situation definition on the task setting both by saying that the wheel pieces were not really crackers (utterance 8), and by introducing context-informative referential perspectives based on wheels (utterances 11 and 13) and trucks (utterances 8, 10, 12, and 13). Even as she was introducing these referential perspectives into the speech situation, however, she "hedged her bets" by relying extensively on nonverbal pointing. Thus in all cases except in utterance 13, the mother accompanied her context-informative referring expressions having to do with a truck or a wheel with a nonverbal pointing behavior. In the only instance where she did not supplement her context-informative referring expression with deixis (utterance 13), the child's response (utterance 14) was inappropriate.

Thus when the child shifted his attention to the appropriate aspects of the task setting, he could have been doing so either because he was categorizing the objects as the adult was or because he was simply following the minimally informative deictic referring expression. If he were acting on the basis of the former, he would be accepting the

adult's situation definition and "transcending his private world." If he were acting on the basis of the latter, he would be entering into only a minimal level of intersubjectivity. That is, he would be attending to the same referent but categorizing it in a different way from the adult's.

The subsequent excerpts indicate that this child was attending to the referents for the latter reason. Later in the session the mother again introduced a context-informative referential perspective concerned with wheels, but she again accompanied her expressions with a deictic referring expression, such as "this." Even later, she switched entirely to using verbal and nonverbal deixis when identifying referents. She then introduced another referential perspective by asking the child whether the object he was holding was "a circle." He responded by defining the wheel piece as a circle; that is, he "bought" this referential perspective or categorization. "A circle" is a common referring expression and represents a default option because it is not closely tied to the specific situation definition (building a truck puzzle that has wheels). Thus the mother and child were able to agree that the referents were circles, and so it then was possible to continue their joint cognitive activity by using diectic and common referring expressions.

Near the end of the segment of interaction, the mother reintroduced the context-informative referential perspective based on wheels. This pattern of reintroducing context-informative referring expressions after an initial lack of success (and the associated switch to default options) characterizes the interaction of several of the mothers in my study (1979a). It often appeared to be a semiotic challenge to the children to determine whether they were capable of redefining the objects in the communicative setting in a task-appropriate way. In the case just mentioned, it seems that this challenge did not meet with success. The child continued to display behaviors that indicated he was not categorizing the objects as wheels. For example, at a later point in the interaction, after continuing to refer to other pieces as crackers he put them in his mouth as if to eat them.

The excerpts of interaction between this two-and-one-half-year-old and his mother can be summarized as follows. The mother and the child did not define the goal-directed task and the objects in the setting in the same way. After initial attempts to introduce a context-informative referential perspective based on the functional significance of pieces in a perceptual array depicting a truck, the mother switched to commu-

nicative moves that did not require this situation definition. One of the ways that she did this was to switch from context-informative referring expressions to common and deictic referring expressions (default options). While she obviously continued to understand that the puzzle depicted a truck, she ceased (at least temporarily) introducing referential perspectives that posed semiotic challenges to the child to enter into intersubjectivity on her terms, that is, to use the same situation definition. One could argue that she never really required the child to interpret her utterances strictly on the basis of a situation definition involving a truck since she supplemented virtually all of her context-informative reference with deictic reference.

In contrast to the problems that this two-and-one-half-year-old had in transcending his private world, or understanding the adult's situation definition, children in the same task setting often are capable of entering into a level of intersubjectivity that permits productive joint cognitive activity. For example, in another excerpt of an interaction between a three-and-one-half-year-old boy and his mother in the same task setting (Wertsch, 1980a), the child seemed to realize immediately which pieces were wheels. He responded appropriately to the mother's initial introduction of a context-informative referential perspective based on "wheelness." Although she subsequently used a deictic referring expression, the initial success at agreeing on referential perspective indicates that the switch was not motivated by a need to operate on the basis of a more primitive situation definition. In this case the deictic referring expression was not functioning as a default option? Unlike the two-and-one-half-year-old, this three-and-one-half-year-old child quickly and smoothly entered into a state of intersubjectivity with his mother in connection with defining the puzzle as a truck, and the mother did not find it necessary to switch referential perspective in an attempt to arrive at some shared situation definition.

To summarize, I examined two cases of adult–child interpsychological functioning in a task setting. These cases differed greatly with respect to the level of intersubjectivity attained. The examination demonstrated that when confronted with a lack of intersubjectivity in such interactional settings, an adult can utilize options in referential perspective to establish and maintain communication.

Two major points can be made about the use of referential perspective in these interactions. First, it again reflects the inherent link between interpsychological and intrapsychological functioning. The

switches from one referential perspective to another obviously reflected attempts to establish a level of interpsychological functioning. In many instances, however, establishing such a level necessarily involves a specification of the interlocutors' intrapsychological representation of the situation. Any switch in one is inherently linked with a switch in the other.

My second point concerns the nature of the relationship between referential perspective and intersubjectivity, that is, between referential perspective in interpsychological and hence intrapsychological functioning. In the case of the two-and-one-half-year-old above, it appears that the mother often was forced to change referential perspective in order to bring the common situation definition "down" to the child's level. However, she continued to try to introduce context-informative referential perspectives that would lure the child "up" to her situation definition. The latter represents what I term a "semiotic" challenge. It is an attempt to communicate by using a semiotic mechanism whose understanding would require the child to redefine the situation in a manner more like that of a mature member of the culture. There is nothing inherently better or worse about representing the round pieces in the puzzle task as wheels. In fact, the model-copying procedure could be executed perfectly without doing so. Such a representation was, however, the one chosen spontaneously by all the adults in my studies (1979a, 1980a) and hence something on which they all tried to establish intersubjectivity with children.

The notion of a semiotic challenge points out what might be termed a "creative" use of language (compare Silverstein, 1976). Instead of using signs, in this case linguistic signs, such that they presuppose another person's existing intrapsychological situation definition, they are used to encourage the creation of a new one, on both the interpsychological and the intrapsychological planes. In the particular cases examined earlier, their use indicated an adult's attempt to lure a child into a new situation, that is, to create a new situation definition in social and individual functioning.

Because referential perspective is one device that seems particularly well suited for this subtle but powerful process of setting up semiotic challenges, it is often used and, I believe, is quite effective. In a nutshell, referential perspective is a semiotic mechanism whose use can lead a child to think differently by talking differently. The changes it induces represent a form of development that meets the criteria I mentioned earlier.

Abbreviation

A second semiotic mechanism involved in the transition from interpsychological to intrapsychological functioning is abbreviation, the reduction of fully expanded, explicit linguistic representation. Vygotsky examined this phenomenon in his account of inner speech. He claimed that the "first and most important" property of inner speech is its "unique abbreviated syntax." Furthermore, he analyzed egocentric speech to obtain concrete evidence about the "fragmentary, abbreviated nature of inner speech as compared with external speech" (1934a, p. 292).

In these and other comments about abbreviation Vygotsky dealt only with the intrapsychological plane of functioning. I shall argue that abbreviation plays an important role in interpsychological functioning as well. Specifically, it is instrumental in the changes in adult–child interpsychological functioning that are tied to changes in the child's intrapsychological functioning.

The starting point for such an argument is to recognize the relationship between linguistic representation and a situation definition. All aspects of a situation definition may be explicitly and exhaustively reflected in speech, or only some of them may appear. This is a matter of degree. As fewer and fewer aspects are explicitly represented, the level of abbreviation rises.

Just as there are many referential perspectives a speaker may take toward an object, there are many ways in which a speaker may represent a situation definition when providing other-regulation. A speaker may use quite explicit (nonabbreviated) utterances when a listener shares relatively little of the situation definition, but with greater intersubjectivity the speaker's utterances need not be so detailed, or explicit, because the listener can be relied upon to understand more abbreviated directives.

These issues were examined in an analysis of adult–child interaction where mother–child dyads were assigned the task of constructing a copy puzzle in accordance with a model (Wertsch and Schneider, 1979). That is, the study involved the general structure of the objects and goal-directed action used in earlier illustrations. Again, the strategic steps that comprise the action in the adult's situation definition are (1) consult the model to determine the identity and location of the piece needed next, (2) select the piece identified in step 1 from the pieces pile, and (3) add the piece selected in step 2 to the copy. The major

difficulty for young children in carrying out this goal-directed action consistently seems to be in coordinating information from the model and the copy. The coordination required is reflected in step 1. There it is specified that one must look at the model, but in order to obtain relevant information from it one must also know what comes next in the copy.

The nature of abbreviation in this context becomes obvious when one considers the fact that the listener must utilize information both from the model and from the copy in order to respond appropriately to a directive that deals with only one of them. It is especially important to recognize that in order to comply with a directive that seems to be concerned only with the copy, the listener may be called upon to identify and carry out substeps in connection with the model. For example, utterances 15 and 16 would be used to direct the listener to carry out some action concerning the copy, but to comply, the listener must consult the model:

15. Put the next piece in the copy puzzle.

16. What do you need in the copy puzzle now?

In this task setting the listener can identify what piece is needed or what piece is next only by checking the model. That is, utterances 15 and 16 are abbreviated with respect to the implicit substep of checking with the model.

Although it is possible to distribute directives along a multivalued continuum of abbreviation, a simple, dichotomous distinction was used between "abbreviated" and "nonabbreviated" directives (Wertsch and Schneider, 1979). Abbreviated directives were defined as those that do not specifically instruct the listener to consult both the model and the copy in their puzzle-making task but in fact implicitly require the listener to make a comparison between the two. Utterances 15 and 16 do not specifically direct the listener to be concerned with both the copy and the model, but they in fact require the listener to do so in order to respond appropriately. Nonabbreviated directives were defined as directives with which the listener can comply without having to carry out any implicit substeps involving both of the puzzles (ibid.). Examples of nonabbreviated directives are utterances 17 and 18:

17. Find the blue piece in this puzzle.

18. Put the red piece next to the orange in that puzzle.

The listener can respond appropriately to both utterances by dealing with only one of the two puzzles. There is no need to be aware that two puzzles are involved in the task and that a specific functional relationship exists between them.

The distinction between abbreviated and nonabbreviated directives is not based on how the listener actually responds to the directive (ibid.). It is based solely on an analysis of the directive utterance, without regard to the response it elicits. This point is important since in the task setting virtually every utterance by the adult is a directive, and if the listener understands the task very well, even a nonabbreviated directive such as 17 or 18 may be followed by several steps beyond those required to respond to that directive alone. It is possible for the listener to "see where the speaker is going" with a nonabbreviated directive and to respond as if he or she were complying with an abbreviated utterance.

We examined the verbal directives used by eighteen middle-class American mothers when directing their two-and-one-half-, three-and-one-half-, or four-and-one-half-year-old children through the task of making the copy puzzle in accordance with the model (Wertsch and Schneider, 1979). In those cases where information from the model was required for correct placement of pieces in the copy, we categorized the directive as either abbreviated or nonabbreviated.

Several differences were found among the three groups of dyads. For my purposes here, the findings about the "mix" of abbreviated and nonabbreviated directives used by the mothers is of greatest interest. The mothers switched from a predominant use of nonabbreviated verbal directives to a predominant use of abbreviated verbal directives as the age of the children increased. That is, directives addressed to older children were likely to require them to carry out implicit substeps or subdirectives in order to respond appropriately, whereas those addressed to younger children were less likely to require the recognition and execution of implicit substeps.

The following excerpts of mother–child interaction illustrate the nature of these differences (ibid.). The first excerpt involves a two-and-one-half-year-old child and her mother.

19. C: (C looks at the pieces pile.) Now what do you think?

20. M: Well, what colors do you still need?

21. C: (C looks at the copy puzzle; then C looks at the pieces

pile.) Uh (C looks at the copy puzzle), there's no purple on there. (C looks at the pieces pile.)

22. M: That's right.

23. C: I need (C looks at the copy puzzle) two colors for those two empty spaces. (C looks at the pieces pile.)

24. M: So where does the purple go?

25. C: Where's this (C picks up purple cargo square from the pieces pile) purple go, you think?

26. M: Where (C looks at the copy puzzle), is it over here?

27. C: (C looks at the model puzzle.) It's, oh, I mean only (C points to the purple cargo square in the model puzzle) in the, it's on, it's right (C points to purple cargo square in the model puzzle) above the yellow.

28. M: Okay.

29. C: (C inserts the purple cargo square correctly in the copy puzzle.)

In this segment of discourse the mother's utterances 20 and 24 are abbreviated directives, since an appropriate response by the child would require her to deal both with the model puzzle and with the copy puzzle. In contrast, utterance 26 is a nonabbreviated directive, since in order to respond appropriately, the child must be concerned with one or the other puzzle (in this case, the model) but need not carry out any implicit subdirectives that involve consulting both puzzles.

Utterance 30 represents the discourse that occurred in an episode for a four-and-one-half-year-old girl and her mother:

30. M: Now (C looks at the copy puzzle) what else do you need? (C looks at the model puzzle; then C picks up the black cargo square; then C looks at the copy puzzle; then C looks at the model puzzle; then C looks at the copy puzzle; then C inserts the black cargo square correctly in the copy puzzle.)

In this case the only directive in the episode was an abbreviated directive. The child did not in fact provide a verbal response here, but the directive is still abbreviated in our coding system because any appropriate response (verbal or nonverbal) would have required information both from the model puzzle and from the copy puzzle.

In addition to illustrating age differences, these two excerpts exhibit a general fact about the way that abbreviated verbal directives function in adult–child interaction. When an abbreviated directive such as utterance 20 or 24 was addressed to a younger child, the child often did not provide the appropriate response. For example, after hearing utterance 20, the two-and-one-half-year-old did not shift her eye gaze to the model. We interpreted this to be a reflection of the child's failure to recognize and carry out the implicit subdirectives involved in utterance 20. Conversely, in the case of the older child, the abbreviated directive was followed by an appropriate sequence of behaviors. This was interpreted as reflecting the four-and-one-half-year-old's ability to identify and carry the subdirectives implicit in utterance 30.

In order to analyze differences in the children's ability to recognize and carry the implicit subdirectives in abbreviated verbal directives, we examined their responses to this type of utterance. Specifically, we identified the subset of all abbreviated verbal directives that resulted in the correct insertion of the piece in the copy puzzle without any further assistance from the adult. While it is true that adults used abbreviated directives with the younger children, such utterances seldom led directly (that is, without further adult intervention) to the correct placement of the pieces in the copy puzzle. Conversely, older children identified and carried out all the implicit subdirectives necessary to select and insert the piece correctly significantly more often than younger children did.

The two segments of mother–child interaction presented above reveal why these particular empirical results were obtained in the study (Wertsch and Schneider, 1979). The example of the interaction between the two-and-one-half-year-old and her mother represents a common pattern of interaction in dyads involving younger children. If the mother used an abbreviated directive at all, she often had to "break it down" by using subsequent nonabbreviated directives. Thus it should not be surprising that in the case of younger children (a) the directive mix included relatively more nonabbreviated directives, and (b) the correct insertion of a piece in the copy puzzle seldom followed directly from the use of an abbreviated directive. These tendencies were reversed in the case of older children.

The results reported in these studies on abbreviation (Wertsch and Schneider, 1979) are similar to those reported by Arns (1980); Wertsch, Minick, Arns (1984); McLane (1981); and Sammarco (1984) with regard to "direct" and "indirect" other-regulation. The analysis of direct and indirect other-regulation was a part of the multilevel analytic technique mentioned earlier. After determining that a child's execution of

a strategic step was other-regulated, these investigators identified the type of other-regulation used. Direct other-regulation corresponds roughly with what we termed nonabbreviated directives (Wertsch and Schneider, 1979), whereas indirect other-regulation corresponds with abbreviated directives. In all the studies, significant differences in indirect other-regulation were found between groups. For example, Wertsch, Minick, and Arns (1984) reported that in rural Brazil teachers were much more likely than mothers to use indirect other-regulation when directing six-year-olds through a model-copying task. Such results indicate that the teachers were providing more complex semiotic challenges to the children than were the mothers. Because they were faced with more frequent indirect other-regulation when dealing with teachers, the children were required to operate on the intrapsychological plane with a more sophisticated situation definition. This in turn offered more opportunities for taking over full responsibility for the task than were to be found with rural Brazilian children dealing with their mothers. Such differences are the essence of how interpsychological functioning can vary in its tendency to induce the transition to intrapsychological function.

As in my account of referential perspective, I wish to make two points about the role of semiotic abbreviation in the transition from interpsychological to intrapsychological functioning. First, analyses such as Wertsch and Schneider's (1979) reveal once again the inherent link between interpsychological and intrapsychological functioning. Changes on the interpsychological plane typically reflect changes in the child's intrapsychological functioning. Thus any analysis of interpsychological functioning is seen to be ipso facto an analysis of intrapsychological functioning.

Second, abbreviation is another mechanism that allows a tutor to pose semiotic challenges to a tutee. By using an abbreviated directive, a tutor is inviting a tutee to identify and carry out the implicit substeps involved in a task setting. If this challenge is not met, the tutor always has the option of switching back to nonabbreviated directives, thereby taking over responsibility once again for certain aspects of the situation definition. The fact, however, that a tutor can switch between abbreviated and nonabbreviated directives means that the tutor has another mechanism for posing semiotic challenges and luring the tutee into a culturally appropriate situation definition.

The process at issue here is what Rommetveit has examined in so much of his writing. What an adult says to a child in interpsychological functioning in the zone of proximal development may "impose a definite structure . . . upon the situation in which it is said" (1979b, p. 70). The transitions in intrapsychological functioning are often products of what the child is not told at all—but yet is forced to assume in order to make sense of what is heard.

I have extended Vygotsky's comments on the general genetic law of cultural development by examining the communicative mechanisms that make possible the transition from interpsychological to intrapsychological functioning. In order to understand this transition, one must specify in more detail than has been done the semiotic means used in social interaction. They provide the key to the origins and transition of intrapsychological functioning. One must first specify the situation definition at issue and then identify ways in which various levels of intersubjectivity can be created through devices such as referential perspective and abbreviation. In all the cases examined here, I emphasized the inextricable link between the levels of interpsychological and intrapsychological functioning, and I noted the potential for using these devices to pose semiotic challenges that would encourage the child to view situations in a culturally more appropriate way.

actually increases. This curvilinear growth pattern is consistent with Vygotsky's notion of functional differentiation of speech functions but cannot be reconciled with Piaget's account of egocentric speech.

6. The Russian term here is *znachenie*. Therefore this term is now being used in a more general way than in the distinction between meaning and sense. I have made a practice of always using "meaning" for *znachenie,* but a more general term such as "signification" could also be employed here. If it were, it would be an overarching term for sense and meaning more narrowly interpreted.

5. Extending Vygotsky's Semiotic Analysis

1. Quine has noted in his accounts of reference that the objects about which we can speak are by no means limited to physical entities. While he sees physical objects playing an essential role in early forms of reference, his account also concerns how we speak "of attributes, number, sets, all sorts of abstract objects" (1973, p. 81).

2. There is no definite or indefinite article in Russian. Hence in Vygotsky's example *(Chasy upali),* no commitment to the definiteness of the referent was encoded.

3. In actuality, pitch and stress organization of the utterance would probably change in the two contexts outlined by Vygotsky. Hence even in this case, some aspect of the form would probably reflect the context in which it was used.

6. Semiotic Mechanisms in Vygotsky's Genetic Law of Cultural Development

1. I use the terms "objects" and "events" throughout this chapter when dealing with situation definitions. Although most of the objects and events examined are in the spatiotemporal context of the interlocutors involved, they need not be. They may also be abstract and/or removed from the speech context.

7. Units of Psychological Functioning

1. Much of Vygotsky's conceptualization about units, including his analogies based on chemistry (compare Vygotsky, 1962, p. 3), owe a great deal to R. Müller-Freinfels (compare Vygotsky, 1971, p. 205).

2. In actuality, each of the steps is a goal-directed action in its own right. Therefore this case actually involves an action made up of actions or subactions. However, the overall action has a unique psychological status that cannot be equated with the sum of the component actions. Since my ultimate concern is with the overall action, I shall follow the practice of labeling it with "action" and the three subactions "strategic steps." Furthermore, when I speak of the action of constructing the puzzle in accordance with the model, I am really concerned with the action of inserting a single piece. That is, I am concerned with the successful execution of one episode rather than with the entire task. Thus a hierarchical structure of actions is involved in the task setting I have chosen to examine. What I am calling an action is actually comprised of several strategic steps that could be construed as actions in their own right. In addition, the action itself is only part of the larger task of making the entire puzzle (something that also could be construed as an action).

8. Mind and Society

1. It is worth noting in this connection that Leont'ev and Vygotsky differed in the importance they placed on semiotic mediation in their theories. It played a much more central role for Vygotsky than it did for Leont'ev. Hence Vygotsky's account of social history is grounded in changes in forms of mediation (see chapter 2), whereas Leont'ev's rests more heavily on the socioeconomic forces outlined by Marx.

The use of this term is one of the points at which Leont'ev does not follow Vygotsky's semiotic orientation. Whereas sense *(smysl)* for Vygotsky (see chapter 4) is a property of contextualized signs, Leont'ev employed this term to deal with the relationship between two levels of analysis in his approach (action and activity), neither of which need be semiotic in any essential way.

2. In what follows, I shall be interested in ideal typical versions of these activities in Western society. These ideal types are seldom if ever achieved in actual practice, but they serve as a target representation with which such practice may be compared.

3. The type of setting I have in mind is that found in Western educational institutions where abstract, reflective thinking is encouraged. This is one of the literacy practices outlined by Scribner and Cole (1981).

4. However, Bronfenbrenner (1979a) has noted that this is perhaps more a reemergence rather than an initial appearance of such interest.

5. Although there is no evidence that Leont'ev was influenced by Lukács, it is worth noting that in his critique of psychology (for example, Leont'ev, 1981) he focused on problems (such as "contemplation" as outlined in Marx's First Thesis on Feuerbach) very similar to those Lukács had raised several decades earlier in his critique of philosophy.

6. While Vygotsky often incorporated the notion of labor into his writings, he almost always had in mind a transhistorical notion of concrete labor. Marx and Lukács were primarily concerned with a second moment of labor that is historically specific to capitalism—abstract labor (see Postone, 1983).

7. In accordance with the comments of Clark and Holquist (1985), I am assuming that Bakhtin was the author of this work.

8. Although some authors (for example, Ivanov, 1976; Pomorska, 1978) claim otherwise, Clark and Holquist (1985) have concluded that Vygotsky and Bakhtin were neither personally acquainted nor influenced by one another's work. In my opinion, the similarities in their ideas derive from a common intellectual milieu and familiarity with many of the same works, in particular, Yakubinskii (1923).

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