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READING VYGOTSKY at CUNY

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On Reading Vygotsky

Sylvia Scribner

The papers that follow have a common history. They originated in a seminar I gave at the Graduate School and University Center of the City University of New York in the Developmental Psychology program. They were first presented in a Vygotsky Symposium held at the University Graduate Center.¹ As papers, they speak for themselves -- and for the continuing power of Vygotsky's ideas to illuminate basic problems in psychology. As products of a seminar, they also reflect a social process whose "outcomes" go well beyond them. I have called this social process "reading Vygotsky" and, because it can be constructed in many settings, I would like to say a few words about what it was and how it worked for us.

Background

Unlike many other seminars, this one was not organized around "Vygotsky." It was organized around a single text by Vygotsky, the complete translation of *Thinking and Speech*, made available to us in manuscript form, and soon to be in print.² Diverse as we were in background and interests (participants included graduate students, postdoctoral fellows and practicing psychologists) we had no difficulty in agreeing upon a common objective. We wanted to give this text a close reading -- to plumb it, interrogate it, analyze it, critique it -- for as many purposes as we saw fit at a pace we found comfortable. We made no other predefined commitments and agreed to turn to writing only as the spirit moved. We hoped these arrangements would create a social and intellectual atmosphere that could sustain the pleasure and value of critical reading activities. We read all portions individually and discussed them collectively, but we also read certain passages together, and often consulted the manuscript to check out what Vygotsky said when our disagreements about what he might mean became especially contentious.³

Our eagerness to immerse ourselves in Vygotsky's writing can be readily understood. Until now, the primary sources available to English readers have been scattered chapters and articles, and two books, *Thought and Language* (MIT, 1962) and *Mind*

in Society (Harvard, 1978). Excellent as these volumes are for introductory purposes, both are highly edited and abridged. Neither gives us the work as Vygotsky wrote it and, accordingly, neither gives us Vygotsky as he revealed himself through the full work. As thousands of researchers and practitioners in the USA and UK have become attracted to Vygotsky's vision of what a science of human nature might look like, secondary sources have multiplied. New writings about Vygotsky range from a full theoretical analysis and extension of his work as a whole (Wertsch, 1985) to papers and chapters expositing or developing special constructs (e.g., zone of proximal development). The more widespread and vigorous this literature, the greater the gain for psychology at large -- yet the deeper the dilemma for those who are committed to working within a Vygotskian framework. When commentary and exposition rest on a narrow textual base, it is difficult to make discriminating use of it and to conduct serious theoretical work. Vygotskian scholarship in the English-reading community often appears to be conducted in a hall of mirrors, each reflecting a certain Vygotsky and each inviting comparison with other reflections. This is quite unlike the Piagetian theoretical enterprise which can turn to an extensive body of original, unexpurgated works to ground the secondary literature.

The publication of *Thinking and Speech* and the scheduled appearance in English of all the Collected Works² now offer an opportunity to meet Vygotsky without mirrors. The interpretive process can become more personally direct, and at the same time, more social. When a group of people participate in reading the same text together, different ways of reading become visible. And when varieties of interpretation confront each other around a common object, it enhances the likelihood that these varieties will contribute to the creation of new shared understandings.

The Text

In *Thinking and Speech*, we have an exemplary object for such a collective intellectual exploration. Some simple facts indicate the new territory opened up by this text. For one thing, it is about two-thirds longer than the 1962 abridged version; deletions and condensations in that version, it turns out, include entire sections, not merely paragraphs or sentences. The translation from the Russian is "strict," with greater fidelity to the original (witness "speech" rather than "language" in the title) and less regard for stylistic criteria that

encourage paraphrase. In the spirit of preparing a definitive work for scholarly purposes, the editors have made no attempt to eliminate "repetitions" and "redundancies." The result is neither tight nor tidy, but the language is richly allusive, and as we encounter successive recyclings of Vygotsky's treatment of certain questions, we more fully discern the different layers of meaning hidden beneath the surface "repetitions."

With the complete text in hand, the architecture of this final work of Vygotsky becomes clearly visible and we can see what different kinds of reading it supports. The manuscript was not written all of a piece but is an assembly of different materials prepared over a 10 year period. The opening chapter was written for the book in 1934 and tells us how Vygotsky proposes to tackle the "fundamental problem of the relationship of thought to word." Chapter 6 on scientific concepts was also newly written, as was the beautiful concluding chapter in which Vygotsky attempted to integrate findings and present the process of verbal thinking "in a unified form." Chapter 5, an experimental investigation of concept development, was written shortly before the book was put together. Between these pillars of new material is a large arch, comprised of three chapters written earlier and reprinted here: these are concerned with the theories and empirical findings of Piaget, Stern and Kohler. These chapters, especially Piaget, were drastically cut in the 1962 edition, but they are a sizeable component of the whole -- constituting nearly one-third of the manuscript. The question arises as to why they are included here and why the book takes the shape it does. These are questions which we can and did bring to the text itself. In my reading, the book's design is a purposeful construction exemplifying Vygotsky's views about theory-building. In the preface and elsewhere, he tells us that to develop a theory adequate to the complexity of psychological structures, two approaches are needed: an extended series of experimental studies and a critical analysis of the best contemporary theories.

In contemporary psychology the study of a problem such as the relationship of thinking to speech requires a conceptual struggle with general theoretical perspectives and specific ideas that conflict with our own. (1934 [ms.], p. 13)

The book does indeed link these approaches; neither the critiques nor the empirical findings take precedence, nor is either dispensable. If we regard this

plan as a movement of thought rather than as a static structure, we find Vygotsky beginning with a theoretical formulation of the problem and basic philosophical and methodological approaches (Chapter 1), moving on to put these approaches into confrontation with others (Chapter 2, Piaget; Chapter 3, Stern): searching for a point of departure for empirical work in phylogenetic research (Chapter 4, Kohler), examining experimental findings (Chapters 5 and 6) and returning again to the theoretical plane. Each aspect is integral to the work as a whole.

Ways of Reading

This grand design offers readings on all levels and time perspectives. Our choices shifted as we sampled different possibilities. We read the text in part as a history of classics in psychology, going through the works of Piaget, Kohler and others along with Vygotsky when we reached those chapters -- reading for the past, as it were. In part, we read the text as a way of making connections with the current state of the art on key questions (chimp language, for example) or of advancing our own thinking on issues of concern; most of the papers presented here exemplify these readings of Vygotsky for the present. Some participants became involved with the manuscript as a philosophical work, pursuing Vygotsky's understandings and citations of Hegel, Feuerbach, Lenin, and others. Our group discussions often involved us in reading past the content for insights on methodology. I learned a great deal by reading Vygotsky as a reader, astounded at the sureness with which, in 1929, he grasped the full dimensions of Piaget's contributions to developmental psychology, yet penetrated beneath the surface of the early works to identify basic theoretical deficiencies more apparent in the Piagetian research programme in its modern form. But, perhaps the most exhilarating activity is to read Vygotsky as a thinker. When the text is restored -- with its long and "convoluted" sentences, its "repetitions" and reiterations, we can catch glimpses of Vygotsky's thought in flight. On these occasions, Vygotsky emerges in all his uniqueness, as a theorist who does not merely lay claim to the terms and forms of dialectic thought, but at his best, thinks in them. Reading this Vygotsky seems to me as one good way of reading for the future.

Notes

¹Other papers presented in the Symposium were: Berger, C., *Everyday and scientific concepts of number from zero to infinity*; Laufer, E., *Acquisition of new concepts among adults*; Phatate, D. D., *Possible underlying neurological mechanisms for Vygotsky's psychological theory*. Discussants were Katherine Nelson and Joseph Glick, Chair, Sylvia Scribner.

²The citations to the work in this issue are to Vygotsky, 1934 [ms]; and the page numbers given are those in Minick's draft manuscript. This volume will appear in September, 1987 under the title, *Problems of General Psychology*, by L. S. Vygotsky, translated and with an Introduction by Norris Minick and a Prologue by Jerome Bruner. It also includes six lectures given by Vygotsky in 1932 at the Leningrad Pedagogical Institute. The publisher, Plenum Publishing Corporation, New York, will be bringing out English translations of all volumes in a Russian series, *Collected Works of L. S. Vygotsky*, representing Vygotsky's entire corpus. The English series is edited by R. W. Rieber and Aaron S. Carton.

MIT has issued a revised edition of *Thought and Language* which incorporates text deleted from the 1962 Hanfmann-Vakar edition. Alex Kozulin is translator of the restored text and editor of the new edition.

³The reading plan of the Laboratory of Comparative Human Cognition suggested this mode of work.

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How Vygotsky's Notion of "Scientific Concept" May Inform Contemporary Studies of Theory Development

Lia Di Bello
Felice Orlich

Within the field of cognitive science, a number of experimenters have explored conceptual development and change within scientific domains, such as, physics, biology, and math. Primarily, the focus has been on the shift between novices and experts in the acquisition of conceptual systems (diSessa, 1983; Chi, Glaser & Rees, 1982; Larkin, 1981). This novice-expert shift involves the restructuring of knowledge as well as an accumulation of new facts. Most recently, in an attempt to describe the development of scientific concepts from early childhood, Carey (1985) has presented a case study of the acquisition of biological knowledge in children aged 4-10.

Drawing on her own case studies and other neo-nativist work (e.g., Keil, 1979; Gelman & Baillargeon, 1983; Bullock, Gelman & Baillargeon, 1982), Carey suggests that development of domain specific theories is tantamount to the development of formal systems. In our opinion, this body of work suffers two major drawbacks. (1) Scientific concepts are treated as being continuous with early childhood concepts. An emergent, restructuring process is implied but investigators have not proposed specific mechanisms for change. (2) It is not acknowledged that scientific concepts are culturally formulated rather than individually created.

In what follows, we will compare Carey's most recent work with Vygotsky's theory of the development of scientific concepts. We will end with suggestions about how a Vygotskian analysis may enhance the empirical study of scientific concept development and help overcome the drawbacks within current work.

According to Carey, what evolves is an intuitive biology in which superordinate concepts such as "living thing" and "animal" emerge. In addition, core concepts, such as "alive," are reorganized and development is viewed as domain specific. For example, in the shift from novice to expert, theory change would involve the restructuring of concepts and explanatory mechanisms particular to the specific domain of

knowledge undergoing development. In other words, the development of explanatory frameworks is part of specific theory change and not necessarily part of the development of formal thinking. Particular causal mechanisms belonging to theories undergo change, but there is no change in the foundational notions that underlie all theory building. Therefore, differentiation and integration must be analyzed in the theoretical context from which they are motivated and in which the concepts are embedded.

These scientific theories are systems of relations between objects whose acquisition is influenced by an initial set of ontological categories, such as the concepts "animal" and "living thing." Carey defines these ontological categories as *a priori* categories of knowing. She differentiates these basic categories from "natural kind" concepts, which emerge with knowledge of the world. Examples of natural kinds are Lemon, Dog, and Tiger. Carey's work suggests that a few ontological categories are innate, although not hierarchically arranged in the sense of Keil's theory of innate ontological categories (1979).

The ontologically basic concepts, being few in number are the background of our conceptual system. And they constrain induction in various ways. (Carey, 1985, p. 163)

These ontological categories are the child's first means of differentiating things in the world, acting as primitive theories about the world. Theory development is therefore characterized as an emergent phenomenon in which a new theory evolves from the old parent theory. This process of theory change is ongoing and can be understood as a paradigm shift similar to that described by Kuhn (1962).

Carey claims that both weak and strong restructuring occur in the acquisition of biological knowledge. Successive conceptual systems are structurally different in the weaker sense if the later one represents different relations among concepts than the earlier one does and if these patterns of relations "motivate" superordinate concepts not found in the earlier system. In the case of the acquisition of biological knowledge, the superordinate concepts of "living thing" and "animal" emerge from the pattern of relations among biological functions in the expert-novice shift.

The essential characteristic of "strong" restructuring is not only that relations change between concepts in the system but that the individual core concepts of the successive systems are changed. This position is influenced by the Kuhnian view, which holds that theory change/history of science proceeds through paradigm shifts in which both relations between concepts as well as the core concepts of some system changes in the shift from old to new theories.

Although her ontological categories may account for primitive theories or domains of knowing, they cannot account for fully formed scientific theories. Moreover, Carey alludes to a mechanism that motivates conceptual change within domains (that is, she suggests that once these ontological categories become explicit they are reorganized), but she does not explain how this occurs. In addition, she does not consider the historical embeddedness of scientific theories, i.e., she does not acknowledge that they are culturally formulated and presented to learners as complete systems. Her work almost suggests that a child can create a scientific theory in the absence of instruction and interaction.

In sum, Carey leaves us with several unanswered questions. Even if we accept her notion of innate ontological categories, such categories cannot account for how children manage to learn theories that are culturally determined. What mechanism is involved in acquisition? How does instruction map onto, interact with, or transform existing ontological categories?

Although Carey and Vygotsky share a definition of scientific concepts as essentially a "system of relations between objects" that develops, Vygotsky sees their development in a strikingly different way. Unlike Carey, Vygotsky sees scientific concepts as distinct from what he calls "everyday concepts." Rather than viewing scientific concepts as emerging from everyday concepts, he sees the development of each as moving in opposite directions, acting upon and transforming each other dialectically.

Importantly, scientific concepts are culturally formulated and transmitted through instruction. In the process of acquisition, they transform and influence thinking. In this sense, mind is socially formed.

[Spontaneous concepts] create a series of structures necessary for the evolution of a concept's more primitive, elementary

aspects, which give it body and vitality. Scientific concepts, in turn, supply structures for the upward development of the child's spontaneous concepts toward consciousness and deliberate use. Scientific concepts grow down through spontaneous concepts and spontaneous concepts grow up through scientific concepts. (Vygotsky, 1962, p. 116)

According to Vygotsky, children first acquire knowledge somewhat rotely in the process of the social activity of instruction; with development, scientific and everyday concepts interact dialectically and what gradually emerges is in depth understanding, or what Vygotsky calls "true concepts."

Unlike Carey, Vygotsky addresses not only development within specific domains of knowledge, but the impact of learning scientific concepts on general development. However, although Vygotsky's work addresses the notion of mechanism more clearly, it is underdeveloped with respect to explaining the development of bounded domains of knowledge. In addition, he does not address anything like Carey's *a priori* ontological categories.

However, a central notion in both works is that the "acquisition" of culturally formulated formal systems requires the reorganization of some more primitive system, consisting of "natural kinds" or "spontaneous concepts" within specific domains. The question remains as to how this process might occur. Here, both Carey's and Vygotsky's work suggest some avenues for study. Vygotsky's discussions of instruction, conscious attention, and the role of signs may point up principles that may act in the refining of domain specific knowledge. That is, they may jointly act in a complex way upon ontological categories of knowledge, such as Carey describes, allowing the refinement of knowledge within a specific domain.

Below is a description of how this might occur. As noted throughout this paper, "scientific concepts" or "theories" are essentially systems of relations. These relations are culturally transmitted through instruction and acquired in a somewhat "top down" manner. For example, one may be able to have linguistic command of certain partial relations before he or she actually understands them and can apply them to the real world with something like an in depth understanding; when the individual can apply schooled abstract concepts to

the concrete, his or her spontaneous concepts have been transformed by them.

To be adequately characterized, each concept must be placed within two continua, one that represents objective content and another that represents acts of thought apprehending the content [spontaneous concepts]. (Vygotsky, 1962, p. 113)

What is special about instruction, practice, and the other forms of discourse involved in schooling? We propose here that the very act of making one's current understanding explicit, through speaking, writing, or in discourse makes one's concepts accessible to the kind of processes necessary for reorganization. Through discourse the learner's concepts are gradually reorganized to match the formal system being acquired.

The processes necessary for reorganization include addition, refinement, and decomposition. These operations require an attentional effort on a system of relations that has been made explicit. Unlike spontaneous concepts or ontological knowledge, formal systems cannot be acquired implicitly, but must be made "accessible" for reorganizing operations. The explicating vehicle in both spontaneous and formal systems is some word or sign that embodies a concept. Once a system of signs is explicit, it can be rearranged, re-prioritized, or broken down analytically. These kinds of operations require conscious control and reflection. In a school setting, the role of instructor would therefore not be that of a passive provider of knowledge. Rather, the instructor would be an agent of a kind of regulatory reformulation process. The knowledgeable instructor may (through feedback, gradual challenge, and responses to the student's errors) guide the student in this process.

That is, it may be that individuals initially do organize the world in terms of broad ontological categories of knowledge as suggested by Carey. But these categories developing and refining on their own cannot account for the success children and adults attain at learning a particular culturally formulated and socially shared theory. A kind of "stepped up" Vygotskian analysis is required to understand how people move from thinking in terms of broad heterarchical categories to acquiring and refining formal theories within specific domains. We propose that instructional discourse and other kinds of activities that explicate

systems of relations make such relations amenable to refinement, reorganization, and correction. This kind of process acts as an essential bridge between a primitive understanding and a fixed culturally formulated theory, enabling acquisition and eventually in depth understanding, or "making the concept one's own."

Studies designed to describe this process must therefore study not only the subjects' movement from novice to expert, but also the discourse process that allows this development and its influence at each point. What is needed is an analysis of the discourse/instruction process along with the more traditional analysis of the learner's initial categories and patterns of change over time.

Currently, one of the authors (Di Bello, 1987) has been conducting a series of studies to capture this process in adults learning computer software systems with minimal instruction from interactive computer tutorials designed to compel explication. None of the subjects has prior experience with computers. Results indicate that those who learn the system well (i.e., those who can solve non-routine problems after training) are those who are given the opportunity to explicate their changing notions at several points during training. They are given some "correct" information about the system only after an opportunity for explication. These subjects then use the "correct" information to reorganize their current notions. Descriptive data of the subjects' errors show that their initial concepts as novices structurally resemble Vygotskian spontaneous/everyday concepts even though these same subjects routinely use formal reasoning in other domains (e.g., their areas of professional expertise). Since subjects were all (1) normal adults and (2) unfamiliar with the target domain, this finding lends support to the claim that formal development is domain specific.

Subjects in two other conditions which more closely resemble traditional teaching methods (i.e., clearly presented information with demonstrations or guided practice) did not learn nearly as well. Although they performed as well as the aforementioned subjects on written tests asking questions about the system, they could not solve non-routine problems requiring an in depth understanding.

In conclusion, the discourse process seems central to developing an in depth understanding of a formal domain. At present the process of acquiring any

formal system is not adequately understood. Currently, both authors (Di Bello, 1987; Orlich, 1987) are developing ways of further elucidating the actual processes involved in discourse and subsequent acquisition of formal systems of knowledge.

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A Vygotskian Perspective on Discourse: From Complex to Concept

Elena Levy

A problem of central concern to Vygotsky was the emergence of "conscious awareness and volition" in the adolescent. In *Thinking and Speech* he focused on the process by which the child gains control over his own mental processes, thus sharpening his ability to produce planned, goal-oriented behavior.

According to Vygotsky, it is through *the word* that conscious awareness and volition are acquired. He says,

... the functional use of the word [is] the means through which the adolescent subordinates his own mental operations, ...the means through which he masters the flow of his own mental processes and directs their activity in the resolution of tasks with which he is faced... (1934 [ms], p. 150)

This passage reflects Vygotsky's view of the *interdependence* of thinking and speech; for him, not only does thinking influence the development of speech, but speech influences the development of thinking as well. Throughout the manuscript, he argues against a view of speech as a mere reflection, or external expression of thinking; in his words, "meaning ... does not exist ... and develop ... in complete isolation from its material carrier" (1934 [ms], p. 10). Rather, he argues that *speech itself* is used to construct meaning.

In his investigation of the development of conscious awareness and volition, Vygotsky took the word as his unit of analysis, focusing on its use as a referential device. As has been pointed out recently (Silverstein, 1985; Wertsch, 1985; Hickman, 1985), by focusing on the word in this investigation, Vygotsky overlooked that language is used both as a referring-and-predicating and as a discourse-constructing tool. As a referring-and-predicating tool (that is, at the level of the proposition), language enables us to report events. As a tool for constructing discourse, we use language

to link reported events in novel ways. Thus to achieve Vygotsky's goal of understanding the mastery of one's own mental processes, it is necessary to take into account the dynamic qualities of language, i.e., its power to generate novel connections among reported events. Minimally, this involves an understanding of how language is used to sustain discourse -- to construct and link a series of predications -- about things not present in the non-linguistic context, that is, things whose existence and identity have been created through the act of speaking itself (Wertsch, 1985).

It is clear that the ability to use referring-and-predicating constructions to produce cohesive discourse does not remain the same ontogenetically, but rather this ability changes in the course of development. My claim in this paper is that one can characterize this progression in the same terms that Vygotsky used to characterize the evolution of speech at the level of the word.

In the rest of this paper I will describe the evolution of discourse as a progression from complexes to concepts; that is, if discourse is seen as a linking of individual utterances (referring-and-predicating constructions), then the relationship between utterances changes in development from complexive to conceptual in nature. In the course of this development, the child gains increasingly greater control over his or her linguistic behavior, ultimately using speech to direct the production of socially-constituted forms of discourse. This constitutes speech in its *planning function*. Thus, my discussion will be consistent with Vygotsky's claim that, at the level of words, meaning does not exist and develop in complete isolation from its material carrier. At the level of discourse this is true as well: The creation of meaning in discourse emerges, at least in part, *through the use of speech itself*.

I will begin by briefly outlining Vygotsky's description of the evolution of word meanings, and will then draw parallels to the development of discourse.

Evolution of word meanings. In Vygotsky's description of the evolution of word meanings, words progress from complexes which are tied to perceived features of the objects they denote, to concepts which take on meaning by virtue of the larger systems in which they occur. To study this, Vygotsky used an experimental blocks task in which words are used to denote aspects of physically-present objects:

specifically, a set of blocks varying along the dimensions of size, color, and shape.

In Vygotsky's first stage of concept-formation -- the stage of "heaps" -- the word is tied to objects which are "inherently unrelated" yet linked by chance in the child's perceptual field. At this point, word meaning is

... an incompletely defined, unformed, syncretic coupling of objects ... that are in one way or another combined in the child's representation and perception into a single fixed image. (1934 [ms], p. 155)

In the second stage -- of complexive thinking -- a form of generalization begins to emerge. At this point, the word is linked to actual features of the objects themselves. The links between word and object are, it should be noted, *concrete* and *factual* rather than abstract and logical. Here, *any* factually present link may form the basis for an object's inclusion in a complex. Furthermore, the links may be unstable; the child may continue to shift focus among different types of links in the course of the experiment. For example, the word may at first denote a *big red square* block and then a *small blue square*, where the link is in terms of *shape*. After this the child may use the same word to denote a *big red circle*, where the link is now in terms of *size*.

In Vygotsky's final stage -- the development of concepts -- a more advanced form of generalization occurs. Here, specific features of the objects are abstracted and maintained throughout the experimental task. Vygotsky says:

In its natural developed form ... the concept ... presupposes the isolation and abstraction of separate elements, the ability to view these isolated, abstracted elements independently of the concrete and empirical connections in which they are given. (1934 [ms], p.195)

Thus, to compare complexive to conceptual thinking: Conceptual thinking represents an advanced form of generalization, a form of abstraction; Complexive thinking is "permeated with an overabundance of connections and characterized by a paucity of abstraction." Complexes represent a *fusion* of the general and the particular; Concepts, in Vygotsky's terms, "rise above" the elements which compose them.

The focal point of concept-formation was, for Vygotsky, the acquisition of conscious awareness by the adolescent. At this stage, the adolescent not only has a concept of an object, but is in addition "consciously aware of the concept itself." Vygotsky termed this a *non-spontaneous* concept of the object. Vygotsky used this term -- non-spontaneous -- since this level of concept must be acquired, at least in part, through formal instruction. In an instructional setting, the concept is defined for the child in terms of the *larger system* in which it occurs; that is, it is defined by virtue of what it *is not*, as well as by virtue of what it *is*, and is thus defined with respect to its place within a hierarchical system. Vygotsky in fact says of the distinction between spontaneous and non-spontaneous concepts that "the key difference ... is a function of the presence or absence of a system" (1934 [ms], p. 320-1).

Discourse as Complexive vs. Conceptual in Nature. I'll now draw some parallels between the level of word meanings and the level of discourse. Specifically, I'll describe a progression from the linking of utterances on a complexive basis to their linkage on a conceptual basis. I'll begin by discussing children's early discourse as complexive in nature.

In very young children's discourse, utterances appear to be linked primarily on the basis of a *single utterance* in the locally preceding linguistic context; that is, linkages can be characterized as "paired associations" or "paired constructions." Weir (1962) has pointed out, in one child's pre-sleep monologues (age 28 to 30 months), that the choice of utterance at any point in a monologue often relies on the *phonological* properties of a single utterance in the child's own linguistic context.

In example (1) (from Weir, 1962),

1. like a piggy bank (2x) /k p g b ɪ k/
had a pink sheet on /p ɪ k/
the grey pig out /g p g/

the form of each utterance can be described as phonologically related to a single utterance in the prior context: *pink* in the second line as a function of *bank* in the first line; *grey pig* in the third line as a function of *like a pig* in the first line.

Weir characterized sequences of utterances such as these as complexive in nature, specifically as "chain" complexes. These are:

... a dynamic, temporal unification of isolated elements in a unified chain, [where there is] a transfer of meaning through the elements of that chain. Each link in the chain is united with that which precedes it and with that which follows it... [T]here may be no structural center. The separate elements may come into connection with one another, changing the central or model element at each stage... Each [element] belongs to the complex by virtue of the fact that it shares some feature with some other elements, an element that is connected, in turn, with another. (Vygotsky, 1934 [ms], p. 165)

Thus at this point in development, as described by Weir, distant prior utterances appear to be "left behind" as the child moves on to each next utterance; the child at this stage clearly cannot sustain discourse about things not present in the non-linguistic context.

In addition to a linkage of utterances on a phonological basis, the child in Weir's study also linked utterances to a very limited extent on a *referential* basis. The referentially based linkages which occur in her data again appear in the form of *pairwise constructions*.

2. what color TV
red and
fire
3. too hot
not too hot
not too good

In examples (2) and (3), each utterance is constructed on the basis of its last prior utterance. In (2), *red* refers to a reddish cast the television set acquires when the sun shines on it; *fire* represents an association with fire engines. In (3), line 2 represents an addition of a single word to line 1, and line 3 is formed by changing a single word in line 2.

After this stage, children begin to acquire the ability to sustain extended discourse about things which are absent from the non-linguistic context. Thus they acquire the ability to make language serve as its

own context in the domain of reference. More specifically, children come to be able to make *large segments* of prior discourse constrain subsequent utterances (Levy, 1984). Here, the child is beginning to develop the ability to maintain a consistent "thread" in the discourse.

Karmiloff-Smith (1980) has characterized this development as the emergence of a "thematic subject constraint." Example (4) illustrates the use of this constraint in a child's discourse.

4. a little boy_i is walking along
he_i sees a balloon man,
the balloon m- he_i asks for a balloon
and Ø_i goes off happily
the balloon- he_i lets go of the balloon
and Ø_i starts to cry

In this example, the child linguistically "creates" a character as thematic in the story; this is accomplished by placing *the boy* in subject position of each clause, and referring to this linguistically-created referent with a pronoun in each (but the first) clause in the narrative. Note that the child could, alternately, have placed other characters in the subject position, as the younger speaker in example (5) does, thus failing to maintain a consistent thematic subject.

5. he's_i walking along
and he_i sees a balloon man,
and he_j gives him_j a green one
and he_j walks off home
and it flies away into the sky
so he_i cries

The emergence of a thematic subject constraint shows development toward conceptual relations in discourse. These more sophisticated types of discourse can be characterized by Vygotsky's description of a concept (cited above), which "presupposes ... the ability to view ... isolated, abstracted elements independently of the concrete and empirical connections in which they are given..." (1934 [ms], p. 195). In creating a thematic subject in a narrative, and thus in assuming a point of view, the child is beginning to "isolate and abstract" elements from the story. The child is thus acquiring the ability to sustain cohesive discourse about things whose existence and identity are created through the act of speaking itself.

Another aspect of this process, which I will touch on only very briefly here, is the ability to create global structure in the discourse, that is, to "chunk" the

discourse into units. In narratives, this results in a segmentation of the discourse into episode units. This ability is closely related to the ability to maintain a thematic "thread" in discourse; that is, the very same linguistic devices used to create thematic subjects are used to segment discourse into global units. An example appears in (6):

6. and they see what's happened to the little boy;
and they come over sort of very calmly
and help him₁ get on his₁ feet
pick up his₁ pears for him₁
and put them back in the basket
and brush him₁ off and everything
and then they put him₁ back on his₁ bike
and he₁ goes off
the little boy₁ that was on the bike had been wearing a hat
and in passing the little girl it had fallen off...

This is a passage from a narrative which has been segmented into episode units through the use of referring expressions: In the second line from the bottom *the boy* is referred to with an explicit referring expression, "the little boy," even though this character has been referred to in the very last clause and thus a pronoun would be unambiguous. The use of the phrase "the little boy" at this point serves, according to Clancy (1980), to signal the start of a new episode unit.

This process of creating implicit episodic organization has been characterized in terms of *pragmatic markedness* relations in discourse; it can be characterized as an ability to creatively manipulate the cohesion-forming function of referring expressions (Silverstein, 1984; Levy, 1984). I will refer to the creation of thematic subjects, and the creation of implicit episodic structure, as "thematic structure." What has been implicit in what I've said so far about the creation of thematic structure at this developmental stage is that it is *constructed in the course of speaking itself*. In other words, thematic structure *emerges through* the linking of utterances with respect to each other. This point is perhaps easier to see in a dialogic situation, where participants mutually negotiate, or construct, topics through the act of speaking. The point here is that in a monologic situation as well, the theme of the discourse is often constructed in the course of the monologue itself; it is not planned in advance. The process of constructing thematic structure through the act of speaking constitutes, in Ochs' (1979) sense, "unplanned" discourse.

So, at this point the child can sustain discourse about things not present in the non-linguistic context; he or she can connect reported events in novel ways, maintaining a coherent point of view. It would appear that the child here has a spontaneous concept of the discourse, specifically, of its thematic structure. It is a *spontaneous* concept in that, although the child has constructed a theme in the course of speaking, he or she may not be able to *articulate* that theme in propositional form; similarly, although a global, episodic structure has been created, the child may not be able to reflect on, or refer to, that structure.

I have given examples from narratives here; however, my point is more general. As the child acquires the ability to make language serve as its own context, he or she is acquiring spontaneous concepts of all sorts of socially-constituted discourse types. I will now briefly contrast this to *non-spontaneous* concepts of discourse, through which the child acquires the ability to use language as a more powerful planning tool.

Non-spontaneous ("Planned") Discourse

For the type of discourse described so far -- spontaneous, or unplanned discourse -- the structure of the discourse has not yet been made an object of conscious awareness for the child. Once the means of creating implicit thematic structure are available to the child, however, he or she can then begin to *reflect on* this created structure. The means of reflection are, as Vygotsky pointed out, acquired in part through formal instruction.

In such a setting, the child is educated to distinguish between the structural properties of different types of discourse which are described to the child (stories, speeches, scientific papers, etc.); relations among elements which compose particular types of discourse are made explicit. What is being learned here is, broadly speaking, how to *structure an argument* in a socially-constituted way. With respect to stories, for example, the child is taught what the components of a story are, and how they are interrelated. A "story grammar" (such as the one given below, from Bower, 1976) illustrates such a schematic representation of a story. Note the appearance of both "themes" and "episodes" here.

The instructional process explicitly connects types of discourse and their components (e.g., themes and episodes) to a larger system of manipulating

Grammar Rules for Simple Stories

Rule #			
(1)	story	→	setting + theme + plot + resolution
(2)	setting	→	characters + location + time
(3)	theme	→	(event) + goal
(4)	plot	→	episode
(5)	episode	→	subgoal + attempt + outcome
(6)	attempt	→	{ event episode
(7)	outcome	→	{ event state
(8)	resolution	→	{ event state
(9)	subgoal goal	{ →	desired state
(10)	characters location time	{ →	statives

(From Bower, 1976)

language for rhetorical purposes. As part of a system, the discourse and its components are defined not only by virtue of what they *are*, but also by virtue of what they *are not* (e.g., a story is *not* some other form of discourse such as a speech; an "episode" is not the same as a "setting"). Types of discourse and their components are thus defined with respect to their place in a hierarchy; the child is now on the way to acquiring a "true" or non-spontaneous concept of discourse types, and their internal structure.

According to Vygotsky's theory, as children apply these general, abstract constructs to specific, concrete instances of stories, they should gain control over the construction of their own discourse. For example, learning that stories require themes (see the example provided from Bower, 1976) should aid the child in making the theme of a given story *explicit*, that is, in articulating the constructed theme. Furthermore, he or she should begin to be able to *use* the theme to *guide the construction* of the rest of the discourse. This would constitute a case of truly "planned" discourse. The child, through the acquisition of non-spontaneous concepts of discourse types, sharpens the ability to use

language to direct his/her own linguistic activity -- to direct the construction of his/her subsequent discourse.

As a result of the acquisition of a non-spontaneous concept of a story, children's narratives should begin to display the use of language to *refer* to the implicit episodic structures being created in their discourse; language forms should be used to refer to large segments of the discourse itself. Explicit references to "scenes" and "episodes," for example, should begin to appear, along with their linkage to explicitly stated themes.

Conclusions

A few points in conclusion:

(1) Turning back to Vygotsky's thesis of the evolution of word meanings, I have focused on meaning which inheres in larger stretches of speech than the word. I have sketched out a framework for investigating developmental changes in the nature of the links between utterances in discourse, specifically, in terms of investigating the development of discourse from

complexive to conceptual in nature. Within this framework, I have drawn parallels at the level of discourse to Vygotsky's thesis that "word meanings do not develop in complete isolation from their material carrier." Rather, I've argued that discourse meaning emerges in part through the act of speaking itself. At first, discourse is used in the process of *constructing* a theme or a point of view; and, later, explicitly stated *themes* are used to guide the further construction of discourse.

(2) It has been pointed out that, for Vygotsky, each stage in development is an enrichment, not a replacement of its previous stage. Thus all stages of development are apparent at various times in adult discourse; that is, adult discourse has aspects of both complexive and spontaneous organization (Ochs, 1979): It is clear that adult discourse is organized in part on the basis of pairwise constructions (including phonological properties of utterances) and that it tends to be unplanned, or constructed in the course of speaking. Only rarely do we plan our discourse entirely in advance.

We tend, however, to *perceive* our talk as planned discourse. Why this discrepancy between the organization of our talk and our perception of it? Vygotsky's notion of non-spontaneous concepts provides one answer to this: It is only the planned aspects of talk that are subject to conscious reflection.

From this point of view, the complexive and spontaneous nature of discourse, in adult as well as child speech, is a promising area of study, since it probably accounts for the vast majority of communicative situations, yet it consists of procedures not normally subject to conscious awareness.

Note

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The Concept of Consciousness: Vygotsky's Contribution

Armonit Roter

It is not by accident that Vygotsky's first major contribution to Soviet psychology was devoted to the problem of consciousness (Vygotsky, 1925 [1979]). As many writers have pointed out (Davydov & Radzikhovskii, 1985; Luria, 1976, 1978; Wertsch, 1985; Zinchenko, 1985) consciousness, for Vygotsky, was the major issue and he believed that the ultimate test of any psychological theory was whether it could deal with and contribute to our understanding of consciousness. In 1925 Vygotsky stated emphatically:

Scientific psychology cannot ignore the facts of consciousness; it must make them materially accessible, translate them into an objective language of the objectively existing, and once and for all dispel and bury the fictions, phantasmagoria, etc. Otherwise, no sort of work is possible, neither teaching nor criticism nor research. (Vygotsky, 1925 [1979], p. 12)

In the next 10 years, until his untimely death, consciousness continued to play an important role in the new psychology and methodology that Vygotsky and his followers were creating. Vygotsky strongly objected to an atomistic view which attempts to reduce complexities of actual psychological activity to isolated mental functions. Moreover, he believed the interrelations between the various mental functions (such as memory, attention, perception and thinking) were not constant but changed with development. Consciousness, according to Vygotsky, is a highly complex functional system in which various mental functions, including affect and volition, interrelate. For Vygotsky consciousness served as a focal point for an integrative, nonatomistic view of mind:

Consciousness develops as a whole. With each new stage in its development, its internal structure, the system of connections among its parts, changes. Development is not the sum of changes occurring in each of the separate functions. Rather, the fate of each functional part of consciousness depends on changes in the whole...[C]hange in the functional structure of consciousness, is the main and central context of the whole process of mental development. (1934 [ms], pp. 238-240)

Unfortunately, in the 60 years that followed, Vygotsky's view has gone, to a great extent, unnoticed. The issue of consciousness has usually been relegated to psychoanalytic theory and therapy or physiological research of various conscious states (sleep, arousal, hypnosis, etc.). In fact, in the heyday of behaviorism the term consciousness almost disappeared completely from psychological literature. Watson was quite adamant in his rejection of consciousness as a subject for scientific psychology:

Behaviorism claims that 'consciousness' is neither a definable nor a usable concept.

That it is merely another word for the 'soul' of more ancient times. The old psychology is thus dominated by a kind of subtle religious philosophy. (Watson, 1913, p. 3)

Therefore, it is not surprising that there are only a few scattered groups of researchers which deal directly with consciousness. Moreover, in each case, they have chosen to deal only with one or two components of consciousness without undertaking to integrate their work within the entire dynamic organization of consciousness.

One of the major difficulties in studying consciousness is that there is no single conventional definition of the concept of consciousness (see for example Klein, 1984). As Perry stated in 1904: "There is no philosophical term at once so popular and so devoid of standard meaning. How can a term mean anything when it is employed to connote anything and everything, including its own negation?" (p. 282). Or as Dewey wrote in his book on psychology in 1893: "Consciousness can neither be defined nor described. We can define or describe anything only by the employment of consciousness. It is presupposed, accordingly, in all definitions and all attempts to define it must move in a circle" (p. 2). This may be one of the reasons we find such a great disparity in the research of psychologists attempting to investigate the problem of consciousness or issues related to the unconscious.

Contemporary research has dealt with the problem of consciousness on at least five different dimensions: (1) awareness and self awareness; (2) automaticity as contrasted with control and/or as contrasted with effort; (3) volition; (4) primacy of conscious vs. the primacy of the unconscious; (5) verbalizability -- tacit vs. explicit. I will only attempt a brief, cursory explanation and example of each of these dimensions. It should be noted that some of the researchers address more than one of these aspects but that, as far as I know, at present, there is no attempt to integrate all of these aspects into one research program or theory.

1. Awareness. The most widely accepted synonym for consciousness is awareness. Consequently, the most popular experimental translation of the concept of consciousness is awareness. Moreover, many researchers who are interested in other aspects of consciousness include awareness as the criterion for determining whether the processes or structures they

are dealing with are conscious or unconscious. As Marcel (1983) states: "The primary criterion for consciousness is phenomenal awareness... [C]onsciousness is addressed in the sense of whether or not someone is aware of *something*" (p. 240-241). A variety of mental functions have been studied in relation to awareness. For example: perception (Marcel, 1983), memory (Eich, 1984; Jacoby & Witherspoon, 1982; Kellog, 1980), judgment (Nisbett & Wilson, 1978a), verbal report (Nisbett & Wilson, 1978b).

One interpretation of the Freudian concept of unconscious is that it is based on the notion of awareness. The contents of the unconscious are not inherently different from the contents we are conscious of. If affectively threatening implications of an unconscious idea are removed or neutralized through cathexis we become aware of it, in other words, we are conscious of it. No additional reconstruction, reorganization or translation is necessary. The basic difference between conscious and unconscious ideas is our awareness of them. The mechanism that prevents our awareness is the censor or ego, in later formulations, which prevents awareness of unpleasant contents. (Freud, 1915 [1959], 1920 [1967]).

A closely related issue in the study of consciousness is the problem of self awareness. This issue has preoccupied philosophers but has rarely been dealt with in psychological research (see Hofstadter & Dennett, 1981, for intriguing essays on this issue). There have been a number of attempts to incorporate this aspect of consciousness into an information processing or computational model (see Battista, 1978; Dennett, 1978; and Johnson-Laird, 1983).

2. Automaticity. The second popular dimension of consciousness is the degree of control. Consciousness implies, renders or allows (depending on one's theoretical inclination) control of the cognitive processing, while automatic processing is unconscious. The controlling role of consciousness represents the functional view of consciousness. For example Angell stated in 1907: "The functionalist's most intimate persuasion leads him to regard consciousness as primarily and intrinsically a control phenomenon" (p.88). Most of the research on habit formation and skill learning suggest that beyond a certain level of learning, control becomes unnecessary or even disruptive and functioning becomes automatic and unconscious. Whenever the normal functioning is obstructed by some problem or change in the routine, one becomes conscious and

assumes control of the processing.¹ This interpretation of the role of consciousness is very compatible with information processing models. According to information processing models there exist a limited capacity central processor (CP). One of the major functions of the CP is to control processing and at least part of the processing in the CP is conscious. In addition, there are automatic processes which occur outside of the CP and are unconscious. Once we have mastered a skill its processing does not require any control and it becomes automatic freeing the limited capacity CP for other processing. (See for example Posner & Warren, 1972.)

A somewhat different interpretation of the relationship between consciousness and automaticity within an information processing model of a limited capacity CP is suggested by Hasher & Zacks (1979, 1984). According to their model conscious processes, those processes that go through the CP, require effort. Unconscious processes are automatic and effortless and can occur simultaneously with conscious processes.

3. Volition. It is quite difficult to disentangle the dimension of volition from the notion of control and in many situations the two are really synonymous. Nevertheless, the motivational connotation implied in the term volition relates to another dimension of the concept of consciousness that is especially meaningful within the context of Soviet psychology's activity theory (see for example Smirnov, 1973 or Smirnov & Zinchenko, 1969). Extensive Soviet research has been carried out on voluntary and involuntary memory processes. The results and models suggested by this research are closely linked to the developmental dimension of consciousness which will be discussed below. According to Vygotsky the voluntary nature of the activity of a given function is the other side of its conscious awareness (Vygotsky, 1934 [ms], p. 238).

Another issue which is closely related to the dimension of volition is the issue of will and free will which has been dealt with extensively in philosophy but, again, only rarely in psychology (see Klein, 1984).

4. Primacy of consciousness vs. primacy of unconsciousness. A number of theories and research programs have dealt with the developmental dimension of consciousness. Two different developmental relationships have been suggested: (1) unconscious processing or structures are prior to any conscious processing or structures; (2) conscious processing are

developmentally prior to unconscious, automatic processing.

A number of psychological theories imply the first relationship i.e., unconscious processing and structures are developmentally prior to conscious structures and functioning (for example, Piaget, 1976, 1978; Fischer & Pipp, 1984).² Vygotsky also subscribes to this view. In 1934 he wrote:

It is a general law of development that conscious awareness and mastery characterize only higher stages of the development of a given function. It arises relatively late. It must be preceded by a stage in which conscious awareness is absent, a stage in which there is no volition in the application of a given form of conscious activity. (1934 [ms], p. 240)

Information processing theories are an example of the second view that processing and structures must first be conscious and only at a later stage do they become unconscious (e.g., Posner & Warren, 1972; Hasher & Zacks, 1979).

5. Verbalizability. The relationship between consciousness and language is, of course, one of the major themes of Vygotsky's work. It is expressed most clearly in *Thinking and Speech* (1934 [ms]). Vygotsky proposed word meaning as a unit for analyzing consciousness. He believed that the word captured more of the essence of consciousness than any other unit of analysis. Vygotsky wrote:

At every step actual research shows that the word plays a central role in consciousness as a whole, not in its individual function... The word is the most direct manifestation of the historical nature of human consciousness.

Consciousness is reflected in the word like the sun is reflected in a droplet of water. The word is microcosm of consciousness, related to consciousness like a living cell is related to an organism, like an atom is related to the cosmos. The meaningful word is a microcosm of human consciousness. (p. 407)

Piaget, in his later research on the problem of consciousness, suggested that there was an important relationship between consciousness and signification: "It is our hypothesis that the most general characterization of consciousness states ... is that they express significations and connect them by what, for lack of a better term, we shall term 'signifying implication'" (pp. 220-221). Piaget's use of the term "signification" should not be simply reduced to "language." Yet I think he was alluding to the dimension of verbalizability in the sense that I mean it. Consciousness implies a level of understanding or processing which is potentially explicable. Therefore, when consciousness is achieved, a definite signifying relationship has been formed.

I believe Johnson-Laird (1983) is also alluding to this aspect of consciousness in his model. He distinguishes between a higher level operating system and a hierarchical organization of parallel processors. Consciousness is located at the high level operating system which is essentially serial and can only receive the end results of the processing of the parallel processors. Concerning the parallel processors, Johnson-Laird states: "Natural selection has ensured that they are necessarily unconscious" (p. 465). In other words there is an intrinsic, fundamental difference between that which we are conscious of, or can become conscious of and that which is unconscious. A distinction which is similar to the difference between tacit and explicit knowledge according to Polanyi (1958, 1966). As Johnson-Laird (1983) states:

According to the present computational hypothesis, however, any attempt to use introspection in order to become conscious of something that is normally unconscious is unlikely to succeed. Not only is the information inaccessible, but also an essentially parallel process has to be grasped by the serial deliberations of the operating system. (p. 468)

Vygotskian points. So where does all of this lead us? Are we up the creek with no paddle? Granted, consciousness is, as Vygotsky has insisted, an important part of human functioning and it has been studied from various perspectives. Nevertheless, consciousness remains as elusive and ephemeral today, as it did to Watson 60 years ago. If only we could leave this area of mind to philosophers as Dennett (1978) says: "Let them make fools of themselves trying to

corral the quicksilver of 'phenomenology' into a reputable theory" (p. 147). But I think Vygotsky was right. We cannot and should not ignore the problem of consciousness. Moreover, Vygotsky's legacy offers a number of insights which can render the research enterprise viable. I will elaborate on only three points. There are others that have been raised elsewhere (e.g., Luria, 1978; Wertsch, 1985; Zinchenko, 1985).

The first contribution Vygotsky makes is to suggest that we look at the problem of consciousness from a functional perspective. Vygotsky is alluding to a functional perspective in two senses. The first sense is what function does consciousness serve in humans and what is the functional relationship of consciousness to other mental functions. The second sense is to conceive of consciousness as an activity. As Luria (1978) states: "Consciousness is a complex form of organization of activity... Consciousness never was a primary 'inner state' of living matter" (p. 4). It is interesting to note that Piaget also believed that intelligence should be viewed as action and interiorized action that becomes operations.

Vygotsky's second methodological contribution, to the study of consciousness, is to advocate the genetic method. The fundamentals of this method have been discussed and summarized by Wertsch (1985, Ch. 2 and summarized on pp. 55-56). The genetic method is especially productive for dealing with the problem of consciousness because this method permits examining some of the basic relationships between conscious and unconscious processing and structures. Moreover, I believe, that through the understanding of these relationships much of the mysteriousness of consciousness will disappear.

The third important insight offered by Vygotsky is that consciousness must be viewed as a unified whole. Vygotsky proposed a hierarchical model of mind in which the components at one level of description become a part of a more inclusive component at the next higher level (see Wertsch, 1985, for example). At the highest level of Vygotsky's hierarchy is consciousness itself. This model enabled Vygotsky to study the full complexity of psychological functioning at its highest level, as well as the changing interfunctional relationship between the mental functions at lower levels.

I suggest we adopt this method and integrate the five dimensions of consciousness that have been

studied separately into a single unified hierarchical model of consciousness. At the highest level, as Vygotsky suggested, is consciousness. The next level is composed of at least two cognitive components³ whose interrelationship changes with development. These two components are two fundamentally different types of cognitive processes. The first let us call the "explicit" function and the second, the "tacit" function. The level below this level includes, again as Vygotsky has suggested the various cognitive functions such as memory, attention, perception, imagery or thinking.

The *explicit* functions are potentially conscious. They are voluntary, under control of the subject, require effort, serial and verbalizable and therefore the person can become aware of them. The *tacit* functions are inherently unconscious. They are involuntary, automatic (not under control and require little or no effort). In addition, we are unaware of the tacit processes because they are inherently inarticulate and parallel.

There is a dialectic relationship between the two types of functions. Initially the tacit function is dominant. Once the child or adult reaches a certain level of knowledge the explicit function becomes dominant. Ultimately both functions operate in unison. At this stage, we are aware of,⁴ can control, and articulate a small part of our functioning at any given moment. In addition, we can at will, with some effort, call forth additional functioning. Though even at this stage as Polanyi (1958) has pointed out, part of our functioning and knowledge remains tacit.

Notes

¹It is interesting to note that only recently has there begun to reappear any mention of the role of consciousness in skill learning. Psychological texts, as recent as the late 1970's, adroitly circumvent any mention of consciousness (for example, Wingfield, 1979, Ch. 6).

²The developmental relationship in their model is more complicated since unconscious processing appears whenever functioning is not at the optimal level that the subject is capable of according to the highest developmental level he has achieved.

³Vygotsky suggests that affect is a third component at this level.

⁴Vygotsky distinguished between "consciousness" and "conscious awareness" (this distinction is not always preserved in the English translation, see Wertsch, 1985). Conscious awareness which is achieved only at the third stage of development is that stage at which, according to Vygotsky (1934 [ms]), "true concepts" are achieved. In learning everyday concepts we go through the development as

described above with an initial dominance of tacit functioning. In the case of scientific concepts which are acquired at a later age, the interrelationship between the two types of functions is reversed. Initially the explicit function (through instruction) dominates.

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Lost for Words: A Vygotskian Perspective on the Developing Use of Words by Hearing-Impaired Children

Sheila J. White

Vygotsky was very interested in what he -- unfortunately -- called "defects." He founded an Institute of Defectology in Moscow, believing that the study of "defects" would illuminate our understanding of normal functioning. He was especially interested in the deaf because, for him, the deaf represented a population where certain types of verbal interactions were not available. Because they missed some aspects of verbal interaction, Vygotsky felt that deaf children were

... left to determine for themselves what objects to group under a common name, [thus] they [deaf children] form their complexes freely, and the special characteristics of complex thinking appear in pure, clear-cut form. (1962, p. 75).

Thinking in complexes had a very specific meaning for Vygotsky. It was the second developmental phase in the child's ascendance toward true conceptual development. The first phase consisted of the grouping or understanding of objects based on casual or transient coincidences (i.e., thinking syncretically or "in heaps"). By contrast, the second stage involved grouping of objects by "bonds actually existing between these objects" (ibid., p. 61). The bonds between objects in the creation of "complexes" are concrete and discernible by direct experience. Unlike true conceptual thinking -- which *transcends* the elements of the object under consideration -- thinking in complexes involves "merging with the concrete objects that comprise it" (ibid., p. 65).

Thus, a "complex" for Vygotsky, is a term meant to indicate that the child's grasp of word-meaning does not yet have full conceptual status. (In

fact, part of his definition of "full conceptual status" specifically entails its being able to be taught through language, which has implications for teaching language-disordered children.) By understanding Vygotsky's notion of the interdependence of thinking and speech, it becomes clear that one cannot serve a language-disordered population by attending *only* to the language problems. If language is involved, then there will be implications for conceptual development as well.

Vygotsky's work suggests that children who have a profound hearing impairment before they acquire language (the population with which I work) may experience a problem related to partial generalization structures. Under some conditions of language socialization, it may be common for a hearing impaired child to emerge with a limited grasp of words, remaining tied to a part of the concrete perceptible reality. The child would have difficulty re-ordering, re-interpreting, and going beyond the immediate. In other words, such children would not generalize.

It is easy to see how an early hearing loss could engender such a circumstance. Children with hearing losses experience a good deal of *irregularity* during their language-learning years if the people in their environment are limited to using oral languages with their reliance on acoustic signals. For example: if a deaf child is not oriented toward you when you are talking or if he is engrossed in something else, *all* acoustic information (linguistic or otherwise e.g., simplified speech or footsteps coming and going) will not reach him in a meaningful or regular way. (See also Wood, 1982.)

All children need a highly individualized and interactive setting as a basis for learning language. Whether that language is English or Chinese, Swahili or ASL (American Sign Language), it is always acquired over a period of many years. During those years, there are numerous repetitions of words and phrases which are uttered within highly routinized and familiar situations involving familiar individuals. (See, e.g., Nelson, 1985.) Further, those utterances (or signs) are usually delivered in a highly contingent manner with respect to what the child is doing. Deaf children are not exceptions to this universal language learning formula!

What are the consequences when the oft-repeated words and phrases are primarily available to a

deaf child in oral-aural form (compared to the manual-visual form of a language like ASL): for the child, the words are only half-heard one time, fully heard at another time, or not heard at all at yet another time. And what are the consequences of the absence of simultaneous presentation of stimuli? For example, when a hearing child is actively engaged in playing with something that his mother is commenting on, that child is being presented with several simultaneous sources of information: what he's doing, what he's seeing, how he's feeling, *and* what he's hearing his mother say. Such situations are routine for normally hearing children. Deaf children, with their limited ability to deal with acoustic stimuli, must disrupt their activities in such situations, often with only partial success. The result is that they get their language partially also.

As a result of these kinds of irregularities of socialization interactions, the linguistic marking of everyday experience can become problematic for a deaf child. A single word might be all that is available to "mark" objects and events which hearing language users would "mark" with many words; further, the use of that single word may appear stilted, unidimensional, and concrete. (Incidentally, this can be true for both signing and oral populations.) It is important to understand, however, that this is not a necessary concomitant of deafness: some percentage of prelingually deafened children do transcend these socialization problems. The reason why this percentage is small is twofold: First, fully 90% of all prelingually deaf children come from *hearing*, not from deaf, families (Schein & Delk, 1974); and second, deafness is not a visible disability. Because deaf infants look and behave much like hearing infants, and because hearing parents have no reason to suspect deaf offspring, deafness is not expected. Further, since most early interactions are very close-to (lots of cuddling, tickling, in-face games, etc.), parental interaction patterns are not altered to deal with the deafness and many mismatches between words and their referents can and do occur. With 90% of the prelingually deaf population potentially facing scenarios such as those described above, it is not surprising that a common result, when a deaf child reaches school age, is that he may have a vocabulary like a much younger hearing child. The real question is: what does he *really* have?

The example on the opposite page might be useful here. It is taken directly from a classroom observation of a teacher and three children (Andy, Bobby, and

Charles) who are in the middle of a Third Grade reading lesson. Charles is reading aloud and has misread the word "follow." (Please note that the dialogue is verbatim; the interpretations, or glosses, are mine.) The example is meant to show several things.

First, it shows that one can get an insight into a child's level of thinking by attending to his language use. In this case, the children are not thinking "conceptually" in Vygotsky's terms. In fact, it is a prime example of complexive thinking as indicated by the children's honing in on a single perceptual feature: closeness. This phenomenon is not confined to deaf children. The scene could just as well have taken place in a hearing classroom. However, it happens *much more often* with deaf children and goes on for a longer time, if it changes at all.

Second, the example also shows the difficulty of teaching verbally to a child who thinks complexively. The example is meant to instantiate a breakdown in shared meaning (that is, Teacher thinks that the children know, and then it becomes clear that they do not because they have not been using words in the same way). This type of breakdown can obviously hamper efforts to teach words directly.

Third, it points to the general difficulty involved in attempting to construct the appropriate contexts to help deaf children create word meaning. With our tendency to concentrate on what the child has and does not have, we overlook one half of the teaching/learning configuration: what the adult is doing. A major aspect of Vygotsky's theory is that learning is a *transactional process*. The child is only one half of an interacting partnership. The other half is the skilled "other." What the "other" does is to provide a scaffold (to borrow a term from Wood, Bruner & Ross, 1976) which facilitates the child's progress. Learning is not a simple transfer of knowledge, but a mediated activity which takes place in the child's "zone of proximal development" (Vygotsky, 1962, 1978). Adults guide the child through the zone, but it has not yet been sufficiently specified how they should do this. To the extent that adults do not know how to provide appropriate guidance, they, too, are "defective." The truth is that we do not yet know how to teach vocabulary to a deaf child.

Third Grade Reading Lesson

Speaker	Utterance	Gloss
Charles:	Yellow.	<i>the misreading</i>
Teacher:	What's that?	<i>clarification request</i>
Charles:	Yellow. (louder)	<i>C is not attempting to define the word, but assumes his speech is unclear</i>
Teacher:	Follow. Ducklings follow their mother in the water. I didn't circle it because I thought you knew it.	<i>(unfamiliar words are 'circled') T corrects and puts word into a context verbally (in a sentence form) and ideationally (into the story being read, "The Ugly Duckling")</i>
Charles:	Follow.	<i>repeats speech pattern</i>
Andy:	Follow.	<i>other child repeats it too</i>
Teacher:	What does it mean?	<i>now T is clearly asking for the definition to check comprehension</i>
Children:	(look like they are thinking)	<i>children are trying</i>
Andy:	(repeats the word three times)	<i>A thinks that repeating is answering the question</i>
Bobby:	Means go too close.	<i>B gives his definition</i>
Teacher:	If I'm first and I tell you to follow, what do you do?	<i>obviously, B's definition was not good enough (otherwise, T would have said right or "good for you"); T tries to get B to understand by embedding it in B's own experience</i>
Bobby:	Have to walk.	<i>B seems to understand</i>
All:	(get up and walk/follow)	
Teacher:	(instructs Charles to write it on the vocabulary chart)	<i>all is well ...But ...</i>
Charles:	(writes)	
Bobby:	Follow means together. (signs 'together')	<i>B seems to have understood only one perceptually salient part: the closeness</i>
Teacher:	Follow means coming after - not together.	<i>T corrects and redefines</i>
Bobby:	I know; (runs to the table and puts two trays that had been apart close together) that means follow.	<i>B demonstrates his understanding of the word -- which contains some elements of 'follow' but lacks crucial identifying information</i>
Teacher:	Okay, I'm going to follow you. Walk around the room. Go ahead (motions), I'll follow you.	<i>T recognizes the lack of understanding and tries again; this time tries to engage them more centrally in the action</i>
T and B:	(walk and follow)	
Teacher:	Now Bobby, you follow me.	
T and B:	(walk and follow)	
Teacher:	Okay, back to the story.	<i>Let's drop it now</i>

Direct Teaching of Words

What happens when a child is taught "a word?" Vygotsky has very definite things to say about this:

The teacher who tries to do this (the direct teaching of words) usually accomplishes nothing but an empty verbalism, a parrot-like repetition of words by the child simulating a knowledge of the corresponding concepts, but actually covering up a vacuum. (ibid., p. 83)

In other words, for Vygotsky, explicit instruction is possible only when a certain level of language and everyday conceptualization has already been attained. If that level has not been achieved, a vicious cycle is entered, often leading to frustration both for educators and children.

As a society, we handle the formal teaching of language in unimaginative and unproductive ways. Instead of trying to pinpoint the underlying reasons for a failure, *we teach to the failure itself*. For example, if the child doesn't know colors, we teach him colors; if the child doesn't know numbers, we teach him numbers; and -- applying the same rule -- if the child doesn't know words, we teach him words. However, teaching "words" is fraught with hazards precisely because, as Vygotsky states,

Word meanings evolve. When a new word is learned by the child its development is barely started... The development of concepts or word meaning presupposes the development of many intellectual functions... These complex psychological processes cannot be mastered through the initial learning alone. (Vygotsky, 1962, p. 83)

We have only to think back to our own experience in school to remember what happened when we hesitated over a word which had been on a vocabulary list the day before. The usual response to our hesitation -- "But we had that word yesterday" -- was not very helpful. When word meanings are not shared, it is difficult to impart them through language alone.

Differences in Degree or Differences in Kind? Implications for Remediation

Consider a deaf child confronted with problems in sharing communication because his/her "words" match those of the teacher or parent only in limited ways. Vygotsky has put this issue in the forefront of his psychology and it has wide-ranging consequences for remediation efforts with language disabled children in general, and with deaf children in particular. Vygotsky's claim that *word meaning develops* is intuitively satisfying to developmentalists with an "environmental" or "nurturist" bent. However, that claim has become the center of controversy for others who are more "maturationally" or "nativistically" oriented. For example, Fodor (1972) states:

... if the conceptualizations of children are radically different from those of adults, it is extremely difficult to imagine how children and adults could ever manage to understand one another. All the more so if the alleged differences are supposed to be differences in word meanings, for that is to say that adults and children are, in a fairly strict sense, talking different languages; a situation only barely disguised by the similarities of the phonological and syntactic system the languages employ. (p. 87)

Compared to what Vygotsky "buys us," this is a very trivial criticism: To concentrate on overt similarities is beside the point. Mynah birds and parrots can display phonological and syntactic forms found in human oral language, but one would not make much of their linguistic prowess! The main point is to understand what are the real differences and real similarities between adults and children. Fodor's position is a natural consequence of a philosophy which sees differences between adult and child functioning as differences in *degree* and not as differences in *kind*. As Fodor puts it, "How, after all, could this fail to be true? We are related to our children" (ibid. p. 93).

It is *precisely Vygotsky's claim that adults and children function in qualitatively different ways*. In attempting to account for the mechanism which allows communication to proceed between adults and children, he states:

... at the complex stage, word meanings as perceived by the child refer to the same

objects the adult has in mind, which ensures understanding between child and adult, but the child thinks the same thing in a different way -- by means of different mental operations." (Vygotsky, 1962, p. 69)

So, it is not the overt similarities, but the covert differences that have to be understood in order to get at what children "have" and what adults must do. Vygotsky's position accounts for how adults and young children communicate by the surface sharing of verbal forms. For my purposes, there are very real issues here -- not just philosophical badinage. The position you take on the "degree" or "kind" issue has profound implications for remediation if you are working with language disordered populations.

If you are in the "degree camp," you would most likely refer to your population as "delayed." (That is, you would view any difference as one of degree, not of kind.) You would plan your remediation tactics along so-called normative lines and expect your population to "catch up." On the other hand, if you are in the "kind camp," you would refer to your population as different; that is, differences are seen as those of kind, not of degree. In this camp, remediating would involve trying to identify and to harness the differences, in order to bring them into meta-awareness for both yourself (as teacher) and for the child (as learner). The trouble usually resides in defining what the differences are. However, until those differences are defined, how will adults be able to guide deaf children?

Concluding Comments

The difficulty in defining differences is clearly illustrated when working with deaf children, for the issues stand out in bold relief. While Vygotsky's approach does not offer solid solutions, it does offer a solid philosophical approach. It allows one *at least* to recognize that there *are* different levels of attainment of word meaning. The differences between these "levels" may not be immediately apparent from surface inspection alone, but burying one's head in the sand doesn't help much either. Vygotsky states:

The mutual understanding of adult and child creates the illusion that the endpoint in the development of word meaning coincides with the starting point, that the concept is provided ready-made from the

beginning, and that no development takes place. (ibid., p. 68).

In my view, this quote contains the essence of why the Vygotskian approach can be used to illuminate our efforts when working with problems in the acquisition of language.

A key consequence of Vygotsky's approach is the implication that by examining a child's range of use of a word, it is possible to get an insight into the scope of his conceptual grasp. For example, while "being together" is certainly one aspect of "following," it is still very bound to concrete perception. If a child is left at the "everyday" conceptual level, as many deaf children seem to be, then reordering of events or interpretation of events may not be an easy task. While there are no easy solutions, this understanding ensures that we do not waste valuable time in wrongly targeted remediation efforts. It also serves to maximize the potential of individual children -- an aim which Vygotsky strived for in his short lifetime.

Note

I want to thank Sylvia Scribner and the members of the City University Graduate School *Seminar on Vygotsky*. In particular, I want to single out Edith Laufer and Armonit Roter for their unique input. Thanks also go to the children and Staff of the Lower School at the Lexington School for the Deaf.

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Discussion

Katherine Nelson

There are so many interesting ideas to pursue in these papers -- I feel privileged to have a glimpse of some of the issues discussed in this year-long seminar. Two themes that I am particularly drawn to that are played out in different ways in different papers are those of (a) the importance of *systems* in language and thought, and (b) the role of consciousness, of making thought explicit.

The first theme includes the idea that with development there comes a restructuring of the conceptual system. This proposition is addressed by Di Bello and Orlich in their consideration of the novice-expert shift hypothesis, as laid out in Susan Carey's (1985) recent book. Di Bello and Orlich wonder what mechanism lies behind the shift from a "natural" system resting on basic ontological categories -- which define general domains in the young child's thinking -- and the emergence of reorganized specific domains. They note that Carey (following many others including Piaget) seems to imply that a child can create a scientific theory in the absence of instruction and interaction, a notion that they and I find difficult to accept. They note a weakness in the Vygotsky description as well, however, in the imputation that the young (pre-conceptual or spontaneous conceptual) child's thought is unstructured or unsystematized. Rather, they suggest, there is a different system, perhaps reflecting basic ontological categories. I would agree that there must be a beginning system, and would emphasize that identification of its properties is essential to our further understanding of conceptual development. In addition, we need to understand how the initial system may be transformed through encounters with the formal systems in specific interaction, whether explicitly instructional or not. This point is addressed by Di Bello and Orlich as well, but I defer consideration of it to the second theme mentioned above.

Sheila White's discussion of the concept-word relation in the education of deaf children is also relevant to the issue of systems and raises a number of important questions, but I have the feeling that it will be very difficult to get a handle on them. She is certainly right in pointing out that 9-year-old deaf children

are not the equivalent of 4-5-year-old hearing children, although their language competence may appear similar. But the difficulties she describes in teaching word meanings to deaf children suggest two implications that should be seriously considered: (a) Language enters into the reconstruction of thought long before the stage of scientific concepts, and it is this specific language deficit that makes 9-year-old deaf children unlike hearing children of any age with regard to word learning; (b) Instruction *through* language cannot take place until a certain level of explicit knowledge has been reached. A similar position is considered in the other papers, and is the topic of my next comments. But it should be emphasized that both of these implications demand further intensive investigation. Their importance has been generally unrecognized in developmental research.

The second theme of consciousness, explicit knowledge, and the role of language is discussed by Roter, by Di Bello and Orlich, and by Elena Levy. Di Bello and Orlich ask:

What is special about instruction, practice, and the other forms of discourse involved in schooling? We propose here that the very act of making one's current understanding explicit, through speaking, writing, or in discourse makes one's concepts accessible to the kind of processes necessary for reorganization. Through discourse the learner's concepts are gradually reorganized to match the formal system being acquired. (pp. 98)

They go on to emphasize: "formal systems cannot be acquired implicitly..." and further that the process of instruction "acts as an essential bridge between a primitive understanding and a fixed culturally formulated theory, enabling acquisition and eventually in depth understanding, or 'making the concept one's own'" (pp. 99). This is a very important conceptualization of the dynamic relation involved. I would just add that once this process is under way the individual learner can also manipulate and reformulate in an explicit manner, not dependent upon explicit instruction, yet still dependent on explicit formulation -- resulting in individual contributions to, or construction of, a knowledge system.

Elena Levy discusses the evolution of discourse in relation to the emergence of "conscious awareness

and volition" in the adolescent. The analogy she sets up between discourse and word meaning in terms of the move from complexes to concepts is provocative. The claim that "the creation of meaning in discourse emerges through the use of speech itself" seems just right, with important implications. In her description, the development of thematic structure in discourse is essentially the development of spontaneous concepts of socially-constituted discourse types -- in contrast to non-spontaneous concepts. This way of viewing the matter has interesting implications for studying the development of discourse skills. But what I want to emphasize is her last point, that although our discourse is rarely planned in advance, we tend to perceive it as planned. There is then a contradiction between our organization and our perception that may have a counterpart in the contrast between the child's spontaneous and non-spontaneous concepts. Only the planned aspects of speech -- or non-spontaneous concepts -- are available for conscious reflection. Here it seems to me all the themes come together: non-spontaneous concepts within a culturally-constituted and shared system, made explicit and subject to conscious reflection.

As these papers suggest, these ideas that I have so briefly touched on hold enormous potential for understanding developmental processes, that as yet have not been sufficiently utilized and appreciated in developmental theory. These studies are, I believe, representative of a welcome renaissance of taking Vygotskian ideas about semiotic mediation seriously and doing serious developmental work with them, to the lasting benefit, I am convinced, of the study of cognitive development.

Note

Remarks prepared for the year-end Vygotsky symposium, CUNY Graduate School and University Center, May 1986.

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Work-in-Progress

Facing the Future in Development Reflections on the Zone of Proximal Development

David Middleton
Derek Edwards

A weekend workshop was held at Loughborough University to discuss the study of the development of psychological functioning in relation to practical contexts. Short position papers examined the use made in our own research, and in the Western European tradition, of concepts and methods derived from the socio-historical studies initiated by Vygotsky and his colleagues within the Soviet Union, particularly the current and potential use of the notion of the "zone of proximal development" (henceforth, ZOPED). The growing volume of scholarship in this area has motivated a re-appraisal of the relationships among methods, theory, and practice in the study of learning and development. Have socio-historical concepts *in fact* been incorporated into Western European thinking in such a way as to radically shift the theoretical and methodological focus? The overall issue is whether a genuine shift is being achieved, away from development as an individual enterprise, toward development as grounded in and bounded by socio-cultural activity. Within the European context, there has been little attempt to evaluate the assimilation of "Vygotskian" thinking and the use of specific concepts such as the "zone of proximal development" within either theory-driven or need-driven (practical/applied) studies of development.

Our aim, in the workshop and in this article, is to attempt to remedy that situation, and to communicate our activity beyond our immediate confines. The Newsletter, with its emphasis on inter-cultural discussion of developmental studies and issues, offers the ideal medium for extending the discussions initiated at the workshop. We elicit commentary from interested colleagues so that a broader group can pick up on the issues and join the discussion with examples from their research in allied areas. Should this happen then we would hope to be able to incorporate these contributions within the structure of our future activity (research, writing and communications). The

publication we intend to produce initially will elaborate the major themes that emerged in the workshop's discussion, and especially, how those themes can be applied within particular areas of practical research. Anticipating that some readers not present at the workshop will be interested in joining our colloquium, we here provide more informational context about the participants and issues involved in our workshop.

Although the workshop was held in England we have participants that represent research beyond the limits of the United Kingdom. Michael Cole (University of California, San Diego) provided a North American perspective; Yrjö Engeström (University of Helsinki), a Scandinavian view. The rest of the participants were drawn from the UK. They included David Wood, John Shotter and John Newson (Nottingham University); Charles Crook (Durham University); Andrew Lock (Lancaster University); and from Loughborough University, Michael Billig, Derek Edwards and David Middleton.

The following are the main themes that we identified. We offer them as a framework for further discussion of the use of the ZOPED concept within people's research work.

- (1) The prime importance of identifying the main *mediational instruments* within the various activities to which the ZOPED concept is applied.
- (2) The usefulness of expanding the ZOPED concept *beyond* the context of the *inculcation of novices into pre-existing domains* of cultural activity. The concept has certainly found application in Western discussions of the role of social interaction as a transitional "aid" in the development of individual mentality during some process of becoming an independent thinker or member of the culture. However, many feel that the concept has the potential to be expanded to contexts that do not necessarily reflect fixed asymmetries of expertise or maturity. To interpret what happens within the ZOPED as essentially a social prosthetic or temporary structure (scaffold?) that is dismantled or grown out of as we achieve mature independent functioning removes the concept as an explanatory tool for understanding the joint, distributed and inter-mental nature of cognitive functioning in its "mature" forms throughout life. In other words, the ZOPED is a concept that, in the way it conceives of the

social and semiotic basis of learning and of mind, may be applied beyond some period of initial growth and development. However, such extensions of the ZOPED notion may be unwelcome over-extensions, perhaps losing the essence of the process in the pursuit of generality.

(3) Extension of the ZOPED concept to include situations where asymmetries of competence are locally established in the joint definition of the task at hand leading toward an *account for novelty and creativity* both at the individual and the societal level of analysis. As such the ZOPED can be used as a conceptual tool in the analysis of practice within activity systems that have no known future, in areas where culture does not come so clearly ready-made for the learner.

(4) An examination of the *historical dimension* of learning and development outlined by Vygotsky. We undertook to consider how issues of phylogeny, socio-cultural history, individual history (ontogeny) and what has been termed micro-genesis enter into our use of the ZOPED concept within domains of research with which we are each concerned.

(5) An examination of the notion of "*structuration*," in which there appears to be a developmental necessity or inevitability that underlies the order in which various cultural forms emerge, at all levels of development, from the phylogenetic (plants-animals-carnivores) through the cultural-historical (e.g., the dialectical process itself, and the development of writing systems from representations of whole words, through syllables, to phonemes), to the individual level (e.g., the dialogical origins of thinking and reasoning).

We intend these themes to provide the basis for a common framework for discussion across a variety of practical contexts. Listed below are the interests of the workshop participants.

Studies of work contexts; including the creation and evolution of new forms of working practice within the health services in Finland and the UK.; the development and the evolution of entrepreneurial skills within small organizations initiated by the recently self employed.

Studies of educational practice; the creation of joint understandings between teachers and pupils; the remediation of learning disabilities in the area of

literacy and numeracy; the use of drama, role playing and drama therapy with children with severe communication difficulties; the nature, definition and translation of impairment into handicap for children with auditory difficulties; the use and implementation of new technologies in the classroom as means of promoting model learning systems.

Studies of development and learning throughout life; including the analysis of conversational rememberings in children, parents and in the elderly.

Given the themes of discussion and the areas of research already listed in addition to any further contributions from readers of the Newsletter we hope to produce a fairly comprehensive review of the state of the art in the use and extension of the ZOPED and other relevant socio-historical concepts. We would welcome any comments, observations and suggestions concerning our outlined intentions. We would like in particular to hear from anyone who has extended the range of application of the concept to research contexts that are developmental yet not necessarily focussed on children and apprenticeship. More than welcome would be commentaries that point out our lapses or question the value or validity of the issues we outlined above. Anyone wishing to join the discussion is invited to send their comments to LCHC and to us directly in the UK. Both conventional mail and electronic mail are welcome. The details of our various mailing addresses are given below.

David Middleton
Department of Human Sciences
Loughborough University
Loughborough, Leicestershire
LE11 3TU
UK
Email: DJMiddleton@lut.multics.arpa via ucl.cs.UK.AC

Derek Edwards
Department of Social Sciences
Loughborough University
Loughborough, Leicestershire
LE11 3TU
UK
Email: DEdwards@lut.multics.arpa via ucl.cs.UK.AC

Conference Report

Arts and Cognition

Michael Cole
Howard Gardner
Yutaka Sayeki

In the spring of 1986, a group of social scientists met at the Harvard Graduate School of Education to discuss issues in learning, development and educational practice. Sponsored by the Social Science Research Council, the group consisted of five Americans, four Japanese and one Finnish scholar.

The participants were:

Michael Cole, University of California, San Diego;
Yrjo Engeström, University of Helsinki;
Howard Gardner, Project Zero, Harvard School of Education;
Kumiko Hiromatsu, Tokyo School of Education;
David McNeill, University of Chicago;
Kyotaka Miyazaki, University of Tokyo;
David Perkins, Project Zero, Harvard School of Education;
Yutaka Sayeki, University of Tokyo;
Takao Umemoto, Konan Women's College;
Merry I. White, Harvard School of Education.

Their point of departure was the topic "cognition and the arts." This report summarizes the events leading to this topic as the focus of joint discussion, the major themes that arose during the conference, and their possible implications for broad educational accounts of learning, teaching, and development.

Background

This conference was the most recent in a long series of activities bringing together American and Japanese social scientists around problems of child development and education. A common concern uniting the groups is the limitations of their respective educational systems as environments for maximizing human potential. This failure manifests itself in a variety of ways; for example, school dropouts, unacceptably low levels of academic achievement, alienation of youth, and inadequate preparation for later work.

Prior meetings among Japanese and American social scientists, some of them organized collaboratively by LCHC, have explored a range of topics relevant to issues of culture, development, socialization and education. Earlier conferences in which members of LCHC participated focused relatively narrowly on particular lines of research involving the technologies of instructional interaction. Among the technologies were computers, print literacy, and television. But almost immediately we found ourselves adding another kind of technology, centering on an understanding of the context of instructional interaction and problem solving. Both sides found that the other had many complementary insights to offer. As these discussions evolved, attention focused on the theoretical/practical problem which the Japanese called "learning with understanding."

Our conversations had made it apparent that the concept of "understanding" in the study of cognition within American cognitive science seems to lack an important aspect of human cognition that has long been acknowledged in the Japanese tradition. Understanding is more than "declarative knowledge" and more than "procedural knowledge," i.e., more than articulations of truth conditions and the like and more than appropriate use. Understanding is also appreciation of the knowledge and its uses, as well as of their significance to the "understanding person" and his fellow humans. For an example of the American-Japanese contrast, consider the so-called "symbol system." The usual American case of the concept of a symbol does not include the uses of the "symbol" in aesthetic contexts in which even one representation implies an indefinite number of meanings or possible interpretations. The Japanese viewpoint says, yes, the human is a symbol-manipulating mechanism; but the human is also symbol-generating, a creating mechanism; we interpret symbols in a variety of creative ways. The "creation" and multiple interpretations are not "addenda" for super-users or experts, but are an essential part of the very elementary entry-points of novices who must, in the Japanese sense, "understand" from the very beginning.

The American participants have framed the problem in a complementary way. Our educational practice suffers from the application of psychological theories that push the "basic skills" idea to its limit, creating analytic dichotomies like "higher order" vs. "rote" thinking, "decoding" vs. "comprehension" and Arthur Jensen's Level 1 - Level 2 hypothesis. The

Japanese emphasis on "learning with understanding" resonated among the American cognitive scientists, where one hope of new computer technologies is to defeat rote acquisition of knowledge. By the common analysis of the two groups, the process of "learning with understanding" *cannot* be reduced to a set of propositions, nor a series of procedures, nor the so-called "basic skills" made up of cognitive components. One of the joint concerns that emerged as a result of these discussions among the two national groups at a theoretical level was to promote the creation of a cognitive science adequate to addressing our common theoretical and social concerns from our two different perspectives.

In prior discussions of these issues, the organizers of the present conference found ready agreement upon a common topic of concern (identified here as the excessive tendency to rote education). However our ideas about the nature of rote learning in classrooms and the sources of rote learning in the broader cultural context were quite different. Consequently, an approach to the topic which made contact with the larger cultural context was sought. After much discussion it was decided to address the problem *indirectly*. Instead of concentrating on psychological theories and educational practices where rote learning was of fundamental concern, we decided to focus on one area of cultural practice, the arts, where creativity is a central value. We hoped that this indirect approach would allow us to contrast the usual modes of teaching and learning for the universal basic skills of literacy, numeracy, and technology with the teaching methods and skills involved in artistic activity. This orientation suggested new questions to be addressed in our conference. Could we significantly enrich cognitive science and educational practice by understanding cognition as *creative* activity? Could we benefit from analyses of the different methods of understanding fostered by different cultural practices (schooling, the theater, music, etc.). We believed the answer was "yes" and this conference resulted.

The Conference: Main Themes

Creativity, innovation and mastery. A major topic of conversation throughout the conference was the similarities and differences between Japanese and American conceptions of the path to mastery. In the opening paper, Merry (Corky) White discussed American criticisms of Japanese educational practice and its problematic relationship to Japanese reality.

Americans, she said, criticize the Japanese for

- (1) centralized educational control and lack of individual choice;
- (2) the adoption of uniformity as educational policy and cultural ideal;
- (3) the celebration of obedience to received opinion;
- (4) "inhuman" efficiency.

These criticisms, while having some basis in the realities of Japanese life, are not generally valid, Dr. White pointed out. Even when these characteristics are observed, their meaning in the overall context of Japanese culture is not what Americans take it to be. For example, in many cases where Americans see uniformity and obedience, the Japanese see the encouragement of cooperation and commonality. The forms of activity which Americans see as creative, Japanese view as overly individualistic; they prefer joint accomplishments of valued goals over individual variations. Dr. White pointed out that the Japanese believe that the freedom to create comes only after mastery of traditional forms. Put differently, that one must first learn to "see form" and then to "see through it."

Kumiko Hiromatsu distinguished two aspects of the construction of mastery in teaching traditional Japanese arts. *Katachi* refers to procedural knowledge of how to carry out a performance, while *kata* refers to contextualized knowledge that is needed to transform the bare bones of the *katachi*-based performance into masterful performance. Ms. Hiromatsu likened the concept of *kata*-based performance to Marcel Mauss' concept of "habitus," the modes of life of a people. The *kata* aspect of mastery is achieved by incorporating the novice into the life world of the master. To acquire *kata*, novices therefore live with the master and others, both highly accomplished adults and other novices.

It is sometimes said that "*katachi* should proceed *kata*" and so it may appear that first one should learn the decomposable, "rote," aspects of performance before being exposed to the "higher order" aspects. Discussion revealed that while *katachi* aspects of skill may be the first to be mastered, both *katachi* and *kata* learning proceed in parallel as integral parts of the teaching-learning process. It is the fusion and interpenetration of *katachi* and *kata* that is essential to mastery. *Katachi* learning may appear to be "rote" practicing until the mastery of a basic form. However, what is mastered in *katachi* learning is not a

component, or a part, of performance decomposed into elements. Rather, mastery requires various potentialities in performance to be associated later with *kata*. The association with *kata* through *katachi* is to be attained not by piling up *katachis* but by habituating to the way of life so completely that the student can come to "breath in accordance with the choir of masters."

In Ms. Hiromatsu's discussion, mastery was a key concept, but creativity was not. In discussion of both the White and Hiromatsu papers, it became clear that the issues being discussed in terms of "creativity" by the American contributors do not translate directly into Japanese. The Japanese concept of "mastery" (*meijingei*) implies flexibility, deep understanding, long practice, and fusion with "habitus." Creativity is seen as a byproduct of mastery. The concept corresponding to creativity in Japanese comes in two forms, neither of which are traditional Japanese words: "*dokusou-sei*" refers to a quality of individual nature while "*souzou-sei*" refers to the social valuing of the manner in which an action considered "creative" is carried out.

Talks by Howard Gardner and David Perkins each elaborated directly on questions raised by the differing conceptions of processes leading to mastery, valued mature performance, and creativity. Dr. Perkins's discussion of creativity emphasized its close alignment with the concept of criticism. In traditional Japanese performance education, criticism is virtually absent. Question asking is disapproved of -- one should learn by "stealing" the arts of performance through "teaching without teaching."

By contrast, in Perkins's conception, creativity and criticism are linked; both go through the same series of transformations. There is a didactic stage in which the learner must obey and conform, then a stage of analysis when the learner must work out what is to be done to fill gaps between the sought-after-goal and current accomplishment, then a cybernetic phase where gaps are perceived rapidly, and finally a ballistic phase where the learner has mastered (internalized) the flow of activity. What distinguishes creativity from critical thinking in this process is that the kind of thinking called "creative" goes beyond given boundaries, either by breaking a paradigmatic way of understanding or by revealing new potential within a paradigm. Unlike the Japanese conceptions of mastery and *kata*, Perkins's conception of creativity posits the possibility of identifying an individual product as creative prior to mastery

and independent of the domain of activity. A good deal of discussion focussed on this issue of generality vs. specificity of creative thinking and the measures that would be needed to decide between alternatives.

An important and possibly universal pattern in the development of creative behaviors was described by Gardner. Citing evidence from the use of figurative language and the development of skill in drawing, Gardner recounted how he and his colleagues have found that young children often exhibit important features of creative artists, such as a pleasure in exploration, a willingness to transcend conventional boundaries, and a sensitivity to synesthetic elements. When children enter middle childhood, they typically begin to conform to compelling cultural conventions and adult standards; as a result their aesthetic activities tend to be concerned with what is literally correct, and not with innovative or flavorful productions. Only in a minority of students does a creative spark remain alive, to be reactivated during the preadolescent and adolescent years.

It may well be that this U-shaped curve is encountered all over the world. Gardner reviewed his observations on arts education in China, where adherence to cultural conventions is stressed and taught from an early age. This emphasis results in products which are technically expert but often devoid of flavor and originality. There has been an upsurge of interest in creative activities and products in China but it is still unclear how these concepts are apprehended in that cultural context.

Activity-based instructional conceptions. Embedded in the previous discussion about creativity and allied conceptions is considerable uncertainty about the sequence of instruction and the path to mastery. Is one to seek a strict ordering of instruction (as one interpretation of the expression "katachi before kata" and Perkins's sequence of stages in mastery of critical-creative thought imply)? Or is simultaneity of higher and lower (kata and katachi) aspects of learning to be sought?

Activity-based approaches to cognition and the arts choose the second path and suggest interesting ways in which activity systems based on art can be profitably used in basic skills instruction. Michael Cole spoke of the dramatic metaphor in educational practice. In the case of children who have not learned to read with comprehension, uni-directional

developmental stage models have little to offer to educational practice. There is no adequate declarative theory of reading comprehension which could be applied as a basis of formulating direct exercises. And the stage models contain no explanation of the transitions between the stages or the role of the teacher in the teaching-learning process. Instead of dividing comprehension into a series of separate tasks, Cole and his colleagues have used meaningful total activity settings or "model systems" where reading for comprehension is structured collectively and dramatically. A system of "question-asking-reading" was demonstrated, involving a group of children and guiding adults who work through a meaningful text according to a script which determines the roles and tasks of each participant. In an activity context like this, reading comprehension evolves from the main idea of the text to the constituent details *and* from the parts to the whole at the same time. A change may be observed from external motives to a phase where comprehension itself has become the motive of the activity.

Takao Umemoto distinguished between four levels of musical cognition in the light of experimental data. The lowest level was that of individual sound with corresponding pitch, loudness, timbre and time. The highest level was that of the idea or image of the title, motive and theme of the whole musical composition. The highest levels represent comprehension, the lowest sensation. But the development and learning of musical cognition do not proceed in a uni-directional manner from the low to the high levels. The Suzuki method of music instruction demonstrates the necessity of proceeding simultaneously in both directions: from an overall idea of the piece of music to its individual dimensions and sounds -- and vice versa. Only this way can the katachi and kata of music be gradually integrated.

Yrjö Engeström discussed Stanislavsky's theory and practice of theatre as an activity system. He emphasized that from the perspective of an activity approach to cognition, human beings are not only tool users but necessarily tool creators as well. For Stanislavsky, theatre was not only production of performances but also production of its own instruments. The most powerful instruments are physical actions through which inner feelings are captured and communicated. The "superobjective" of the role or play -- roughly corresponding to the highest level of musical cognition in Umemoto's system -- determines the line of action and makes a truthful performance possible.

Theatre may be conceived of as collective worldmaking. For educational purposes theatre may function as an ideal model system, being compact and complex at the same time. However, theatre may become a closed system if its tension-laden relations with the life of the audience, with social reality, are overlooked.

These ideas resonated with Kumiko Hiromatsu's analysis of traditional Japanese dancing, Noh play, and Sumo wrestling. The novice not only acquires the elaborate techniques of performance through arduous exercises, but, by living in the world of the activity in question, novices acquire a deeper understanding of the art form, become able to adapt themselves to the total atmosphere, and understand the meaning of each action of the participants.

The cross-breeding of various artistic instrumentalities and educational activity demonstrated in these four papers indicates that art has a powerful potential for breaking the mechanical uni-directional ordering principles of traditional instruction. Furthermore the papers demonstrated the importance of contextually embedded uses of art in education. In other words, art may not reach its educational potential if it is treated as just another content or subject matter to be transmitted.

Symbol systems and situations. Three papers concentrated on the nature of symbols systems and strategies for making meaning.

Yutaka Sayeki contrasted two kinds of symbols systems. "Computer-like symbols" share three properties of special concern: all symbols are of equal importance in the interpretability of a proposition (an error in a comma is as damaging to the operation of a program as an error in an entire lexical entry); meaning is derived through the syntax of the language; and computer-like symbols are "solipsistic" in that they start and end in the predefined world of the program. Sayeki contrasted computer-like symbols with "sketchy symbols." Sketchy symbols have cues that remind one of the primary reality that they are intended to represent; they are representative too in the sense that they function as media of interaction and examination from different points of view; they are invented by individuals (e.g., constructed); they are non-solipsistic; and they coordinate different points of view. Sayeki illustrated this contrast with several examples taken from engineering drawings, arithmetic, and logo programming. In each case, the symbol serves as an inter-mediating abstraction which retains the individual's

intuitive understanding of the objects being represented while making contact with standardized (computer-like) symbols.

The paper by Kyotaka Miyazaki took as its object the process by which people understand literary texts. Basing his analysis primarily on very old Japanese poetry (Waka and Haiku), Miyazaki explicated a strategy of meaning making that he called the "appearance first" strategy. The essence of this strategy is to evoke the inner feelings of the author through a description of the primary situation of the subject matter of the poem. For example, the initial line might read, "With her, no night of love is mine tonight." It is followed by a second idea unit describing the situation of the subject, "On the field of withered pampas grass, the moon is sinking behind the mountain." Miyazaki argued that the strategy embodied in such poems is to put the reader in the situation of the subject, providing a constrained point of view which, when adopted by the reader, leads to deep understanding of the poem. He also introduced examples of teachers using the "place yourself in the place of a character and imagine the appearance of things" strategy to help young children gain deep understanding of stories.

David McNeill talked about the role of gesture in meaning making. His examples showed how the meaning carried by gestures represents aspects of the primary situation being represented by speakers that are not recoverable from their spoken language. In the examples given by McNeill, gestures played a role similar to Sayeki's sketchy symbols. They retain aspects of point of view and the dynamics of meaning making that are lost in the reduction of the inner sense of the speaker into culturally conventional oral speech.

Questions of methodology. Taken as a whole, the papers at this conference raised many questions about the appropriate methodology for the study of cognitive processes. Creativity and artistic expression, while requiring mastery of conventional symbol systems, by their very nature open up new potentials within the symbol system that provide people with alternative views on reality. As a consequence, standardized methods of testing, or rigid task analyses, appear inappropriate to understanding the basic processes involved either in mature performance or in acquisition. Howard Gardner sounded a common theme when he said that in his work on testing for artistic ability, he found it necessary to merge assessment with curriculum design. This amalgam, which

fuses evaluation with teaching, means a commitment of time and resources that go beyond currently accepted procedures. This same strategy was adopted by Cole in the work with children experiencing reading problems; the activity setting that he and his colleagues constructed served simultaneously as a context for detailed diagnosis of individual children's problems and the remedial environment to overcome those problems. The example of learning in the theatre provided by Engeström is an extreme case of learning and evaluation *in situ*.

A second general methodological point arises from the inherently interactive nature of the processes being discussed. Perkins, for example, emphasized the dual nature of creativity, one part of which consists of the process by which individuals arrive at a new way of doing things, the other part of which consists of cultural evaluation that determines if the product of deviation will be forgotten as a mistake or taken up and valued as a new cultural means of meaning making. Hiromatsu's description of the role of life in the collective company of masters and apprentices, and methods

such as Suzuki's music instruction, also rely heavily on the process of acquisition as one involving multiple participants in different roles. At present there is no generally acceptable methodology for specifying how individual psychological processes are developed in such interactions.

Finally, the conference forced all participants to struggle with the way in which basic terminology for referring to cognition and the arts is, in a sense, fundamentally untranslatable. For example, several of the key Japanese concepts for thinking about this domain of artistic activity (including the terms glossed as "creative," *kata*, and *katachi*, to name a few) were not really translatable into English. One major problem was that the entire conception of the relationship between the individual and the social unit is very different in the two cultures, as is their relationship to technology, tradition, and authority. The gradual working through of these problems to arrive at the complexities of each side's world views as they influenced their theories of culture and cognition provided some of the most thoughtful moments in the conference.

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