

Cognitive Precursors to Language

The question of the “cognitive precursors” to language has come up in child language research when people started to ask when children start to understand the **semantic relations** that are apparently expressed in early utterances.

But there is a more difficult question that still concerns, apparently, the cognitive prerequisites to language: when and how does the child develop the capacity for **representation**? It has been taken for granted by many child language researchers that children are using language to represent the world around them. The character and origin of this representation often go unexamined.

To answer both these questions people have turned to the work of Jean Piaget. And, more recently, they have also considered the writing of Soviet psychologist Lev Vygotsky. Discussion of the relationship between cognition and the child’s emerging use of language generally makes reference to both Piaget and Vygotsky. Piaget’s work was drawn upon in early research on first words (e.g. Bates, 1979). And more recently Vygotsky’s work has become central to sociocultural developmental theory.

The simple version of their two positions is that Piaget sees language as secondary to cognition, while Vygotsky has the opposite view. Indeed, Piaget asserts that “language is a product of intelligence, rather than intelligence being a product of language” (Piattelli-Palmarini, 1980, p. 167). Things aren’t quite this simple, however.

Jean Piaget

Just as Freud has become such a classical figure in clinical psychology that his work is now often not taught, so Piaget is the classical figure of developmental psychology. Few students seem now to read Piaget closely. There are indeed considerable obstacles. One is his technical vocabulary, made worse by the inconsistent and often simply bad translations of his work. Another is that Piaget wrote prolifically, so there is a lot to read, and his views developed over time, yet many of the English translations of his books and papers give no indication of when they were originally published. On top of all that Piaget wrote in an intellectual context unfamiliar to modern readers. (In *Play, Dreams & Imitation*, the book we’re concerned with here, he writes in passing of his conversations with Freud, for example, and cites Stern, Wallon, and others who most modern readers know nothing about.) In fact this context was already unfamiliar to those who first introduced Piaget to a U.S. audience (John Flavell, for example, in 1963). And then if we do read Piaget we have to struggle with his rationalist biases, his universalist beliefs, and his troublesome digestive metaphors.

To understand Piaget’s account of the semiotic function one must have a grasp of his overall account of development. Piaget described development in terms of constantly changing **structures** and invariant (unchanging) **functions**. The structures he called **schemas**: these are patterns of action on the part of organism; first physical action (in the sensory-motor stage), then mental action (from the pre-operational stage onwards).

The idea that structure, and action, moves from being physical to being mental is part of Piaget's story of the semiotic.

Piaget viewed the child as in constant interaction with their environment, and development as a process of adaptation to that environment. Interaction has two sides to it: the organism applies its patterns of action, and it modifies these patterns. The first is **assimilation**; the second is **accommodation**. These are the invariant functions. Assimilation and accommodation have been called the "Batman and Robin" of developmental psychology. All-powerful yet mysterious, this duo pops up on every page of his writing. In assimilation old action patterns, existing schemas are applied to objects and situations that may be familiar, or may be new. For example, the very first schemas are the reflexes of the newborn baby, one of which is the sucking reflex. This schema assimilates all objects to itself: the infant will suck on anything and everything.

In accommodation, on the other hand, a schema is modified. The baby learns that it is necessary to suck differently on a pacifier than one does on a bottle. The schema accommodates; the action pattern is changed.

You will see that assimilation is essentially conservative: the status quo is conserved. Accommodation on the other hand involves change. Together these two functions make up the child's continual **interaction** to their environment. In practice assimilation and accommodation always go hand in hand; both will occur at the same time. But the balance between the two will shift. Sometimes there is a primacy of accommodation, sometimes a primacy of assimilation. When there is a balance of the two, this is **equilibrium**, and this Piaget saw as the optimal path of **adaptation**, and of **intelligence**: "Intelligent adaptation is the equilibrium between assimilation and accommodation" (PDI, p. 84).

Piaget asserted that the two functions continue to operate throughout development. The structures, of course, are continually changing: from reflexes and the circular reactions of infancy through the different kinds of mental action of the preoperational, concrete operational, and formal operational stages of development. The structures are **constructed** by the child, in their continuous interaction with the world around them.

Sensory-Motor Development

Where should we locate Piaget philosophically? He is a structuralist certainly, but also, as he himself insisted, a "genetic epistemologist." He is indebted not to Descartes but to Kant. Like Kant (1787), Piaget focused on what mind brings to experience of the world; that's to say, on the character of our representation of the world. But Piaget considered Kant to have assumed too much in his analysis of the *a priori* conditions of human knowledge.

Where Kant considered **space, time, causality and object** to be *priori* categories or concepts, as it were "built in" to the structure of mind, necessary conditions for any experience, Piaget was concerned to trace the **genesis** of these conditions. In his infancy books (*The Construction of Reality in the Child*, and *The Origins of Intelligence*) Piaget argued that during infancy the child is gradually constructing a practical understanding

of space, time, causality and object. This is the work of the **sensory-motor intelligence** of infancy.

Piaget described six substages to infancy, and he described them in two ways. In the *Origins of Intelligence* he described the schemas, the structures, that are characteristic of each stage. The first structures are simple reflexes (though even here Piaget insisted that reflexes are actively exercised by the newborn, not just passive reactions to external stimulation). Reflexes become **circular reactions**, and these become more complex, organized, and differentiated.

In *The Construction of Reality in the Child*, Piaget described the substages again, but this time he attempted to characterize the way the child experiences the world around them at each stage. For example it is not until substage 6 that the child has constructed a practical understanding that objects exist in the world in their own right, independent of the child's perception of them and action on them. This **object permanence** has become a focus of much subsequent research.

The table below summarizes the six substages of infancy, but includes only the constructed understanding of object (leaving out space, time and causality).

SENSORIMOTOR SUBSTAGE:	RESPONSE TO HIDDEN OBJECT:
Substage 1 (0 - 11/2 months) <i>Reflex Schemas</i> involuntary rooting, sucking, grasping, looking	No attempt to locate objects that have disappeared
Substage 2 (11/2 - 4 months) <i>Primary Circular Reactions</i> repetition of pleasurable actions, on or near the body	No attempt to locate objects that have disappeared
Substage 3 (4 - 8 months) <i>Secondary Circular Reactions</i> repetition of actions that produce interesting change in the environment; dawning awareness of the effects of one's own acts	Search for objects that have dropped from view or a partially hidden
Substage 4 (8 - 12 months) <i>Coordinated Secondary Circular Reactions</i> combining schemas as means to achieve a desired end; earliest form of problem solving	Search for completely hidden objects--but makes the A-not-B error
Substage 5 (12 - 18 months) <i>Tertiary Circular Reactions</i> deliberate variation of problem-solving activity; experimentation to discover consequences	Ability to follow visible displacements of an object
Substage 6 (18 - 24 months) <i>Beginnings of Symbolic Representation</i> invention of new means of problem solving through symbolic representation	Ability to follow invisible displacements of an object

People have concluded that Piaget's work provides support for the idea that by around 12 months of age children are developing an understanding of objects, locations, actions, and agents: central semantic notions that seem to be expressed in early utterances.

Representation

Play, Dreams and Imitation in Childhood is about the form of intelligence found between the sensory-motor stage (infancy) and the “operational” intelligence of what Piaget called “early childhood” but we would call middle childhood (i.e., years 7 or so to 11 or so). He aimed to “bridge the gap between sensori-motor activity prior to representation, and the operational forms of thought’ (p. 1) that Piaget had described in *The Genesis of Number* and *The Development of Quantity in the Child*. Piaget’s discussion of “the semiotic function” is central to this book. First translated into English in 1951, this book was originally published in French in 1945.

It will be no surprise that representation itself, so central to Kant, is not for Piaget something *a priori*. It is a constructed capacity.

Piaget saw the balance of assimilation and accommodation swinging in the direction of the former when the child **plays**, and in the direction of the latter when the child **imitates**. As Piaget puts it, play is a primacy of assimilation; imitation is a primacy of accommodation. When the child plays they are applying their existing schemas to the world around them: making a pencil a laser gun, for example. Their egocentrism is maxed out. When the child imitates they are modifying their action patterns to copy a model they find in the world.

This is why play and imitation are highlighted in the title of this book. (Dreams are there because Piaget takes time to consider theories of unconscious symbolism in Freud and others.)

Piaget’s story of infancy, of sensory-motor intelligence, ends with the child achieving, in substage VI, a new kind of play and a new kind of imitation. **Symbolic play** is play in which one object stands for another. And **deferred imitation** is imitation of a model that is no longer in front of the child. Both, according to Piaget, play an important role in the appearance of the semiotic function.

Piaget’s Analysis

Piaget’s aim is to describe the “progressive articulations which gradually transform representation into operational, reversible thought. It is therefore important to give an account of the beginnings of representation, and to attempt to understand its specific method of functioning” (1). What we find at this age are “imaged or intuitive representation” and not yet “systems of operations.” Through the play, the imitation, and the symbolic thought if early childhood imaged representation retains an existence that is apart from and distinct from the operations of middle childhood.

Piaget grants that “Obviously, these problems involve the question of the role of language.” He notes that in his earlier books *The Language and Thought of the Child* and *Judgment and Reasoning in the Child* he had “considered this question from the point of view of the socialization of thought.” But now his approach is a different one: “We shall now try to show that the acquisition of language is itself subordinated to the working of a symbolic function.”

Piaget's strategy is to ask what is *common* to representation in play, imagination, intuitive concepts, operational concepts, even dreams? His answer is that the common factor is not the *image* (as classical associationists had argued), because this is not present before the second year of life. Moreover, it is only a signifier, and this is only one part of representation.

Nor is the common factor to be found in social life (as Wallon had argued), in the form of ritual, myth, and language. This is clear from the fact that language is acquired *after* a certain age, and in a particular order. Piaget argues that "Though obviously social life plays an essential role in the elaboration of concepts and of the representational schemas related to verbal expression, it does not in itself explain the beginnings of the image or the symbol as they are to be seen in the deferred imitation or in the first imaginative games of the one year-old child"

The common factor that can be seen in the representation of play, imagination, concepts and so on, is what Piaget calls the **semiotic function** (or **symbolic function**). Its source is in the individual, not in society. Indeed, it needs to be acquired *before* individuals can interact intelligently:

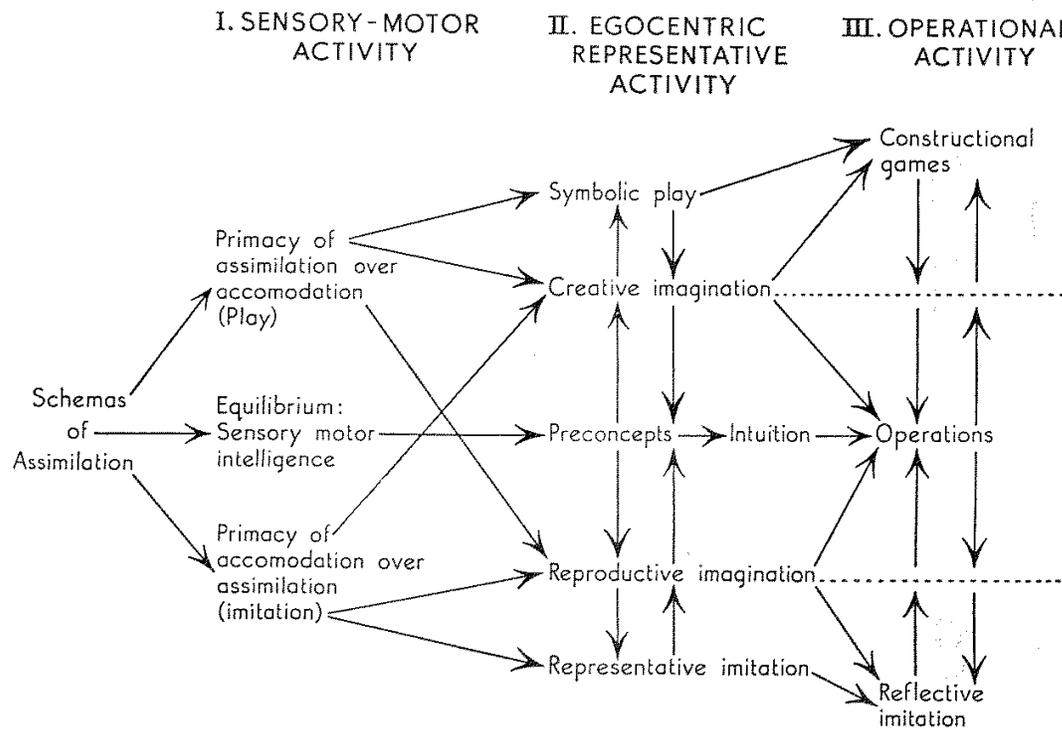
"The problem we shall discuss in this volume is therefore that of the **symbolic function** itself considered as a mechanism common to the various systems of representation and as an individual mechanism whose existence is a prerequisite for interaction of thought between individuals and consequently for the constitution or acquisition of collective meanings. This in no way implies that we dispute the social nature of collective meanings, far from it, since we have constantly tried to show that reason implies co-operation and reciprocity. But the social fact is for us a fact to be explained, not to be invoked as an extra-psychological factor" (4).

How does the semiotic function become possible? Piaget will argue that two contributions must come together, one from imitation, the other from play.

In short, imitation—through accommodation--provides imaged "signifiers": mental images; actual or mental imitation of an absent model. Play—through assimilation--provides "meanings"; the signified.

In this way sensori-motor schemas (infancy) lead to individual symbols which then become combined (during the preoperational stage—early childhood) with collective signs, so as to give rise to the concepts of concrete operational thinking (middle childhood).

There is, in Piaget's view, a functional continuity though these developments, but structural change. Somewhat mysteriously, Piaget remarks that in the course of the analysis of these changes, "the ego will doubtless follow of itself" (3)



Part I: Imitation

In the first section of the book Piaget traces forms of imitation through the substages of sensorimotor intelligence during infancy. He notes that sensorimotor activity is at first mainly assimilatory, oriented to preserving and consolidating the organism. So imitation in substages II and III is never more than the *reproduction* of familiar models.

From substage IV onwards, some schemas start to serve as tools to others, and this mutual assimilation gives rise to increased accommodation. "Intelligence makes its appearance."

And assimilation and accommodation begin to actively differentiate. Assimilation is seen in the increasing mobility, and widening range, of the child's schemas. Accommodation is seen in the infant's active investigation of the world around it. Imitation is now reproduction of *new* models.

In substage V, this imitation of new models becomes *systematic*, as accommodation progresses to become active experimentation.

And finally, in substage VI, accommodation is "interiorised," for this is the level of what Piaget calls *deferred* imitation: imitation of an object or action no longer present

Piaget's "conclusion" about the role of imitation in the naissance of the semiotic function is given in the following rather opaque paragraph:

“Imitation then, and this is our essential conclusion, fits into the general framework of the sensory-motor adaptations which characterize the construction of intelligence. As we have constantly seen (N. I. and C.R. [i.e., *Origins of Intelligence and Construction of Reality in the Child*]), intelligent adaptation is the equilibrium between assimilation and accommodation. Without assimilation, accommodation would fail to produce co-ordination or comprehension, while without accommodation, mere assimilation would distort the object to suit the subject. Sensory-motor intelligence is therefore always both accommodation of the old schema to the new object, and assimilation of the new object to the old schema. But accommodation is essential inconstant, being in fact only the ‘negative’ of the objective data which are an obstacle to the integral assimilation of reality to the child’s activity. Continually at the mercy of the new circumstances which give assimilation scope for development, it only attains equilibrium by envisaging reality as a series of ‘positives,’ i.e., stable copies or reproductions, the forerunners of representation proper. The function of imitation seems to be to produce this set of ‘positives,’ which correspond to the ‘negatives’ of accommodation and which at each new ‘printing,’¹ make new reconstitutions and anticipations possible. The mental image or symbolic representation thus comes into being, as the product of the function of more or less exact imitation”

¹ This ‘printing,’ by which the ‘negative’ of accommodation is transferred to the ‘positive’ of imitation, is of course the result of reproductive assimilation” (p. 84).

Piaget seems to be saying that the sensory-motor child is “at the mercy” of environmental contingencies; it can only accommodate when assimilation *happens* to fail. Equilibrium can be achieved only when “it [but what’s the referent here? Development? Assimilation? The child’s activity?] envisages” reality through images, copies, “reproductions”--which make possible “new reconstitutions and anticipations.” These “reproductions” are the “forerunners of representation proper.” Symbolic representation “thus comes into being.”

Part II: Play

In the second section of the book Piaget turns to the forms of play in the sensorimotor substages. In play, “reality is subordinated to assimilation which is distorting, since there is no accommodation” (86). Play is repetition of behavior for its own sake, pleasure at mastery, “functional pleasure.”

“Why is it that play become symbolic?” (162) Piaget’s answer is that distortion is part of assimilation, and this turns into make believe. Representational thought “begins as soon as the ‘signifier’ is differentiated from the ‘signified’” (163).

In the sensory-motor stage there are already 'signifiers,' namely 'indices' by means of which a child recognizes an object or situation. But these indices are *aspects* of that object or situation, so there is no differentiation between signifier and signified in infancy.

Between the index, on the one hand, and the fully differentiated linguistic sign, on the other hand, we find the symbolic image, in "imaged or pre-conceptual representation". "The image is interiorised imitation, i.e., the positive of accommodation, which is the negative of the imitated object" (163).

But the image is not an image of the *object* itself, it is an image of a *schema*, which has been used for dealing with the object. That's to say, this schema has already been accommodated. Now it can be used as a 'signifier' for present assimilation, which constitute the 'signified.' These present assimilations are also interiorised.

The image is thus a signifier that is *differentiated* from what it signifies, unlike the index.

But unlike the symbol the image still *resembles* the object that it stands for. That means that the image is a "motivated" signifier, not an "arbitrary" signifier. And the image is individual in origin, not social. In both these respects, the image differs from the **signs** that are found in language.

signifier	signified
Simultaneously differentiated and coordinated	
mental image ("the draft of potential imitation," PDI, 70)	meanings ("the concept of the object") schemas for dealing with the object?
the positive of accommodation (interiorised imitation)	provided by assimilation (play) (interiorised assimilations)
Symbols: "inherent in the individual mechanisms of thought" (PDI, 70)	

In play, things are a little different because accommodation is subordinated to assimilation. The **ludic symbol** is also an image, substituting for the subject, but now it is also assimilated to the ego, for temporary interest or immediate satisfaction.

"From the point of view of the signified, play enables the child to relive his past experiences and makes for the satisfaction of the ego rather than for its subordination to reality. From the point of view of the signifier, symbolism provides the child with the live, dynamic, individual language indispensable for the expression of his subjective feelings, for which collective language alone is inadequate. The symbol-object, being a real substitute for the signified, makes it actually present in a way that the verbal sign can never achieve" (167).

The child's egocentrism means that "collective and impersonal truth" cannot be satisfactory and gratifying.

Part III: Cognitive Representation

In the third section of the book, Piaget traces the way representation is put to use by the child, in the new kind of mental action that is now possible. He describes in some detail the transition that begins with the end of the sensorimotor stage, though to the beginning of “conceptual schemas” in the operational stage. In other words, he is describing the “preoperational stage” that was also the topic of his earlier book. He describes language (especially the recounting of past actions and the describing of present actions), and the appearance of the earliest forms of logical classification (preconcepts) and of inference (transductions).

Representation, he says, “begins and gradually develops at the beginning of the second year” (165).

The primitive expression of the assimilation of affective schemas (211)

This is the stage of intuitive thought, intermediate between image and concept, that represents by imagining (from general to particular), not deducing.

Freud places the roots of intuitive thought in the unconscious. Piaget disagrees, arguing that symbolic thought, both conscious and unconscious, forms a single whole. The difference is that in dreams egocentrism is at its maximum, and completely suppresses the ego’s consciousness of itself (170).

With “the *intervention* of language, collective verbal signs coming to *interfere* with the symbols we have already analyzed, in order to make possible the construction of concepts” (214, emphasis added).

Language

Piaget sees the first words as complex schemas of actions, either related entirely to the subject (i.e. to the child herself) or at best partly objective (219). These first words refer much more to systems of possible actions than to objects. They are “merely sensory-motor schemas in process of becoming concepts” (219). They are modes of action, capable of generalization and application. But they are expressed in verbal phonemes through which they are related to the actions of others--and so involve the element of communication (220).

The “definition” of these first words is unstable (unlike the concepts that follow in middle childhood); their “disconcerting mobility” stems from the fact that these words are related by subjective feelings of kinship, not by true class inclusion. As Piaget puts it, they are semi-concepts expressed by semi-signs.

The first use of language is *coupled* to an immediate, present action. First words are used to give orders, as expressions of desire. Even the naming of an object is a statement of a possible action. In other words this is not language to refer to things; it is language as a form of action. [Piaget certainly anticipates the work of Elizabeth Bates here.]

Recounting of Past Actions

Piaget proposes that “recounting” is an important step in the development of representational language. Recounting is the child giving an account of past events. In such a reconstruction of *past* action talk is no longer part of a current action, but is used to evoke an action that is over. This is re-presentation (new presentation), the beginnings of representation. And there is a kind of objectification involved, with the “communication or socialization of thought itself” (223).

For example, “Hopper, hopper, jump boy” 1;7 (28).

Descriptions of Present Actions

A “further step” occurs when a verbal account is continued into the present. Now, describing a *current* action, it is according to Piaget clearly no longer an integral part of that action. Description becomes, Piaget proposes, present representation. And this is clearly shown, he argues, by the appearance of “what is it?” questions.

“What’s that, Jacqueline, what’s that? ... There (knocking down a block). What’s falling? A block.” Jacqueline, aged 1;9 (24)

“Daddy, mummy, nose (of her doll). Mouth.” 1;9

Such questions involve both the name of the object and the concept, the class, to which it belongs. A “*split*” has occurred, Piaget suggests, in the sensory-motor schema: a split between the scheme inherent in action and the representative schema.

But the child is still only half way between egocentric monologue and communication with others. Accounts and descriptions are addressed to self as much as to others. This shows that ego and other are still not yet differentiated.

Preconcepts (Logic of Classes)

In this section (Chap VIII, § 2) and the one that follows (§ 3) Piaget deals with two notions central to formal logic. The first section deals with “concepts,” understood to be equivalent to the mathematical notion of “classes” or “sets.” The second deals with “propositions” or “inference.” Though he doesn’t say so explicitly, Piaget is tracing the logical character of children’s reasoning at an age when they are (he would say) strictly speaking “prelogical.” But this makes it all the more interesting to look to see if one can find precursors of logic in this preoperational stage. Piaget’s discussion here has relevance to those efforts to characterize children’s speech in terms of *semantic features*.

So far Piaget has explored verbal schemas towards the end of the sensory-motor stage. Now he turns to consider those verbal schemas that appear at the start of the preoperational stage. This he calls (a little confusingly) the “second phase” of the development of representation.

We've seen that the first words are only "semi-signs" that express only "semi-concepts." Conceptual schemas, in contrast, will turn out to be related to the system of organized verbal signs—that's to say, public language (221).

Indeed, Piaget asserts that the relation of language and concepts is "naturally reciprocal," so that "language makes possible the construction of concepts" while at the same time the "capacity for constructing conceptual representation is one of the conditions necessary for the acquisition of language" (221).

Piaget writes here, and elsewhere in this book, as though the social is a prerequisite for the stability of concepts and the rationality of cognition. However it seems to me that his method of inquiry can't really make good on these claims. We see that when he reports and comments on children's speech he simply takes it to be an "expression" of the child's individual cognition.

Piaget notes that learning to speak follows the lines observed by Stern: word-sentences, sentences of two-words, complete sentences, then sentences linked to one another. Between 2 and 4 years of age the child's notions fluctuate between individuality and generality. Even the child's own identity is unstable:

"Daddy, Odette and Jacqueline in the glass" 1; 11 (0) cf p. 224-235

As Piaget sees it, the child apparently thinks that the same individual can be composed of distinct persons – thus showing an absence of individual identity—and that a class is a kind of typical individual reproduced in several copies—thus showing an absence of understanding of the general class. At this age, part-whole relationships (central to the logic of sets or classes) are intermediate and unstable.

As a consequence the child asks many questions about wholes and parts:

"Is a worm an animal?"

These same characteristics can be seen, Piaget proposes, in children's *play* at this age. Words, like images, are not yet detached signifiers; they are still "prototypes" or "representatives." [Remember the work by Eleanor Rosche on *adult* categorization that suggests that adults too think in terms of prototypes. We've discussed the example: ask someone to name a bird and they're more likely to say "robin" than "ostrich."]

The word at this stage (like the image) represent a preconcept. This is not yet a class of many elements, any of which the word can stand for. The word stands for a *typical* individual, one which serves as a representative of the others, a substitute for all the others. The word is thus a 2nd order substitute: a verbal substitute for the representative who in turn is a substitute for all the others.

Between ages 4 or 5 and 6 or 8 there is a gradual articulation of intuitive thought, as generality is gradually achieved, and a "hierarchy of nestings" is constructed. One result of this is the appearance of what Piaget calls "partial constructions," which are logical within the restricted field of perceptual configuration.

For example, spontaneous inclusions:

“They’re the same family, blackbirds and crows...” 6; 7 (9) (p. 229)

Transductions - First Reasonings (Logic of Inference)

Piaget also traces the steps from the “precausal” reasoning of early childhood, which he calls “transduction, to the deductive reasoning of middle childhood. He finds the same characteristics he found in the child’s concepts.

The first verbal reasoning is practical and teleological: that’s to say, it is oriented to finding means to a desired end. In this respect it resembles the sensory-motor intelligence it is slowly replacing. One might think that it would be less egocentric than sensory-motor intelligence, but Piaget argues that precisely because representation enables the child to go beyond the perceptual field (what’s perceived here and now), he can now distort reality to suit his wishes, and subordinate it to his ends.

Thus we find “the discovery of lying,” which Piaget views as closely linked to the distortion of reality that appears with the “dawn of reasoning.”

“Transduction” (which Piaget says Stern described without using the term) is reasoning without the reversible nestings of a hierarchy of classes and relations.

In summary then, we have the following picture of the role of language and other kinds of symbolic intelligence in the preoperational stage:

SENSORY-MOTOR STAGE (0-2;5)	PRE-OPERATIONAL STAGE (2;5 - 6)	CONCRETE OPERATIONAL STAGE (6 - 11)
practical understanding	symbolic thought	rational thought
Practical schemas No representation Space, time, causality, object Ends with construction of the image	Its instrument is the symbol . <ul style="list-style-type: none"> • Motivated (there is resemblance between signifier and signified) • Individual • Intimate • Found in dreams and daydreams • Syncretic, prelogical Preconcepts -> Partial constructions Transduction; precausal reasoning	Its instrument is the sign . <ul style="list-style-type: none"> • Arbitrary (signifier and signified are related by convention) • Social • Liable to generalization and abstraction • Used in intellectual language Concepts; hierarchical relations Deduction (though still tied to the concrete)

Evaluating Piaget's Account of the Semiotic Function

Does Piaget give a satisfactory account of the genesis of the semiotic function? His attempt to locate an origin seems to keep shifting. For example, symbols have an important source in imitation, in the “mental images” that accommodative imitation provides. But how are “mental images” possible? Where do they exist? And the “interiorisation” that Piaget appeals to to explain (pre)conceptual thought seems to presuppose as much as it explains. One mysterious ability is explained in terms of another, equally mysterious.

To give him his due, Piaget does recognize this problem, and he spends some time considering a variety of alternative solutions. Does the image lead to representation, or the other way around?

“All our analyses of the earlier stages have been a preparation for the solution of the great problem with which we are now faced. Does this representative capacity come to the support of imitation from outside, as a new factor, or can we consider that the representative image is itself only the interiorised product of imitation in its final state?” (p. 62). Piaget distinguishes two different senses of representation: a broad sense in which it is identical with thought, and a narrow sense in which it is mean memory, mental image—the “symbolic evocation of absent realities.”

Piaget returns to one of his observations of his daughter Luciene:

“OBS. 57. L. also provided examples of imitation of objects with an essentially representative aim....

We have already noted (*N.I.*, obs. 180) a striking example of intelligent investigation during which L. tried to depict the solution she sought by imitating with her mouth the opening of a match-box. At 1; 4 (0) L. tried to get a watch chain out of a match-box when the box was not more than an eighth of an inch open. She gazed at the box with great attention, then opened and closed her mouth several times in succession, at first only slightly and then wider and wider. It was clear that the child, in her effort to picture to herself the means of enlarging the opening, was using as “signifier” her own mouth, with the movements of which she was familiar tactually and kinesthetically as well as by analogy with the visual image of the mouths of others. It is possible that there may also have been an element of “causality through imitation,” L. perhaps still trying, in spite of her age, to act on the box through her miming. But the essential thing for her, as the context of the behaviour clearly showed, was to grasp the situation, and to picture it to herself actively in order to do so” (p. 65)

“But what is most obvious—and we have been leading up to this—is that the image used by L. was precisely not mental, since it was still exterior. It is therefore clear that in such a reaction presentative imitation does not follow the image, but precedes it, the interior symbol thus being a product of interiorisation and not a new factor from some other source” (p. 71).

And he draws a parallel with what he later observes with speech: the child uses language first externally, and only later internally. (Which suggests, a little oddly, that speech doesn't necessarily involve *mental* representation.)

So Piaget's final answer seems to be that representation is first enacted, not internal. So the “mental image” is “still not interiorised at the beginning of the sixth stage” (71).

It is only subsequently interiorised. And yet this account remains somewhat contradictory: for instance, can one properly refer to an external representation as “mental”? And what makes interiorisation possible? What makes it necessary?

Note that the things that Piaget says can be “done” internally are multiple and disparate. They include accommodation (“it is the accommodation that is interiorised,” p. 62), movements (“an internal combination of movements,” 62), as well as “images and suggestions of action” (60) and “models” (“the model perceived externally has been replaced by an ‘internal model’” 67). All this begs the question, what exactly is the status—epistemological and ontological—or this interior realm or level?

We have to pay attention to this because it cuts to important ontological issues. Is the division between mind and world a preexisting one, a necessary one, or it is contingent accomplishment?

Lev Vygotsky

Vygotsky (1934/1987, 1978) insisted that human development is cultural. It is influenced by various “mediational means” that the culture provides, one of the most important of which is language.

Although the infant shows intelligence prior to speech, and also shows early forms of vocal expression prior to true thinking, it is not until early childhood that language becomes meaningful, as thought becomes verbal. Central to both these development is what Vygotsky refers to as “word meaning.”

Vygotsky, like Piaget, appeals to a distinction between “external” and “internal,” and like Piaget, to a process that moves speech, for instance, from one to the other. His term for this is “internalization.” (It would be interesting to trace the original French and Russian terms for “interiorisation” and “internalization.”) But according to interpreters of his writings, and to those such as Leont’ev who developed his ideas, the “internal” mental realm is not pre-given, presupposed:

“Earlier approaches in psychology viewed consciousness as some sort of metaphysical plane of movement of mental processes. But consciousness is not given from the beginning and is not produced by nature: consciousness is a product of society: it is *produced*. Therefore, consciousness is not a postulate and is not a condition of psychology; rather, it is a problem for psychology—an object of concrete investigation.

Thus the process of internalization is not the *transferal* of an external activity to a preexisting, internal ‘plane of consciousness’: it is the process in which this internal plane is *formed*” (Leont’ev, 1981, pp. 56-57).

John Lucy (1988) has defended Piaget against the prevalent criticism that he neglects social factors in development. It is true that Piaget occasionally asserts that language enables thought to be socialized, and that cooperation fosters logic, and so on. But at the

same time he seems not to have a method to investigate these social influences. It is certainly quite clear that he considers the semiotic function to be *individual* in its origins.

With Vygotsky we seem to have a somewhat different emphasis:

“At first the indicative gesture is simply an unsuccessful grasping movement directed at an object and designating a forthcoming action. The child tries to grasp an object that is too far away. The child's hands, reaching toward the object, stop and hover in midair. . . Here we have a child's movements that do nothing more than objectively indicate an object.

When the mother comes to the aid of the child and comprehends the movement as an indicator, the situation changes in an essential way. The indicative gesture becomes a gesture for others. In response to the child's unsuccessful grasping movement, a response emerges not on the part of the object, but on the part of another human. Thus, other people introduce the primary sense into this unsuccessful grasping movement. And only afterward, owing to the fact they already have connected the unsuccessful grasping movement with the whole objective situation, do children themselves begin to use the movement as an indication. The functions of the movement itself have undergone a change here: from a movement directed toward an object it has become a movement directed toward another human being. The grasping is converted into an indication . . . this movement does not become a gesture for oneself except by first being an indication, that is, functioning objectively as an indication and gesture for others, being comprehended and understood by surrounding people as an indicator. Thus the child is the last to become conscious of the gesture” (Vygotsky, 1981, pp. 160-161, cited in Wertsch, 1985).

Jim Wertsch has argued that internalization is “the process of gaining control over external sign forms” (Wertsch, 1985, p. 65). And the example of pointing illustrates that a prerequisite for this control is the social interpretation and action of other people.

In a nutshell, Vygotsky's account of the developing relationship between speaking and thinking during late infancy, early childhood and on into the formal schooling of middle childhood can be summarized as follows:

INFANCY	EARLY CHILDHOOD	MIDDLE CHILDHOOD
<p><u>prespeech thought</u></p> <ul style="list-style-type: none"> • simple generalization • purposive activity • tool use • highly individual • depends on immediate environment 	<p><u>verbal thought</u></p> <ul style="list-style-type: none"> • using speech to achieve cognitive ends (as a tool to aid & express thought) 	
<p><u>preintellectual speech</u></p> <ul style="list-style-type: none"> • expresses emotion • primitive social interchange • with gesture & 	<p><u>meaningful language</u></p> <ul style="list-style-type: none"> • speech becomes language proper • generalized meanings used to achieve social 	<p><u>formal schooling</u></p> <ul style="list-style-type: none"> • spontaneous concepts become true scientific concepts • reflexive, hierarchically

vocalization

ends

organized

word meaning

- this develops during the preschool years

structural transformation:

- from congeries to complexes to pseudo-concepts

functional transformation:

- from social speech to egocentric speech (to guide & regulate own action)
- from inner speech to thinking in pure meanings (isolation of conceptual thought from its spoken aspect)
- leads to "spontaneous concepts"

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