4

Internalization of Higher Psychological Functions

When comparing the principles regulating unconditioned and conditioned reflexes, Pavlov uses the example of a telephone call. One possibility is for the call to connect two points directly via a special line. This corresponds to an unconditioned reflex. The other possibility is for the phone call to be relayed through a special, central station with the help of temporary and limitlessly variable connections. This corresponds to a conditioned reflex. The cerebral cortex, as the organ that closes the conditioned reflex circuit, plays the role of such a central station.

The fundamental message of our analysis of the processes that underlie the creation of signs (signalization) may be expressed by a more generalized form of the same metaphor. Let us take the case of tying a knot as a reminder or drawing lots as a means of decision making. There is no doubt that in both cases a temporary conditioned connection is formed, that is, a connection of Pavlov's second type. But if we wish to grasp the essentials of what is happening here, we are forced to take into consideration not only the function of the telephone mechanism but also of the operator who plugged in and thus connected the line. In our example, the connection was established by the person who tied the knot. This feature distinguishes the higher forms of behavior from the lower.

The invention and use of signs as auxiliary means of solving a given psychological problem (to remember, compare something, report, choose, and so on) is analogous to the invention and use of tools in one psychological respect. The sign acts as an instrument of psychological activity in a manner analogous to the role of a tool in labor. But this analogy, like any other, does not imply the identity of these similar

concepts. We should not expect to find *many* similarities with tools in those means of adaptation we call signs. What's more, in addition to the similar and common feature shared by the two kinds of activity, we see very essential differences.

Here we want to be as precise as possible. Leaning for support on the term's figurative meaning, some psychologists have used the word "tool" when referring to the indirect function of an object as the means for accomplishing some activity. Expressions such as "the tongue is the tool of thought" or "aides de memoire" are usually bereft of any definite content and hardly mean more than what they really are: simple metaphors and more colorful ways of expressing the fact that certain objects or operations play an auxiliary role in psychological activity.

On the other hand, there have been many attempts to invest such expressions with a literal meaning, to equate the sign with the tool. By erasing the fundamental distinction between them, this approach loses the specific characteristics of each type of activity and leaves us with one general psychological form of determination. This is the position adopted by Dewey, one of pragmatism's representatives. He defines the tongue as the tool of tools, transposing Aristotle's definition of the human hand to speech.

I wish it to be clear that the analogy between sign and tool that I propose is different from either of the approaches just discussed. The uncertain, indistinct meaning that is usually read into the figurative use of the word "tool" in no way eases the researcher's task. His task is to uncover the real relationship, not the figurative one, that exists between behavior and its auxiliary means. Should we conceive of thought or memory as being analogous to external activity? Do the "means of activity" simply play the indefinite role of supporting the psychological process that leans on them? What is the nature of this support? What in general does it mean to be a "means" of thought or of memory? Psychologists who so enjoy using these fuzzy expressions furnish us with no answer to these questions.

But the position of those psychologists who treat such expressions literally turns out to be even fuzzier. Concepts that have a psychological aspect but do not actually belong to psychology—such as "technique"—are psychologized without any grounds whatsoever. Equating psychological and nonpsychological phenomena is possible only if one ignores the essence of each form of activity, as well as the differences between their historic roles and nature. Distinctions between tools as a means of labor, of mastering nature, and language as a means of social intercourse

become dissolved in the general concept of artifacts or artificial adaptations.

We seek to understand the behavioral role of the sign in all its uniqueness. This goal has motivated our empirical studies of how both tool and sign use are mutually linked and yet separate in the child's cultural development. We have adopted three conditions as a starting point for this work. The first pertains to the analogy and common points of the two types of activity, the second clarifies their basic differences, and the third attempts to demonstrate the real psychological link existing between the one and the other, or at least to hint at its existence.

As we have already noted, the basic analogy between sign and tool rests on the mediating function that characterizes each of them. They may, therefore, from the psychological perspective, be subsumed under the same category. We can express the logical relationship between the use of signs and of tools using the schema in figure 4, which shows each concept subsumed under the more general concept of indirect (mediated) activity.

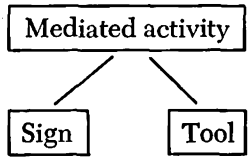

Figure 4

That concept, quite justly, was invested with the broadest general meaning by Hegel, who saw in it a characteristic feature of human reason: "Reason," he wrote, "is just as cunning as she is powerful. Her cunning consists principally in her mediating activity which, by causing objects to act and react on each other in accordance with their own nature, in this way, without any direct interference in the process, carries out reasons' intentions."[1] Marx cites that definition when speaking of working tools, to show that man "uses the mechanical, physical, and chemical properties of objects so as to make them act as forces that affect other objects in order to fulfill his personal goals."[2]

This analysis provides a sound basis for assigning the use of signs to the category of mediated activity, for the essence of sign use consists in man's affecting behavior through signs. In both cases the indirect (mediated) function comes to the forefront. I shall not define further the relation of these jointly subsumed concepts to each other, or their relation to the more generic concept of mediated activity. I should only

like to note that neither can, under any circumstance, be considered isomorphic with respect to the functions they perform, nor can they be seen as *fully* exhausting the concept of mediated activity. A host of other mediated activities might be named; cognitive activity is not limited to the use of tools or signs.

On the purely logical plane of the relation between the two concepts, our schema represents the two means of adaptation as diverging lines of mediated activity. This divergence is the basis for our second point. A most essential difference between sign and tool, and the basis for the real divergence of the two lines, is the different ways that they orient human behavior. The tool's function is to serve as the conductor of human influence on the object of activity; it is *externally* oriented; it must lead to changes in objects. It is a means by which human external activity is aimed at mastering, and triumphing over, nature. The sign, on the other hand, changes nothing in the object of a psychological operation. It is a means of internal activity aimed at mastering oneself; the sign is *internally* oriented. These activities are so different from each other that the nature of the means they use cannot be the same in both cases.

Finally, the third point pertains to the real tie between these activities and, hence, to the real tie of their development in phylo- and ontogenesis. The mastering of nature and the mastering of behavior are mutually linked, just as man's alteration of nature alters man's own nature. In phylogenesis we can reconstruct this link through fragmentary but convincing documentary evidence, while in ontogenesis we can trace it experimentally.

One thing is already certain. Just as the first use of tools refutes the notion that development represents the mere unfolding of the child's organically predetermined system of activity, so the first use of signs demonstrates that there cannot be a single organically predetermined internal system of activity that exists for each psychological function. The use of artificial means, the transition to mediated activity, fundamentally changes all psychological operations just as the use of tools limitlessly broadens the range of activities within which the new psychological functions may operate. In this context, we can use the term *higher* psychological function, or *higher behavior* as referring to the combination of tool and sign in psychological activity.

Several phases in the use of sign operations have been described thus far. In the initial phase reliance upon external signs is crucial to the child's effort. But through development these operations undergo radical changes: the entire operation of mediated activity (for example,

memorizing) begins to take place as a purely internal process. Paradoxically, late stages of the child's behavior appear to be the same as early stages of memorizing, which were characterized by a direct process. The very young child does not rely upon external means; rather he uses a "natural," "eidetic" approach. Judging only from external appearances, it seems that the older child has simply begun to memorize more and better; that she has somehow perfected and developed her old methods of memorizing. At the highest levels she appears to have abandoned any reliance upon signs. However, this appearance is only illusory. Development, as often happens, proceeds here not in a circle but in a spiral, passing through the same point at each new revolution while advancing to a higher level.

We call the internal reconstruction of an external operation *internalization.* A good example of this process may be found in the development of pointing. Initially, this gesture is nothing more than an unsuccessful attempt to grasp something, a movement aimed at a certain object which designates forthcoming activity. The child attempts to grasp an object placed beyond his reach; his hands, stretched toward that object, remain poised in the air. His fingers make grasping movements. At this initial stage pointing is represented by the child's movement, which seems to be pointing to an object—that and nothing more.

When the mother comes to the child's aid and realizes his movement indicates something, the situation changes fundamentally. Pointing becomes a gesture for others. The child's unsuccessful attempt engenders a reaction not from the object he seeks but *from another person.* Consequently, the primary meaning of that unsuccessful grasping movement is established by others. Only later, when the child can link his unsuccessful grasping movement to the objective situation as a whole, does he begin to understand this movement as pointing. At this juncture there occurs a change in that movement's function: from an object-oriented movement it becomes a movement aimed at another person, a means of establishing relations. *The grasping movement changes to the act of pointing.* As a result of this change, the movement itself is then physically simplified, and what results is the form of pointing that we may call a true gesture. It becomes a true gesture only after it objectively manifests all the functions of pointing for others and is understood by others as such a gesture. Its meaning and functions are created at first by an objective situation and then by people who surround the child.

As the above description of pointing illustrates, the process of internalization consists of a series of transformations:

(a) *An operation that initially represents an external activity is*

reconstructed and begins to occur internally. Of particular importance to the development of higher mental processes is the transformation of sign-using activity, the history and characteristics of which are illustrated by the development of practical intelligence, voluntary attention, and memory.

(b) *An interpersonal process is transformed into an intrapersonal one.* Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, *between* people (*interpsychological*), and then *inside* the child (*intrapsychological*). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relations between human individuals.

(c) *The transformation of an interpersonal process into an intrapersonal one is the result of a long series of developmental events.* The process being transformed continues to exist and to change as an external form of activity for a long time before definitively turning inward. For many functions, the stage of external signs lasts forever, that is, it is their final stage of development. Other functions develop further and gradually become inner functions. However, they take on the character of inner processes only as a result of a prolonged development. Their transfer inward is linked with changes in the laws governing their activity; they are incorporated into a new system with its own laws.

The internalization of cultural forms of behavior involves the reconstruction of psychological activity on the basis of sign operations. Psychological processes as they appear in animals actually cease to exist; they are incorporated into this system of behavior and are culturally reconstituted and developed to form a new psychological entity. The use of external signs is also radically reconstructed. The developmental changes in sign operations are akin to those that occur in language. Aspects of external or communicative speech as well as egocentric speech turn "inward" to become the basis of inner speech.

The internalization of socially rooted and historically developed activities is the distinguishing feature of human psychology, the basis of the qualitative leap from animal to human psychology. As yet, the barest outline of this process is known.