

Cognitive Socialization

Traditionally cognition used to be treated as a set of functions that develop within human beings as a result of maturation and individual learning experiences. Cognitive functions were treated as beneath-the-skin events; the focus was entirely on the individual, and while it was admitted that certain "outside" events such as gross neglect could interfere with the development of cognitive processes little credence was given to the notion that the child's social transactions may be an essential part of cognitive growth and that they can provide the foundations for its emergence.

Much of the credit for changing this view is due to Vygotsky (1978), whose work first appeared in Russian in the 1930s but was not discovered and translated in Western countries till several decades later. Cognitive skills, according to Vygotsky have a social origin: they must first be performed jointly with a competent adult before they come under the child's control. Thus all higher psychological functions including thinking, learning, and problem solving, appear first on an intermental plane, i.e. in the course of interacting with another person, before they become internalized and the child is able to perform them on an intramental plane. Social interactions therefore form the primary context in which the child is initiated to the more mature ways of thinking current in each society, and cognitive functioning can only grow under the guidance of adults willing to support, direct, and organize the child's activities in such a way that the child can participate in increasingly complex ways until eventually able to function independently. Not that children are merely passive receivers of adult guidance: they seek, select, and structure the assistance of those around them in learning how to solve problems, and to be effective the adult must therefore be aware of and follow the child's own motivations to learn. Cooperative activity is thus the hallmark of individual mental growth.

One way in which children contribute to such cooperative activity is by signaling their readiness to learn. Interaction with adults in problem solving situations can only be of benefit if the child has achieved some specified level of competence. Accordingly Vygotsky proposed the *zone of proximal development* (ZPD) to define the range within which adult guidance is likely to be most effective. The boundaries of the ZPD are determined by the gap between what children can do on their own and what they can achieve when acting as the junior partner of a more knowledgeable person. It is thus a region of sensitivity to guidance where the child is uncertain and looking for help and is therefore most susceptible to adult instruction. Only interactions that occur within the ZPD are said to bring about cognitive change. The ability of adults to pitch their tutorial efforts within this zone is thus a crucial factor in helping the child to progress to independence, and the competent tutor is someone who is capable of determining this zone for any given child and a given task, providing the necessary help and guidance and then gradually withdrawing support as the child becomes capable of performing independently. Mutual cooperation is thus the key to mental growth: on the one hand children actively seek help and communicate their requirements to those around them, and on the other hand adults sensitively respond by first offering support but then progressively withdrawing it as the child achieves the necessary competence to cope alone.

The research instigated by this account (e.g. Rogoff, 1990; Rogoff, Mistry, Gonen, & Mosier, 1993) has focused on interactions, not on individuals, treating

adult and child as a problem solving dyad. Work carried out by D. Wood (1988; D. Wood & Middleton, 1975) provides a good example of this approach. Mothers of 4-to-5-year-olds were asked to teach their children to put together a construction toy - a task too difficult for these children to do alone but one which they were able to accomplish with "good" tuition. What is good tuition? On the basis of detailed observations of how mothers went about their task, Wood suggests that mothers who relied exclusively on demonstration, or mothers who merely attempted to talk children through the task, had little success; when subsequently asked to put the toy together on their own these children achieved little. The mothers of children who learned most were those who taught their children "contingently," that is at each step the mother monitored what the child was able to do, adapted both the nature and level of her help accordingly and in this way made any help she offered contingent upon the child's understanding of previous levels of instructions. When the child failed she offered more support; when the child succeeded she offered less support, and the extent to which such a "contingent-shift" rule was applied turned out to be predictive of the child's subsequent skill on this task.

In our previous discussion of the onset of language skills (pp. 120ff.) we noted that these develop optimally in the context of *joint involvement episodes* (JIEs), i.e. one-to-one encounters in which adult and child pay joint attention to and jointly act upon some specific topic. We can now extend this notion to functions other than language; following on from Vygotsky it appears that such encounters, in which children can make their first attempts at some new skill on the basis of the adult's support and feedback, provide the requisite context for the growth of higher cognitive functions generally. Whether Vygotsky was right in proposing that the *long-term* development of cognition is crucially dependent on the child's experience of these encounters remains uncertain. What is clear is that in JIEs children's behavior is often richer and more complex than at other times. JIEs, that is, can elicit a child's optimal and developmentally most advanced performance.

The evidence for this proposition (reviewed in Schaffer, 1992) relates to various cognitive functions such as attention, problem solving, and symbolic play. Take attention - a function that has traditionally been treated as though it were purely an individual property, untouched by interpersonal experience. Yet it has been apparent for some time that children's attentional capacity varies according to social context. Dunn and Wooding (1977), for example, observed 2-year-old children at home and found the length of their attention bouts to be significantly greater when playing with the mother than when playing on their own. However, such correlational data leave open the question of whether the mother was in fact responsible for bringing about this effect; experimentally varying the adult's involvement in the child's play is one way to ascertain this. A study by Parrinello and Ruff (1988) did so by assigning adults to either low, medium, or high levels of involvement in the play of 10-month-old infants, the levels varying according to the manner and frequency with which toys were offered, the amount of the adult's talk and her physical proximity. As table 38 shows, the infants' attention span did vary with the amount of adult involvement,

Table 38 Mean length of infants' attention episodes (in seconds)

	<i>Adult involvement level</i>		
	<i>Low</i>	<i>Medium</i>	<i>High</i>
Low attenders	2.71	4.05	3.50
High attenders	4.70	5.12	4.67

Source: Adapted from Parrinello & Ruff (1988)

though the effect was greatest at medium rather than at high levels (perhaps the latter were too overpowering). But the effect also varied from one infant to another: infants who had earlier been classified as low spontaneous attenders while playing on their own were found to benefit significantly more from adult involvement than infants classified as high spontaneous attenders.

We can conclude that children's performance can be raised to more optimal levels by an adult's involvement but that the extent of this effect varies according to characteristics of the child. This is borne out by other studies too, such as those that have examined children's play behavior. In the early years play goes through some marked developmental changes that reflect the child's cognitive competence. Thus in infancy play is generally of a *sensorimotor* nature, in that the child explores toys merely for the pleasure of sensation. Subsequently play becomes *functional*, i.e. the child assigns objects the function they are designed for (blocks are for building, cars for pushing, etc.). Eventually play becomes symbolic in that the child can use toys to represent other objects and engage in pretend play. Various scales have been developed to chart children's progression in play maturity (e.g. Belsky & Most, 1981; Nicolich, 1977); these differ in the number of levels describing that progression, but historically all were used to examine play as an essentially solitary activity and yielding a "pure" indication of the child's cognitive growth.

Play, however, frequently occurs in social interaction contexts, and there are signs that a partner, under certain conditions at least, can elicit higher maturity levels from a child than shown in solitary play. Slade (1987), for instance, during observations of toddlers at home found that both the level of play and the length of play episodes increased when the mother participated in the child's activities in contrast to periods when the child played alone. The effect depended, however, on the nature of the mother's participation, being greater when she actively entered into the child's play activities and encouraged by means of explicit suggestions. Merely providing a verbal commentary was not as effective. Again, however, we find that child characteristics also play a part in determining the effectiveness of the adult's help, and of these the child's age is a particularly important influence. This is well illustrated in a study by O'Connell and Bretherton (1984). Children at two ages, 20 and 28 months, were observed playing on their own and in a joint session with the mother. When their play

activities were categorized into three main groupings corresponding to sensorimotor functional, and symbolic play it was found that the diversity of activities within these categories increased significantly when the mother joined in. The maternal effect differed, however, according to the child's age: at 20 months sensorimotor and functional play actions were affected by the mother's presence; at 28 months only symbolic play was thereby fostered. As the mothers provided guidance to an equal extent with respect to all categories of play one must conclude that the children quite systematically selected from the constant flow of suggestions those that fitted in with their own capabilities. At the earlier age sensorimotor and functional play predominated; children then used the mother's assistance for these two kinds of activities. At 28 months, on the other hand, they had become capable of the rather more advanced symbolic type of play and accordingly took advantage of those suggestions which helped them to perform at that level. It was thus the *child* who determined the effectiveness of the mother's instructions, many of which may not have been particularly suitable at that developmental stage but which the child simply ignored.

There can be no question that much of cognitive growth is initially propelled by spontaneous changes within the child that are an inherent part of development. Thus children set the agenda; as Vygotsky stressed, there is little point in instruction until the child reaches the ZPD. The adult's role is not to create new cognitive processes; it is rather to facilitate, direct, and extend those that have already appeared. During the early years this is brought about most effectively in contexts of joint involvement, i.e. in one-to-one exchanges where adults can provide the support that children require for more advanced performance and where they can negotiate with the child what activities to carry out and what meanings to attach to these activities. Responsibility for tackling the problem can then gradually be transferred from adult to child as the latter internalizes the adult's strategies and instructions. The term *scaffolding* has been used to designate such adult activities, meaning thereby the "process that enables a child or novice to solve a problem, carry out a task or achieve a goal which would be beyond his unassisted efforts" (D. Wood, Bruner, & Ross, 1976). It is a useful umbrella term to describe a wide range of adult actions. In some respects it is misleading in that it implies a rigid structure or one that does not involve the child; however, Wood and his colleagues use the term to denote the continuous revision of action in response to the child's ongoing activity that an adult undertakes, thus denoting a highly flexible process. It is this which is said to be the crucial element in helping the child towards independent behavior.

There is much in this account which remains uncertain: how the internalization occurs whereby children manage to adopt adults' behavior as their own; whether all cognitive functions need social priming to the same degree; what the most effective adult forms of involvement are and how these should vary according to age and other child characteristics. What is clear is that this approach bears out the mutuality model of socialization we described above, and that it is applicable to cognition as much as to other aspects of behavior. The idea that *social* skills require an interpersonal context for their acquisition and development can no doubt be readily accepted; on

the other hand, the proposal that *cognitive* abilities are similarly tied to a social context does not have the same intuitive appeal and has in the past been rejected in favor of searches for purely intrapersonal processes responsible for the course of development. There is, however, increasing evidence that social interactive experiences do affect cognitive growth, that their influence in the early years is most effectively transmitted in the context of what we have referred to as joint involvement episodes, and that they entail the mutual cooperation of a participant child and a sensitive adult.

The case of early number development

One cognitive function that illustrates the need to consider social aspects in attempts to understand its development is numeracy. The idea that a child's *literacy* has social roots has been grasped by educators for quite some time; the interest shown in the role of joint picture book reading (e.g. DeLoache & DeMendoza, 1987) is one example. Involvement in such an activity with a parent enables the young child to learn that pictures and text are meaningful, to become acquainted with some of the conventions of literacy (e.g. holding books upright and turning pages in sequence) and to acquire the necessary motivation to look at books by finding out that they are fun. It is thus no surprise that the extent of children's experience of such a joint activity can predict their later reading ability, as well as foster their language development (Whitehurst et al., 1994).

The growth of numeracy skills, on the other hand, has for the most part been treated as a purely intrapersonal development. Such research has thrown valuable light on the way in which children begin to construe the world in quantitative terms and on the principles which underlie their number concepts at different ages (Hughes, 1986). However, it neglects the fact that from the beginning children are exposed to adult conversations that are full of references to number, made quite spontaneously and with no particular intent to teach (Durkin, Shire, Crowther, & Rutter, 1986). In addition, a great

many social activities go on at home which involve children in number-related ideas (Saxe, Guberman, & Gearhart, 1987): songs and rhymes (e.g. "One, two, buckle my shoe"), informal games (e.g. counting toes or fingers), competitions (such as number of times children can skip up and down), household activities (e.g. getting the child to help with measuring out ingredients in cooking), or such other domestic routines as laying a table or choosing a particular TV channel. Thus children's developing cognitive competencies to deal with number are given every opportunity in the course of daily life to become interwoven with the way in which society makes use of numeracy.

This process has been examined at a more detailed level in observations of mothers playing number games with children. Saxe and colleagues (1987) asked mothers of preschool children to teach them various counting and number reproduction tasks, thereby treating mother and child as a problem solving dyad and as a result finding many similarities to other joint involvement interactions such as those on attention and symbolic play described above. Mothers generally adjusted the level and kind of guidance given to the child's ongoing number activity: they would, for instance, recognize the type of difficulty experienced by the child at any given moment and respond with instructions tailored to that difficulty. Following an error by the child they shifted to more specific instructions;

following a successful move they adjusted the complexity level of their guidance upwards. Mothers of less able children simplified the task more by breaking it down into smaller and easier components; mothers also simplified their instructions when confronted by more difficult tasks. At the same time children adjusted their behavior in the light of the mother's input, making use of her efforts to cope with a number task that they could not solve on their own. Thus mothers created teaching contexts in which, on the basis of a continuous process of mutual adjustment, they were able to convey to their children some of the specific skills required to tackle

number problems and do so in a context of playful, motivating interaction.

This is a very different orientation to one which suggests that children try to figure out on their own the nature of number. It is apparent that any account of the origins of numeracy must include reference to the part this concept plays in the child's social exchanges; we need to look not just at the child but also at the child's caretakers and their joint interaction if we are to understand how number understanding becomes a meaningful aspect of the cognitive repertoire.