



THE QUARTERLY NEWSLETTER OF THE  
*LABORATORY*  
*OF*  
*COMPARATIVE*  
*HUMAN COGNITION*



Volume 14, Number 1

January 1992

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# THE QUARTERLY NEWSLETTER OF THE LABORATORY OF COMPARATIVE HUMAN COGNITION

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# Introduction

The contributions to this issue of the *Newsletter* highlight the broad conception of the term "comparative" on our masthead in an interesting way. Four markedly different topics are addressed by authors of three different nationalities.

Matthew Edgeworth provokes us to think about the multi-layered process(es) of sociocultural construction that are involved in the work of archaeologists seeking to gain understanding of the lives and natures of our distant ancestors. The process of discovery of their material artifacts and re-construction of their life worlds is, he points out, a process of re-discovery which shares important properties with its ancient predecessor. His argument and examples illuminate for us the way in which "in the act of discovery the object is re-appropriated and cognitively re-fashioned, according to the projects of the archaeological community in the present day." And, we might add, according to the projects of each of us in our daily activity.

Erik Axel uses the occasion of the publication of Tolman and Maiers' book on Critical Psychology to explore the relationship between the cultural-historical school of psychology in Russia and the development of Critical Psychology at the Free University of Berlin. Many issues of long-standing interest to readers of this *Newsletter* are touched upon in Axel's discussion. Perhaps of special note in light of current efforts to bring emotion back into cognitive psychology is his discussion of the way in which German Critical Psychology has enlarged upon Leont'ev's version of activity theory to make emotions a central topic. Axel's discussion of contemporary Critical Psychology, with its emphasis on expanding the category of subjectivity also fits well into current discussions of Russian psychologists in the post-Soviet period. Concern about the calculus of individual-social relations appears to be a natural outcome of the rearrangement of global politics and their ideological underpinnings.

Stig Brostrom also begins his discussion with Vygotsky and Leont'ev, but it is their student Daniel El'konin, who provides the springboard for his discussion of play as the leading activity of early childhood. Significantly, in light of Axel's discussion, is Brostrom's emphasis on the way that needs and motives are central to the developmental significance of play. Not only does play separate object and meaning, it provides the basis for the development of conscious motives, laying the foundation for the leading activity to come—learning.

Phil Agre's discussion of technical language addresses another topic of longstanding concern to *Newsletter* readers—the opposition between "scientific" and "everyday" thinking. In his critical analysis of this distinction, Agre notes the way in which technical discourse marks itself as superior to (or, more neutrally, "privileged," a term favored by *Newsletter* board member James Wertsch) "everyday," "ordinary" discourse. His conclusion, that critical theory should be used to identify the multiplicity of discourses and to re-examine the suppositions that result in privileging one over another, provides a fitting end point for the current set of articles, one that sends us back to the beginning to re-consider the process of discovery and re-discovery to which Edgeworth directed our attention in the opening article.

Michael Cole

## Analogy as Practical Reason: The Perception of Objects in Archaeological Practice

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Archaeological inference is normally regarded as a wholly theoretical concern—a matter of argument, logic and the justification of propositions. In this paper, inference will be discussed on a very different, more practical, level—not so much something that is written or argued, but rather as something that people *do*. So I shall shift various questions of inference away from the world of texts and theories, and relocate them in the world of practical action and the everyday events of excavation.

One reason for this strategy of bringing theory down to earth, and grounding it in the practical events which occur *on the ground*, is the sheer intransigence of theoretical problems, when dealt with solely on a theoretical level. Take the problem of analogy as an example. It tends to be framed as, "How can we use ethnographic analogies to shed light on archaeological data?," or "How can we interpret archaeological data without using analogy?" (for a critical review of treatments of analogy in archaeology, see Wylie, 1984). But supposing, in the events of excava-

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0278-4351/92/1-3 \$1.00 © LCHC

tion, that the very act of perception is an analogical process, that analogies—drawn from our own experience—are embedded in the observation, manipulation and recording of material remains. This would mean that the data which are the basic units of theoretical analysis are themselves analogical products. To give an adequate account of the role of analogy, then, we would have to move onto the *other side* of data. We would have to look at the processes of the production of data, in excavation practice.

Ethno-archaeology, with its emphasis on the study of material culture, is the method normally associated with the gathering of source analogues from the ethnographic present, which can be used to shed light on archaeological material. But let us turn this method inside-out and upside-down. *Ethnography of archaeology* is the reflexive or ironic form of *ethno-archaeology*. The ethnographic fieldwork upon which this paper is based was carried out on an excavation, where I worked as a kind of participant-observer. The focus is still on material culture, but on our own rather than that of some distant Other. For clearly, if we are interested in the ways people ascribe meaning to or extract meaning from material things, we do not necessarily have to journey far in time or space. There are material symbols “in action” on an archaeological site, just as there are in the villages of the Baringo (Hodder, 1982). It could even be said that archaeologists, of all peoples, are the manipulators of material symbols *par excellence*.

This reversal of the ethnographic perspective has interesting effects and implications. For instead of travelling outwards to look at cultural activities which, from our point of view, seem exotic and strange—translating these into our own categories of thought—the journey takes an inwards direction, into our common-sense world, trying to penetrate into that which we normally take to be natural and self-evident. The aim is to suspend as far as possible the beliefs which we have come to take for granted, to make the familiar and the close-to-home seem strange, and to look at archaeological practice as if for the first time.

One of the things that archaeological theory always takes for granted is the act of discovery. The *act of discovery* can be defined as our original contact with material entities—the objects of our knowledge—as these emerge from the ground in the context of excavation practice. Indeed, in the act of discovery objects emerge and *take* form in our perception only as we *give* form to them, by *acting* on the material field in particular ways, through the application of material and cognitive tools, and the performance of a range of practical skills.

This is, so to speak, the “ground” of archaeological knowledge, where data are produced. All subsequent descriptive and analytical events are effectively dependent upon this practical moment of discovery, the foundational and (arguably) the most important interpretive event. As concrete human activity, it is as complex and mysterious and as difficult to understand as any other material practice in which agents equipped with symbolic faculties are engaged. Yet theory tends to represent the act of discovery as literally just the uncovering of material evidence—a process in which the agents of discovery (the diggers themselves) are seen to play only a passive receptive role. For various reasons, the act of discovery is regarded as mundane, ordinary, run-of-the-mill, and of little theoretical interest. As a corollary of this, the people who dig up the evidence from the ground—who actively recognize and select out relevant objects and patterns from a field of background noise, who manipulate and explore the unfolding evidence and transform it into meaningful data—are regarded, as far as theory is concerned, as little more than manual workers.

In everyday life, of course, we really do perceive the world as if it were comprised of pre-given facts. When we adopt this natural attitude, our perception tends to be understood as just the reception and processing of incoming sense-data. But it is equally valid to understand perception as a skilled, active performance (Ittelson & Cantrell, 1954; Welford, 1970; Neisser, 1978). Our perceptual experience is structured by 1) the environment perceived, and 2) the conceptual schemes which we apply to the environment. These schemes have an intentional structure, directing our actions within the material field, and imbuing objects encountered with a meaning related to our purposes. As Heidegger (1962, pp. 95-100) argued, our everyday dealings with the world are concerned with intentional objects or “*pragmata*”—objects to work with or upon, according to the nature of our projects (cf. Gibson, 1979, pp. 127-143, on the “*affordances*” that objects offer to the perceiver).

In excavation practice, as in everyday life, the observer or agent is not detached and placed at a distance from the objects of concern (which is the case in subsequent theoretical analysis) but is *embodied* in the material field. Bodily movement or action is normally part of the process of observation. The content of the visual field depends partly upon the location of the observer, which can be changed, according to what the observer wants to see. The slightest movement of the eyes, head or body, the slightest manipulation of the material evidence, changes the structure of the perceptual field radically. To focus

attention on an object—perhaps to trowel around it or to pick it up—is to send all the others receding into the background. Yet still—as patterns emerge, wax, wane, vanish—the experience is coordinated by the intentional agent, who continuously monitors and directs actions according to the observations made from moment to moment of the results of those actions. We are all familiar with the character of our everyday perception. The point is that the act of discovery always takes place in this zone of shifting attention, immediately in front of the body. The body is always there in the background, rarely attended to as an object-in-itself. It is, as Merleau-Ponty (1962, p. 102) puts it, “the hither zone of corporeality...against which the object as the goal of our actions stands out or the void in front of which it may come to light.”

Direct bodily contact with the object is an important component of the act of discovery. In practice archaeologists make much use of the sense of touch, alongside vision, to evaluate material evidence encountered. Analogies are embedded in these practical observations. Consider, for example, what happens when a digger finds an object that could be a “hammerstone” or could be “natural.” It may be unclear whether the shape and features of the stone are the result of human or natural agency. How does the archaeologist evaluate such an object? Generally speaking, (s)he picks it up, holds it in various ways, judges the center of gravity, sees how the object would feel and perform in the hand if it was a striking implement. In other words, the archaeologist brings his or her own practical experience to bear upon the object—constitutes and evaluates the evidence in terms of that experience (S)he sees how (s)he would use the object, in order to judge how an agent in the past might have used it. It is a kind of practical experiment, and the results of that experiment determine whether the object will be retained as a recorded find, to achieve the transition into data, or whether it will be consigned to the spoil-heap. Clearly the analogies involved in this act of observation are very different to the kind of theoretical argument-by-analogy to which we are accustomed. They are what might be called *practical analogies* or *analogies-in-action*.

Such analogies, with their implicit reference to the body, involve the bringing together in perception of schemes or rationales (derived from past experience) and aspects of the material environment, as we encounter it in ongoing practice. Our past experience is always present, as a kind of horizon, so that we continually draw analogies from what is already known to make sense of the new situations that the world constantly confronts us with. In this sense, analogy is more than just a subsidiary method or

form of argument. It has an ontological status, is part of our “being-in-the world,” embedded in human cognitive structures and in human praxis. We may not notice it, we may come to believe it isn’t there, simply because we use it all the time.

The active and skilled nature of perception is evident even in the most routine excavation tasks, such as the trowelling of surfaces or the following down of sides of features. In these performances, attention is highly selective. Very few of the hundreds of objects and patterns which pass through the troweller’s field of vision achieve the transition into data. Some are apprehended *en passant* to be examined closely by eye and touch, only to be thrown away again. Only *relevant* objects are plotted on plan or placed in the finds tray, and this clearly involves the application of some *criteria of relevance*. In other words, objects are found because they are looked for, because they can be recognized in terms of some pre-existing conceptual scheme.

Normally, of course, we can take our cognitive powers for granted, and just get on with the task in hand. But most diggers are familiar with the occasional experience of relevant objects seeming to “jump out,” “leap out,” or “pop out” of the ground (as it is being worked)—instantly recognizing these as human artifacts. This is one of the few practical instances when we can actually apprehend our cognitive processes in action. For though it is certainly true that the object leaps out and grasps our attention—in the sense that it suddenly stands out as a figure from the general background, pulling our attention towards it—it must also be the case that our conceptual apparatus leaps out and grasps or “apprehends” (lays hold of, catches the meaning of, arrests) the object, imbuing our experience of it with a particular *intensity*.

Consider the following anecdote. Since I first started work on the site (a Bronze Age ring-ditch cemetery), a major topic of conversation was the absence or non-appearance of arrowheads. It became a standing joke amongst the diggers that a giant arrowhead would have to fall out of the sky and hit us on the head before we actually discovered one. Eventually, however, a small leaf-arrowhead was found by K while taking out the upper fill of a ring-ditch. It was an occasion for some celebration. The object was passed from hand to hand as we all came over to admire its workmanship and design. When I asked K what had drawn her attention to it, she said, “There was something about the sheen of it...it seemed to fall out of the earth nicely.” She told me that she immediately recognized it as a worked flint, and on picking it up realized it was an arrowhead.

The act of discovery in this instance can be described as the practical meeting-ground of an expectation and its material conditions of satisfaction. Furthermore, we can say that the anticipatory schema brought to bear upon the object are social phenomena, belonging to the community of archaeologists (but not necessarily to non-archaeologists). It is also worth pointing out that these schemas are reinforced by the finding of the object, so that our expectations of finding further arrowheads in ring-ditch fills are strengthened. In this way the act of discovery reproduces existing knowledge.

It is of course the case that archaeologists learn to recognize relevant objects through practice. Previously encountered objects may serve as "prototypes" (Rosch, 1978, pp. 35-37), comparison with which can admit newly discovered objects into established categories. But our concept of what an arrowhead is consists of much more than simply a mental template of material form and properties. Indeed, to all the archaeologists present, the status of the object as an artifact—the product and/or instrument of human labor—was a matter of common-sense. We all commented upon the particular characteristics of the object in terms of its manufacture and use by some past human agent. These discussions were based upon a network of assumptions which, to all intents and purposes, could be taken for granted:

- the arrowhead was attached to an arrow-shaft
- the arrow was designed to be shot from a bow at a target
- the users and makers of bows and arrows were capable of the motor movements, intentions-in-action, and reflexive monitoring of action required to operate and manufacture such artifacts. In short, they were human beings, very much like ourselves.

All this knowledge, including a practical understanding of the human body in action, was not only tacitly present in the act of discovery—it pre-existed and pre-figured the moment of discovery. The object was perceived or apprehended in terms of this knowledge. If identification was practically instantaneous, it was because the necessary assumptions had been integrated into habitual and routine perception so that, as far as the perceiver was concerned, they were embodied or objectified in the object, as could even be read from it.

The arrowhead, then was a *conceptual object* of archaeological knowledge even before it was found; once discovered, it became a *material symbol*. Like all material symbols it is both a model of and a model for (Geertz,

1975, pp. 93-94). Imbued with meaning in the act of discovery it is literally full of meaning, and to all intents and purposes can be taken to "speak for itself."

Let us turn to another example. During the trowelling of an area to delineate the cut of a ring-ditch, a task which had taken S several hours, the only find had been a flint flake. I pointed out to S that many similar flints must have passed before his eyes in this time; why had he kept this flint and not the others?

S replied that this flint had been "worked"—that it had been "struck off" from a core in the making of an implement. (As he told me this he demonstrated the relevant hammering actions, holding an imaginary hammerstone in one hand and an imaginary core in the other.)

I asked him how he differentiated between worked and unworked flints.

S (searched on the ground for an unworked flint to use as a comparison, found one, handed both flints to me, and) said that, if I looked closely, I would see a percussion mark on one of the stones "where it has been hammered." He pointed out the absence of any such features on the other stone.

I asked whether he had to look hard in order to find a worked flint.

S said that, in this case, no. As soon as he saw it he knew it had been worked. In fact the flint seemed to "jump out" of the soil as he was trowelling, and he "couldn't miss it."

Perhaps what is most apparent in this dialogue is just how much S knows about the discovered object. This knowledge extends not only to an identification of the object as an artifact, but also to how it was produced, and the kind of agency responsible for its production. His account invokes the former existence of a raw material (the flint core), a tool for working the raw material (the hammerstone) and an intentional product (the implement) from which the flint flake itself was a waste-product. It also invokes the former existence of a wielder of the hammerstone, and this agent is credited with the ability to *intend* a product, as well as the basic manipulatory skills required to carry out those intentions. Indeed, while S is talking, he is acting out some of the motor-movements which would be necessary in order to strike a flake from a core.

There was definitely a sense in which this gestural drama, and the explanation it supported, did not depend upon the presence of the flint flake any more than it did upon the presence of the core or the hammerstone. It was something S already knew, before the object was discovered—a practical performance of a pre-existing conceptual scheme. As in the previous example, this might account for why the object seemed to “jump out” of the soil, and the instant recognition of it as an artifact. But what is particularly interesting is the way in which S talks about past human agency—the making of the artifact—by reference to his own body. This bodily reference is present in most archaeological interpretation but is not usually made explicit. Indeed, the intimate connection between our understanding of human agency in the past and our understanding of how we use our own bodies rarely surfaces in the universe of theoretical discourse either. The example illustrates the point that not all archaeological knowledge is in the form of propositions that can be articulated in words. Much of it is integrated into body schema as a kind of “knowing how” rather than “knowing that” and is founded upon practical skills so basic to our existence that we tend to take them completely for granted.

Tacit reference to our own body seems to be intrinsic to any identification of artifactual material. To recognize an object as an artifact is to comprehend it in the attributed context of human projects, intentions, actions and capabilities, and we cannot do this without drawing from our own experience of what it is like, in the most general sense, to be *embodied* in the world in a particular way. We perceive an object to be an artifact by reference to ourselves. The subject makes an active contribution to the constitution of the object.

Importantly, even an unfamiliar or unexpected object unparalleled in our experience can be practically constituted in terms of the potentialities and possibilities of the human body. For the unfamiliar object can be manipulated and explored in the light of a whole range of anticipations, questions and strategies for action that our practical analogies generate. Every time we pick up an object, turning it over in our hands and directing our attention first to this aspect and then to that (its overall form and “feel,” as well as its particular details), we are exploring the possibilities of the object by reference to our own body.

In this process of exploration, the object itself may surprise or contradict the practical schemes that are brought to bear upon it, so that these schemes are modified in practice to take account of the object, redirecting further exploration of it. Ideas and object mutually fashion each

other, and the observer emerges from the act of discovery as a more skilled and “practiced” perceiver than before. As Neisser (1978, p. 11) argues, “Perception and cognition are not just operations in the head, but transactions with the world. These transactions do not merely *inform* the perceiver, they also *transform* him.”

Analogies-in-action, then, are quite different from conventional (theoretical forms of analogy). It is only in texts, after all, that analogies are frozen into static schemes. In action, analogies have a *temporal* structure, not only in the sense that they occur in time, and are continually shifting and changing to take account of emerging evidence, but also in the sense that they refer to the temporal sequences of intentions and bodily actions performed by some agent in the distant past. They also have a practical character that cannot be reduced entirely to the form of a theoretical argument:

1. The object usually emerges in the context of an ongoing practical task, e.g., the excavation of features, and this context affects what is being looked for and the meaning attached to what is being found.
2. The subject uses his or her own practical experience to interpretively constitute the object.
3. The object is constituted in terms of the practical activity of human agents in the past.
4. The analogy itself is practically mediated, usually through direct bodily contact with the discovered object.

The principal difference, then, between theoretical analogies and analogies-in-action, is that in the former a comparison is drawn between disparate sets of objective data, with both source and target sides of the analogy being “out there,” whereas in the latter the source of the analogy is not outside of us at all. The analogy-in-action is a practical *transaction* between the subject and the object, mediated in perception.

## Conclusion

It is characteristic of artifacts that once they have been shaped they can be released, so to speak, to stand for themselves. The arrowhead, the archaeological “fact” of the arrowhead, and indeed the ethnographic account of the making of an archaeological fact, are all cultural artifacts which have been released in this way by their makers. This

paper has briefly examined the production of artifacts on the second of these levels by analogy, as it were, to the first—while leaving the third (the craft of doing and writing ethnography) more or less implicit. For just as the artifact was originally produced in the past by appropriating a raw material from its natural setting and fashioning it for a certain use and purpose, so in the act of discovery the object is re-appropriated and cognitively re-fashioned, according to the projects of the archaeological community in the present day.

There is much to be said, then, for taking archaeological theory out of the constricted horizon of texts and academic discourse and into the flux of everyday excavation experience—on the ground and under an open sky. We can learn a great deal about the nature of archaeological inference from those who make practical as well as written contributions to the production and reproduction of archaeological knowledge. For in the last analysis archaeology is essentially a form of practical exploration. This bringing of theory down to earth necessarily involves us in a *re-discovery* of the act of discovery.

#### Note

This paper was written while my fieldwork was still in progress and first published in *Archaeological Review* from Cambridge 9.2, 1990. Thanks to all the members of the excavation team who gave me every help and facility during fieldwork.

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## One Developmental Line in European Activity Theories

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#### Background

A forthcoming book on Critical Psychology (Tolman & Maiers, 1991) is the occasion of this article. The paper will relate Critical Psychology to the two theories which constitute the origin of the Cultural Historical School and its activity theory.

The most central aim of the article is to demonstrate that activity theory is fundamentally reversed compared to other explanations of the social creation of mind.

In other theories, the social creation of mind is often taken to mean that general abilities of the brain are realized through social interaction. Social interaction is a mere trigger, which starts up the general ability to perceive, remember and think. These mental abilities are characterized by some properties—like their structure, form, abstract process. They are taken to be independent of concrete socio-historical forms of interaction, and common to all humanity. One could characterize this approach as an essentialistic functionalism in which form takes precedence over content.

Activity theory reverses the relation between form and content. Fundamentally, this reversal is seen in the reinterpretation of the concept of human nature, which takes on the meaning of human potentials. The unique, historical content and organization of this consciousness is seen as a result of this human being realizing its human nature on the basis of earlier human experience as accumulated in society. You can then state that human beings perceive, think, and remember, but these are open ended

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statements about human potentials. The real concrete organization of these functions and ultimately of consciousness can only be determined by identifying the life histories of these human beings in particular socio-cultural forms of living. One could characterize this approach as a functional materialism, in which content takes precedence over form.

The article will explore the reasons for and the consequences of the reversed relation between form and content mainly by tracing a developmental line in European Activity Theories. A line will be drawn from Vygotsky via Leont'ev to Critical Psychology, demonstrating the unfolding of a praxis paradigm which responds to still more demands on paradigmatic consistency.

Some of the underlying issues which need reworking in order to obtain paradigmatic consistency are the following:

•In essentialistic functionalism even local and cultural specific activities and their mental functioning are derived from the universal structures of mind. The development of concepts is mostly explained by how and when they are triggered. Their generality, relevancy and validity are matters for scientific investigation, but not central for their evolution. But in functional materialism one must be able to comprehend how human beings develop from groping with the immediate surroundings to a mastery and penetration of the socially organized activities. It is a constant task to identify how general concepts in consciousness develop out of specific activities. This entails a determination of the relationship between the general and the specific, and the relationship has to be grasped as a part of the way individuals relate to their social positions. It becomes essential to determine how the individual evaluates what is relevant and what is not. This has to be seen in the broader context of how human beings in activity transform the world according to their needs and their needs according to the world. Out of this dialectic the social determination of emotions, interests, and relevancy must be unfolded.

•As a consequence of these deliberations scientists must see their own general theories as developing within social activity of particular social positions. He must understand the theories with which they work as part of their way of relating to the social interests in the positions they and their subjects occupy. New theories can only be developed from these positions through a dialectic between changing social practices and critical social reflection. Praxis is in itself the basis of theoretical change, and

at the same time the researcher's grasp of praxis is the basis for the critical analysis by providing criteria of generality, specificity and relevancy. The researcher reviews the theories which have evolved from related social positions—among these also the researcher's own position. In this critical review researchers investigate the relations of the general theories to their specific social positions. Through inner inconsistencies, limits of explanatory power, transcendences and interplay between such aspects of the theories, researchers strive for a precise grasp of the matter, which will allow a more conscious development of praxis.

These issues make it necessary to state the following, which is sometimes overlooked in the study of activity theory. The researcher's reflection of their being in and investigation of praxis is based on a set of fundamental categories, of which any theory must have some. It is characteristic of activity theory that its fundamental categories are set up not arbitrarily for the occasion, but developed systematically within the philosophy of historical materialism.

We shall pursue how these issues have unfolded in one developmental line in European activity theories. A proper presentation of this developmental line should be prospective, all possible directions for development at each stage ought to be presented, and reasons be given for why the next stage will react to only some of the problems of the earlier stage. However, the length of the article confines us to reconstructing development: solely those problems of a previous stage will be mentioned which have had a fundamental significance for the unfolding of the next stage. This also means that the earlier stages will be viewed from the perspective of the later ones of the developmental line with which we are concerned.

### Vygotsky

Vygotsky is a transitional figure in Russian psychology, an upcoming scientist from the first years of the Soviet Union. He wrote on the basis of profound knowledge of his contemporary psychology. In his works, therefore, one can find elements of all psychological theories from his time;—intellectualistic psychology, i.e., a psychology which describes consciousness in formal terms such as hierarchical concept structures;—Piagetian structural psychology, where mind is described in terms of operations outbalancing each other;—gestalt psychology;—etc. The reception of Vygotsky in the USA has been influenced by these diverse elements. In the context of an eclectic tradition of science, Vygotsky's diversity

may be especially advantageous. The psychological concepts from his texts may be selected as tools: "I want to investigate this problem, and would like this concept from Vygotsky, that from Piaget, and why not this interesting concept from gestalt psychology." Also, Vygotsky's varied attempts at theoretical integration, which are mirrored in his works, make it easier to take one's personal pick.

However, one can only get a proper understanding of the inner coherence of Vygotsky's project by seeing it as a radical historical development out of the first two decades of the Soviet Union. There and at that time it was a declared policy to establish a psychology on a Marxist basis. This meant conceiving of consciousness as historically created through praxis (cf. Norris Minick's excellent overview of Vygotsky's theoretical development in Vygotsky, 1987).

Vygotsky was moving away from a psychology which sees thinking as based on universal structures—like formal, hierarchical relations between concepts. He was on his way to a psychology where consciousness is seen as a psychic organization, historically realized through activity based upon a dialectics between instruction and development. He understood instruction as any directive which elicits new activity, and development as the reorganization of consciousness through this activity. Between the organization of instruction and development he saw an internal relationship, which took shape according to the developmental stage of the child or human being. An illustration of this can be found in *Thinking and Speech* (Vygotsky, 1987, p. 202f), where Vygotsky argues that instructions to write—whatever their method—develop a new activity, which according to the kind of instruction and stage of development sets up new abstractions and relations to language in the consciousness of the child. In order to write the child must learn how to disregard the sounds of language and identify the correspondences between sounds and letters. The child must disregard a specific and concrete interlocutor and address an imaginary and general one. The motives for immediate communication in a situation are no longer valid in written speech, the child must grasp a broader motivational span. The interaction of dialogue is gone, the child must apprehend what the general speaker will reply or think about the written content.

It is easy to react to this example by saying: "So what, if you speak before you learn to write many of the elements in your talking performance have to be abstracted and this seems to demand a certain maturity in the competence of the child." This is, however, to miss the whole point.

Vygotsky refutes the idea that some more or less specific mental powers have to mature before instructions of, say, writing can be applied. He argues, that the activity of writing, by expanding the communicative activity of the child, makes it reorganize the elements of its consciousness on a more complex level. This argument can be put more precisely: The abstractions performed in order to develop the conception of an imaginary and general interlocutor, are the result of specific necessities in the writing activity developing on the basis of talking activity. There is no general abstraction ability, but this specific mode of abstraction and generalization is developed by necessity within this particular activity. Here content takes precedence over form.

This idea of a specific mode of abstraction and generalization determined by particular conditions has general implications. It must also have governed the way Vygotsky arrived at his own understanding of a specific mode of abstraction and generalization. Vygotsky was well aware of this implication. That is why he presented his theoretical position as a dialectical transcendence of related paradigms. In a critical review of contemporary positions (Vygotsky, 1987, pp. 194-201) identifies two main groupings of the relation between instruction and development. The first grouping gives precedence to development. Some abstract faculty has to mature before instructions in a particular domain will have effects. In this grouping there have been few empirical results, and this has been explained away on the basis of methodological inadequacies, which have been compensated through theoretical abstraction. In the second grouping development and instruction become the same, Vygotsky talks about the predecessor of behaviorism, associanism, and points out that this conception of learning is simply an accumulation of performed instructions. This quantitative approach is not able to demonstrate any transfer of knowledge from one domain to another, and this is an absurd result compared with everyday experience. Neither of the groupings is thus able to grasp development, understood as the continuous unfolding of more and more complex activities, covering still greater fields of action. In this way Vygotsky founded his own theoretical abstractions and generalizations on the necessities within a particular pedagogical field of activity, and his abstractions and generalizations evolved from conceptual inadequacies in theoretical positions related to that pedagogical field of activity.

Thus the conceptual development of children and of scientists has been tied up through the cultural-historical relation between development and specific fields of activ-

ity. To talk in this way in general terms about specific fields of activity also involves considering the more general problems of learning, of psychic, personal, and social development involved in each field. In so doing, one embarks upon a foundation of psychology on a theory of praxis. Such a project entails a complete revision of one's understanding of the relation between the world and human beings.

Vygotsky was only able to get this revision started. Within a Marxist tradition he was mainly interested in the objective elements of knowledge and their stability. We must consider his example on the development of writing activity as historical, because it ties up development with specific circumstances. All the same, Vygotsky did not explicitly emphasize the historical character of knowledge and activity. More broadly stated, he did not arrive at a clear distinction between general principles and specific historical realizations of human development on a Marxist base.

He merely plotted out the course for such a project, and also set up an apparently arbitrary end point. In his last writings one can find statements about the necessity of deriving the meanings in language from the emotions and motives governing activity. However, he was not given time systematically to incorporate this perspective of the relation between the world and human beings into his subject: Thinking and speech.

### Leont'ev

The premature death of Vygotsky left his project unfinished. It became the task of A.N. Leont'ev and a group of colleagues in Khar'kov to rework the elements until they could make a coherent presentation of it in the late 1950's, after the death of Stalin. A comparison of the text of Vygotsky's *Thinking and Speech* and Leon'tev's *Problems of the Development of the Mind* (1981) will indicate the problems Leont'ev and his group faced: While the references of Vygotsky are up to date, most of the references of Leont'ev date back to the same period. Vygotsky set up his presentations as a dialectic dialogue between opposed positions. Critical dialogue has a peripheral function in the text of Leont'ev, the presentation of his psychology is mainly organized as the phylogenetic evolution and socio-historical development of mind. An advanced psychological theory is developed on outdated references.

However, there are also several reasons for the evolutionary and historical presentation, inherent to the project:

Working within a psychological theory of specific conscious organization developed under specific and particular circumstances, entails that circumstances and consciousness both are a concrete unity of many processes. Therefore, at a particular point in time one will find remnants from past epoches, seeds for the future, as well as be able to identify the main organizational principles for the present.

With such a conception of human consciousness we face the problem that the general principles for the development of consciousness cannot be derived directly from empirical research, because each human being is only an instance of all the possibilities to be realized, and we will never be able to see all instances. On the other hand, we cannot stop at what we meet empirically and do nothing but describe it concretely and specifically in its own right. In this way we would get lost in the historical process, and would not be able to achieve an autonomous individual and social development.

Therefore, we do need some conception of general principles—human nature—governing human development under specific circumstances. But the actual organization of the object of investigation can neither be derived nor understood on an isolated synchronic base. One cannot identify a structure of universal elements in consciousness, which has inner coherence, and is independent of and at the same time governs the present field of processes. We must develop a basic notion of human potentials, which in social history are able to realize the observed, multiple specific organizations of consciousness under particular conditions. Such a notion of human potentials must itself be a concrete unity of many possible processes. Therefore, our search for understanding specific human development doubles up. The potentials must themselves be conceived of as a specific answer to specific conditions, in other words, they must be founded on their *historical development*,—as a product of evolution.

This is the background for the double task Leont'ev set out for himself. On the one side, triggered by problems in empirical research he set out to develop a general conception about human nature based on its specific evolutionary development. Thus he founded basic categories for human activity. On the other side, this conceptual frame must encompass an understanding of how individual consciousness is organized through specific and particular activity, so that the relations between these elements guide empirical research of particular phenomena. The remainder of the article will mainly focus on this double task. First we will focus on how to found the

categories, then we will discuss whether they grasp the individual organization of consciousness.

To determine human potentials through evolution becomes the same as identifying the specific characteristics of the human being as a species, and this identification has to be consistent with the double task outlined above.

Human potentials must be conceived of as a general relation between human beings and the world, and as having evolved in evolutionary processes. Evolutionary processes before humankind can be characterized as an accumulation of genetic information in a species population resulting from the activity of population members in the population specific world. The primacy of biological evolution stops at the threshold of humanity, human activity and consciousness are neither instinctually nor genetically driven. As an answer to specific evolutionary problems (a problem which Leont'ev addresses but we will not discuss here), society has become the pool of accumulated human experience, it has substituted the accumulation of phylogenetic information by genes. Human beings are social beings. Human consciousness itself is socially created. The human being unfolds its individuality through its social activity under social conditions that imply the motives and goals of their activity, their means and modes. The human being is not a *tabula rasa*, it has a potential direction towards the appropriation of motives and goals and unfolding of the emotions and needs based on activities and tools evolving in the history of society.

The category of *human nature* has thus been reorganized to make room for identifying general principles for specific human development. Given this, Leont'ev could attack the main task hinted at in the example from Vygotsky: The realization of human potentials in individuals must be conceived of as a form which has been created by the content of the social processes in which individuals actively partake and which they develop. Already in the Vygotsky example of learning to write human social activity can be considered the central notion. But now we are in a better position to distinguish between general categorical relations and historical ones. With this distinction Leont'ev now set out to establish categories for human activity to make possible the investigation of how the specific and particular organization of consciousness evolves in specific and particular social activity.

The level of generality of these categories can be determined more precisely in the following way. As they characterize human nature, they must possess validity for

the time period, where human nature has not changed. They must be understood as more or less easily realized possibilities in all societies, and—if feasible—they must be founded on their development in the most early human life forms, when the genes were still changing. Thus determined, they can be considered fundamental concepts of a general psychology.

The framework must set-up the general relation between activity, society and consciousness, and it must do so in a nonspecific way with regard to the elements which work in these processes. We will first look upon activity as the focus of the general relation and thereafter upon some of the elements.

Human *activity* is always social and cooperative and occurs within the social division of labour. This is also the case when it is performed in solitude. Human activity is a social net of processes, which comes about as a result of the actions of one or more individuals. The interrelations of necessities in activity—if realized by individuals—insures corresponding relations among them. In this way activity mediates between the cultural and the social on the one hand and the individual on the other.

Leont'ev considers *society* as a unity of actual inter-lacing patterns of particular activities,—as a result of and condition for human praxis. In his writings Leont'ev never treats the characteristics of this unity separately. That is a task for sociology, and we shall not touch upon this aspect in this article any further.

The uniqueness of each human being is to be explained on the basis of social activity. In his later writings Leont'ev stresses that uniqueness is not based on biological individuality as such, like animal individuality. Human individuality is based on social activity. Furthermore, in order to specify how the particular and specific organization of consciousness comes about Leont'ev realized that it was not sufficient to determine the relation between a specific activity and consciousness, as Vygotsky did in his analysis of how writing activity could develop a specific and particular organization of consciousness. It is necessary to identify the particular "knots" or unities of activities, which constitutes an "ensemble" in individual's *personalities*, because it is on the basis of their personalities that they relate to and develop particular activities. Personality is thus the key to determine the species specific uniqueness of each human being.

Having thus established the general relations of activity, society, and personality, we can determine the ele-

ments of activity. We shall introduce them by using Leont'ev's example of primeval collective hunt, which is, at the same time, an instance of cooperative interaction in activity. Collective hunting is the activity, the prey is its *object*, and hunger for the prey is its *motive*. When beaters make noise to frighten the game, the clapping of their hands is an *operation*, and the beating as a whole is an *action* within the hunting activity, motivated by the hunger to be fulfilled by the realization of the activity. This noise making action has as its *goal* the frightening of the game. However, the goal contradicts the object and motive of activity, which is to catch the animal and distribute and consume the food. The beaters' action is part of the activity on the basis of their conscious knowledge that they frighten the game so that it can be caught. This implies that human *consciousness* has an engaging and a mediating representational aspect. The beaters' action is only possible on condition that they represent the link between the goal of their action and the motive of the cooperative activity. They must be able to represent relations between objects, irrespective of their actual needs, or else they would simply go for it themselves and therefore in many instances fail to obtain the object. Their specific and particular consciousness is constituted through its content, which has meanings as elements. Through the *meanings* they are able to represent the connection between the motive and the goal of action, in this way they are engaged in the activity, it makes *sense* to the beaters.

One activity is mainly distinguished from another by its object or motive. This can become a key to accounting for the development of activity in the following way. If, for example, a beater discovers it is fun beating, if he starts beating for its own sake, he is motivated by the beating, the beating is an appropriated object, he has produced a new activity from the old action. An action can thus develop into an activity by acquiring a motive, and the new activity might itself become subdivided into a set of actions. On the other hand, an activity can become an action if its motive wanes, and can become integrated into another activity. Likewise, an action can evolve into an operation, capable of accomplishing various actions.

Having thus determined the elements of activity, it is important to stress that they must be understood as potentials which constitute a unity of social, personal and organismic aspects, and the actualization of the potentials must be conceived of as a specific developmental process, which is beyond their determination as potentials.

The motive of activity is thus an individually constituted unity of an originally nonspecific biological "push"

and previously socially produced objectified "pull." Biological functions, which express the arousal of the body, cannot themselves direct activity. Only when desires meet a socially produced object meant for human satisfaction do they become objectified, get their specific direction. Likewise the goal of an action is an individually produced unity of what the objective social circumstances have made possible and the process of actions actualized. Furthermore, meanings are the unity of what appears to the subject on the one hand as relations of the world unveiled through activity, independent of its consciousness and on the other hand as an instrument to become conscious of objective relations. Lastly, sense is established as a unity when the social meanings unveil the relation between goal and motive to the subject and thus release the engagement or commitment of consciousness.

Such elements constitute each kind of activity, and the recognizable unity of the ever changing activities of the subject constitutes the personality. Personality is the transformations of the subject, which comes about as a result of the development of its activities in the system of social relations. The emotions are seen as a constituent of personality, they reflect the relations between the motives of the personality and the possibility for their positive realization in the social world through activity. With the concepts of meaning, sense, and emotion we recognize a movement in the theoretical constructions of Leont'ev towards a localization of the individual in the knots of the system of activities.

The advantages of Leont'ev's position are evident even from this summary sketch:

Human nature does not determine specific activities, but it does determine the set of possible activities which can be realized. This is because human beings are active social agents who produce objects for the satisfaction of their needs and thereby develop the elements of their psyche and internal relationships.

It is in accordance with this line of thought to state that the system of activity as presented is to be understood as a material as well as theoretical seminal core. It is common to all kinds of actualized historical activities, be they cultural, producing, or reproducing. Each particular activity, then, has a history which has developed through contradictions in different sets of concrete realizations of the elements emotional, conscious, operational, musical, instrumental, etc.

Finally, social and individual reproduction and development are conceived of as constituents of the same

process. Society, on the one side, is conceived of as produced and reproduced through the subjects and their social systems of activity. The individual, on the other side, is conceived of as developing through personal appropriation of the accumulated experience of human beings as found in society. So social reproduction and development are more or less intended and cooperatively controlled products of human activity, and individual reproduction and development are based on and a part of social reproduction and development.

Leont'ev's theory unfolds the notion of precedence of content over form: It is actual history which has led to this human being and which is studied when analyzing individual human activity.

However, there are also several problems with Leont'ev's position:

His "babushka" system of activity, action and operation is not straight forward to work with. There are two conspicuous reasons for this. First, Leont'ev sometimes writes as if activity, action, and operation constitute three independent levels. This allows for a hierarchical structural conception of activity, which can be identified in some of his followers. Second, it is difficult to set up guidelines for the categorization of activity in a particular study. The unequivocal determination of individual motives is decisive in order to differentiate between an action and activity and between activities, but it is not possible. Leont'ev's aim is to describe objective activity, but his conception of activity thus easily becomes subjective and relativistic: Activity is what the researcher perceives as motivated.

Leont'ev merely talks about an activity system, not about social organizations and formations. His combination of social theory and psychology remains too abstract and is only rudimentarily and inconsistently developed.

The final problem we shall look into is also the one with which we will draw a line of development produced by Critical Psychology. Leont'ev's theory of activity is—as already stated—meant to grasp individual development as socially produced, and thereby as an attempt to realize a not yet fulfilled promise within Marxist tradition. A central assumption with which to accomplish this is the conception of how needs and interests have a determining and indispensable function in producing knowledge through practice. Objective knowledge can be realized not by abstracting from, but by taking into account the contradictory class interests in which one is embedded. How-

ever, although Leont'ev presents the first elements to locate the subject and thus to demonstrate the unity among needs, interests, and knowledge, the picture presented is not totally coherent. As argued, there are tendencies toward structuralism, ahistoricism, etc., and it therefore becomes difficult to go beyond the demonstration of how a certain social position will typically produce a specific consciousness. In order to understand the specific and particular personal development we must systematically formulate a historical science of the subject. Critical Psychology set itself this task.

### Critical Psychology

According to Critical Psychology the main task of a psychology is to demonstrate how any particular and specific subject develops as a product of its own social action, from a life lived in specific social positions. To do this, one must develop concepts for how human beings relate to social positions, how they maintain their interests in the positions, whether they fight for them, or give in, or adopt any kind of strategy within these limits. Critical Psychology has developed a set of categories to grasp these problems, and we will look into a few of them: subjectivity, action potency, emotions, and restrictive and comprehensive mode of action.

Critical Psychology has been produced collectively by a group of scholars at the Free University in Berlin as their main base. They started out within the wave of radicalization in the late 1960's and participated in the critique of psychology. They argued that the effect of the widespread application of psychology was control over people and assimilation of human beings to society, and they demonstrated how the use of psychological concepts made political and antagonistic social conflicts appear as individual problems. Only a psychology based on Marxist principles would be able to unveil these implications of psychology and develop an alternative understanding of the relationship between individuals and society. In Leont'ev they found a systematic position, which they took as a starting point. They have published a series of books on the transition from animal to humans, on perception, on motivation, on problem solving, etc. Their results have been reorganized in one large volume, and they have published a periodical for 11 years. Their work is more comprehensive and has more implications than can be seen from this article.

Critical Psychology sees its distinctive contribution to psychology as the systematic setting-up of *categories* for the psyche. Inspired by Leont'ev the categories are de-

veloped according to their function in evolution. We will discuss categories crucial to the constitution of the species specific relationship between human beings and their world. These categories were originally developed through the critique of psychological theories and studies of the transition from animal to humans.

Like Leont'ev, Critical Psychology shifts the theoretical focus from the satisfaction of primary basic needs to the social production of the means of satisfaction because this is the central feature of the species specific relationship. Critical Psychology departs from Leont'ev by stressing that there is always a *break* between the productive actions and satisfactions of primary needs of human beings, what I produce is for general use, and what I use was produced for general use. To overlook this is to mix up human with animal psychology. The break presupposes cooperation through division of labour, and it is crucial to conceive the action of human beings as positioned within an objectively given whole.

Most importantly, focussing on the social production makes it possible to found psychology on the dialectics of consumption and production: by producing the means of satisfactions the human beings produce their *conditions* of existence, which have *meaning* for their actions as *action possibilities*. This proposition can also be illustrated with Leont'ev's example on the primeval hunt: it provides the hunters with the conditions for distribution e.g., of meat, skin etc., and thereby has meaning for their actions. There are many possible ways of distributing the meat, not only determined through all the life conditions including the hunt, but also through productive subjective action under these conditions.

Productive human action is determined stepwise in the systematic unfolding of categories, which we will pursue within the species specific relationship.

The social conditions of human existence need human beings to produce them, but not necessarily a specific human being. Therefore social conditions do not necessarily present themselves as an imperative for the individual, but mostly as meanings offering sets of possible actions, which the human being at least can realize or not.

The relation between an individual and his or her set of possible social actions in a social position opens up the possibility of a reflective distance to the social conditions. This is the material base for the conscious relation of a human being to his or her social world. Each human being is a source of cognition, of emotion, of conscious relation and of action, all of which constitute the central character-

istics of *subjectivity*. Relations between human beings thus become intersubjective. Each "I" has to acknowledge this in its actions. I must always acknowledge that whatever passes through the psyche of another subject is worked upon, related to and transformed according to how the subject relates to its social position and its possible set of actions. This is what makes mutual understanding possible and the subjective reasons of others reconstructable. Critical Psychology considers subjectivity as the defining characteristic of psychology, which any method and any investigation must take into account in order to be adequate to the subject matter of psychology. At the same time scientific theories, including psychology, are products of subjectivity. Thus, subjectivity is the reason behind the systematic theoretical criticism outlined by Critical Psychology. Each psychological theory is a result of the way a scientist or a group of scientists relates to their social position. Through the dialectic critique one uncovers these relations and thereby becomes able to reorganize the theories in a more comprehensive way.

On the basis of the categories we have developed up to now, it is feasible to state a core notion for human freedom: Individuals which develop through the social conditions, will have the social conditions at their disposal by participating in the collective disposition over the social process. The category of *action potence* is set up to grasp this relationship, signifying that individuals has the conditions for the possible set of actions at their disposal. An implication of the categorical constitution is that any individual in any society will have some kind of action potence, the specific characteristics of action potence will vary according to the organization of society and the way the individual relates to the social positions of his or her life situation.

Of the elements of subjectivity—cognition, emotion, conscious relation, and action—emotions are the most crucial for a social conception of the individual. Most often emotions are considered our very private domain,—as well as a sort of coloring of our experiences or actions, which it is impossible to communicate to others—as our last resort of resistance, when society crushes our natural instincts with cultural demands. A critical test of a social conception of the individual is whether it is able to demonstrate the function of emotions. In addition to serving a part of the constantly ongoing social creation of the individual human nature they serve as a source of values in situations of social repression.

Critical Psychology has expanded the theory of emotion hinted at by Leont'ev. *Emotions* function as an

evaluation of the environmental conditions based on the meanings for action as they appear to the individual. The emotional evaluations are performed immediately and not consciously. They give direction to the actions of the individual.

Emotions are an integral part of the total species-specific relation of the individual to the environment. This means that the actions of the individual are normally not only determined individually by the immediate pressure of the needs. They are determined socially, on the basis of the general state of needs, meanings, action possibilities and action potency. This general state appears as an overall emotional tone, a *complex-quality*, which makes it possible to identify a unitary direction of actual actions in a complex setting, where many meanings offer many relevant actions. As human beings are creating the conditions for the satisfaction of their needs, the collective meaning of the current satisfaction on long-term interests and goals is incorporated in the emotional evaluation of the social meanings as well as explored in the conscious reflection on the emotional ease or unease. This is part of the human potential for an overall relation to one's own needs. To drink in order to satisfy one's thirst is consequently not an action determined solely by the psychic equivalent of the physiological state of the body. Let us suppose I am thirsty and sit in a class room and teach, while there is a jar of water and a mug in front of me. While somebody else says something, I might reach out and drink without giving it much thought. If on the other hand an earthquake just occurred, and we are all confined in the room with the water, my action potency and all it contains have changed—among other things thirst might become a common problem for all of us. My emotions will direct my action accordingly, even if my body's need for water is the same in both situations.

In this way emotions attune human beings to the problems in the species-specific world of meanings. If we discover that something is out of order, the anticipation of the loss of control generates unease and anxiety, and the need for coping is actualized. If we cannot anticipate getting control of the situation, anxiety takes over and may make us turn away. Otherwise the need for coping activates search activities, and we move towards areas where we feel a solution can be found. An ambivalent situation will let us change between the need for coping and anxiety according to our grasp of the ambiguities in the situation. If we stay in an ambiguous situation and do not find an unambiguous direction for action, everything becomes a problem. At some point, however, on the basis of our search we may become able to develop a goal and thereby

establish a direction for our action. We can resume our complex of everyday actions directed by our emotions, and by and by everything will work smoothly again. Thus, whenever something has been learned, the new way of doing old tasks creates new social conditions and meanings, new possible sets of action, a new action potency; and it has thereby become a new realization of our human nature or human potentials.

However, the emotional action guidance is only effective under certain conditions. To discuss the varied influence of social conditions marks the beginning of one way to leave categorical development and to enter theoretical construction of actual social history.

The subject must find assurance that after conflict resolution its needs will be satisfied according to the interests of its positions. This assurance might be missing. For some possible real social reasons the subject might feel threatened when it confronts the need for altering relevant conditions of life in its own interest, even though this interest might sometimes be an expression of a common interest. In such a social conflict, the subject might refrain from expanding the possible set of actions, give up its own interests, and comply with interests alien to its own social positions. The subject then has to act according to the interest of other people. This is called a *restrictive mode of action*. But now the emotions of the subject will become a problem. As stated earlier their complex quality is a constant evaluation of all individual needs and all meanings pertinent to their satisfaction. By refraining from its own interests, the subject has to disregard the complex quality of its emotional evaluation and even to deny this denial. The emotional evaluation becomes detached from cognition through defense mechanism. However they make themselves felt as uneasiness, unrest, a disturbed inner life with odd inclinations, they appear as the phenomena of the "unconscious." Only when the possibility of a better life is apprehended as realistic can my emotions and I locate myself in a readiness for struggle, which opens up the possibilities of a more *comprehensive mode of action*.

In Critical Psychology the categories of the species specific relationship between human beings and their world is taken as the starting point for the development of a categorical body of the subject, only hinted at here.

This body constitutes the foundation with which to address social historical problems, both of personal development, and of a theoretical nature, e.g., in education and therapy. That is, they provide a frame of reference within



which I can both interpret what my emotions tell me and guide my research. As a natural consequence of the categories, the focus of research performed within education is resistance to learning, and within therapy it is handling conflict from the subjective perspective of the therapist as well as that of the client.

## Conclusion

In this article one line of development in European Activity Theory has been reviewed. It was demonstrated that Vygotsky's conception of the specific and particular development of consciousness necessitated a complete reorganization of the notion of human nature as one of human potentials. This entails that basic categories are to be determined in quite another dimension of generality than is normally found in psychological and sociological theories. Developing this level was the task performed by Leont'ev.

It was also demonstrated that unclarity in Leont'ev's categories inhibit the conception of the specific and particular development of concrete individuals. It was demonstrated how categories developed by Critical Psychology on the basis of Leont'ev's Activity Theory are able to deal with problems such as, how individuals relate to their social position, and how individuals act on an inner urge whose social origin need not be clear to them. By working on how to systematically found a science of the subject, Critical Psychology has started to pull psychology back on the track and to expand the realm of subject matters reachable by an activity theoretical historical approach within psychology. Psychology is on its way to being reestablished as a science of the subject, a science of how human beings relate to their circumstances and sometimes are able to struggle to get the conditions of their actions changed.

## Note

This article owes its existence to the chaotic and bubbling discussions of a class of graduate students attending an introductory course on activity theory at UC Berkeley given by Professor Jean Lave and the author of this article, Erik Axel.

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## Quick Response: An Ethnographic Analysis of a Drama-Game in a Danish Preschool

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Play has a crucial role in early childhood education in Denmark. Teachers usually view play in two ways: on the basis of its own value, as an independent expression; and as an activity which contributes to the development of new psychological structures. Leont'ev's approach concerning play as preschool children's leading activity is widely accepted (Leont'ev, 1981, p. 363). That means play is an integrated part of the curriculum in preschools and kindergartens.

## Role-Play

I will not expound the theory of role-play, but only point out some typical characteristics. Play is a subjective reflection of reality. In play the child reproduces his observations and experiences in his own way. Play is a creative activity, since the child through play changes his surroundings, leaving out something and inventing something. Fiction, imagination and fantasy are essential. The child works out actions of make-believe, and gives actions and objects new meaning.

Play is voluntary and independent. If you try to force play, children will stop playing. Play is a social activity, in which human relations are essential, and are expressed together with peers. The motive of play is in the process itself, in the contents of the action, not in the result of the play. The motive to play is unconscious, but the goal is conscious. "Nor does the presence of such generalized

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emotions in play mean the child herself understands the motives given rise to the game" (Vygotsky, 1978, p. 93).

**Cultural appropriation.** Play facilitates the development of the child because through play he or she appropriates the culture. According to Leont'ev's tri-nomial formula (1978, p. 50) the interaction and the ties between child and culture is mediated by the child's own activity. Through interiorization the child appropriates the culture, which is transformed into processes that take place on the mental plane (Leont'ev, 1978 p. 58). In play the child interacts with the artifacts of the surrounding world, and these external material objects are transformed into psychological processes.

Material objects, artifacts, tools, etc. should not be defined too narrowly. In activity people interact with material tools, systems of symbols and other people. In Vygotsky's early writing about the mediation of culture through tools and artifacts, he specifically described signs and tools as containing a mediating function (Vygotsky, 1978, p. 54). Other people are the third mediating factor which he represents more indirectly through inter- and intra-psychological categories (Vygotsky, 1978; 1981). Later, Leont'ev made use of this approach: "Equipment mediates activity connecting man not only with the world of things but also with other people" (Leont'ev, 1978, p. 59). From my point of view D.B. El'konin gave a more comprehensive description of the unity of mediation through tools and other persons. In the article "Theory of periodicity of psychic development" (El'konin, 1971) he emphasizes that the object of the child's activity alternates between the system of "social objects" and the system of "social human beings." The first system develops particular cognition and the second emotions and motives. Although one dimension is dominant at a particular stage of development—for example, human relations and emotions at the stage where play is the child's leading activity—both dimensions will be represented at each stage. The force in El'konin's theory is the unity of mediation through objects (tools) and mediation through other persons. The weakness is the absence of the mediation through signs.

In current research there seems to be an effort to develop a more complete and comprehensive theory concerning mediation by artifacts. Concerning the unity of mediation, Alex Kozulin emphasizes that "the source of mediation is either in a material tool, in a system of symbols, or in the behavior of another human being" (Kozulin, 1990, p. 114). And Adam Rutland emphasizes that the children's understanding of tools, which he de-

fines as objects or words, only "evolves from interaction in culturally organized activities;" through "active negotiation with others in the culture" (Rutland, 1990, p. 39).

Giving a more explicit formulation of mediation through artifacts, Michael Cole defines an artifact as "a material object which has been modified by human beings as a means of regulating their interactions with the world and each other" (Cole, 1990, p. 7). In an interview he broadened the conception: "Artifacts, also the social activities that are repeated are artifacts, in the same way a spoon is an artifact" (Engeström, 1986 p. 28).

Wartofsky also creates a very usable approach, in which he combines the tools and signs analogous to Leont'ev's three-leveled hierarchy of human activity (operation, action and activity). Wartofsky describes three corresponding levels of artifacts (see also Engeström, 1990, p. 173): The primary artifacts are those directly used in the production, for example the bicycle the child uses in his play. The secondary artifacts are representations of the primary level. First it means a representation of a concrete artifact, for example the child uses the word bicycle in his play; and secondly the representation of different modes of action, where the child uses a primary artifact. Wartofsky specifies this: They are "reflexive embodiments of actions or praxis, in the sense that they are symbolic externalizations or objectifications of such models or actions" (Wartofsky, 1979, p. 201). That means that children are able to reflect and speak about their own activity in play and to use different kinds of models, for example by saying: "We pretend to be racers, and we make a bloody smash-up."

The tertiary or imaginative artifacts "constitute a relatively autonomous 'world,' in which the rules, conventions and outcomes no longer appear directly practical" (Wartofsky, 1979, p. 208). This level is reserved for novel works of art, social-political visions, etc., and are not a part of preschool children's play.

### **Play as Leading Activity**

Through play important changes take place in the preschool child's psyche which pave the way for the child's transition to a new, higher level of development (Leont'ev, 1981, p. 369). The leading function and its impact have a number of causes. In the first place, all three mediating factors are active in the child's play activity. Here the children are involved in an interaction with peers and adults, they use tools and artifacts, and represent the culture through signs and symbols. Secondly, in play the

children are able to master ideas and to carry through more advanced actions than they do in non-play situations. For example, a child is able to stand at attention for minutes while playing sentry, a concentration which goes beyond the child's daily skills. Through fiction, imagination and fantasy the child works out actions of make-believe, and in this world the child masters big things independently.

### **The Zone of Proximal Development**

In play the child raises the demand on himself and with that brings himself into a zone of proximal development, which Vygotsky defined as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). Through this kind of cooperation the child will raise his actions to a more advanced level, which starts new processes of development. According to Vygotsky, not only the independent actions in the zone of proximal development will support the development, the child's imitations have a similar effect. The child is able to imitate actions which go beyond his possibilities.

In play the child is always above his average, above his usual everyday behavior; in play he is as if head-high above himself. The play contains in a condensed way, like in the focus of a magnifying glass, all tendencies of development; in play the child tries as if to accomplish above the level of his ordinary behavior (Vygotsky, 1962, p. 74).

In play activity children very often go beyond the current contextual frame. The child not only appropriates the social surrounding world, he also makes creative changes. Play observations from preschools confirm that the children not only assume the topical culture, but expand beyond it. Through this activity new knowledge, skills and actions often will appear. According to Yrjö Engeström, this kind of activity is dramatic and radical for the future life of the individual, it is a turning point, a revelation. Engeström names this kind of learning activity "learning by expanding," which is like a "voyage through the zone of proximal development" (Engeström, 1987, p. 175).

Old and new, regressive and expansive forms of the same activity exist simultaneously in the society. Children may play in a reproductive and repetitive manner, but they do also invent and construct new forms and structures of play, new tools and models for play activity... Once in a while parents are astonished as they find their children playing

something which does not seem to fit any preconceived canons: something new has been produced "from below." Sometimes these inventions from below become breakthroughs that significantly change the structures of play activity (Engeström, 1987, pp. 173-174).

My observations in preschools and kindergartens confirm that children's play can in some way compare to Engeström's concept of "expanding learning," which is defined by three qualities: It is a learning activity which runs for a period, changes the situation and from which arises a new content. Because preschool children's play is in accord with the three criteria of expanding learning, and because their leading activity is play and not learning, I choose to name this type of activity—when we speak about preschool children—"expanding play."

### **The Psychology of Play**

Because of its mediating function and its potential for creating a zone of proximal development, play develops new structures in the psyche. From a psychological angle the most important meaning of play is its influence on development of motives and needs (D.B. El'konin, 1980). Play results in a movement from unconscious motives to more conscious motives. If a three-year-old girl plays at tucking in her doll, she does so just like her mother would, but her motive is unconscious. A girl of five performs apparently identical actions, but though the actions seem alike, the child of five is not content with just doing what adults did. In her consciousness the girl of five is a mother; she identifies herself with the role and appropriates the actions of the mother. This is the foundation for developing a new conscious motive: The wish to be an adult and act like the adults. Gradually the child understands that this demands new knowledge and skills and this new understanding leads to the development of a new motive: The learning motive.

In addition, play helps children to overcome their egocentricity. When the girl identifies herself with the role of a mother, she has to take over the motives, feelings and actions, which are attached to the role. Role-play also contributes to the inhibition of spontaneous action. In order to be able to play, children have to reflect on and arrange some play actions. Play implies that children reflect, then express their thoughts linguistically and finally carry out the play actions. In other words, there is a slow movement from unconscious and impulsive actions to conscious, will-directed actions. The order: action-speech-thought is changed to the reverse order: thought-speech-action.

Play develops imagination and fantasy. The child can only carry out the role-play, if he is able to imagine the role and the actions. Children have to ascribe another meaning to the play actions and play accessories. For instance, the girl has to imagine that a table is a bed. Otherwise it is meaningless having the doll on the table.

Finally, play develops the social capacity of the children. The individual role demands particular play actions. Because play is an activity children want to do, they enter into an agreement with each other. The play helps the children in a meaningful way to subordinate to one another's play wishes. In this way the role-play will contribute development of new mental functions and structures: the learning motive.

### **Drama-Games**

During the age of six the role-play gradually changes. The child becomes conscious of his or her own activity and as a result, the rules behind the roles become conscious to the child. This forms the basis of mastery of new forms of play. Six-year-old children are able to organize and play games with rules independent of adults.

These are games, whose fixed content is no longer the role and the play situation but the rule and the purpose. Such, for example, is hopscotch; it is necessary to achieve a certain goal set by definite conditions (Leont'ev, 1981, p. 386).

In this kind of play the rules are relatively specific and arbitrary. They are based on agreement among the children on specific acts that are allowed. These rules must be known and understood before the games begin. Awareness of the purpose of play leads to specific results.

The development of this new level of play makes it possible to introduce new types of play. Leont'ev mentions different "borderline games," including the development of dramatized games and improvised games (Leont'ev, 1981, p. 389). Based on Leont'ev's work, I developed a new type of play in collaboration with pre-school teachers: Frame-play or drama-games.

Unlike role-play, the drama-game is a play activity in which the children and the teachers plan together. They decide contents, settings and frames of the game,—hence the name. They discuss the different roles, the rules within the roles and possible actions. The decisions the children make are formulated verbally but also in creative drawings and paintings, which serve as models. In accordance with Davydov (1977) and Aidarova (1982) these models

help to develop a new self-esteem and consciousness of the children's own activity as well as incipient reflective thought. After this planning the play is carried out.

The drama-game thus contains several elements that have been decided on beforehand among the children and the adults. Because there is a certain interval of time between the decision of play and carrying out the play, the roles, rules and the actions are prepared thoroughly. Often the children produce a lot of accessories for the game. For instance, for a game involving ships the children may create an engine, a bridge, a wheel, and an anchor in addition to aprons, and money to go shopping at the store and restaurant. In this way, frame-play is more organized and more purposeful than role-play. According to Leont'ev, the play motive in drama-games is different from the motive in the role-play. In role-play the motive lies in the play itself. In drama-games the motive is consequently shifted more and more to the result of the play activity.

### **Research Questions**

In a pre-school we experimented with using the frame-play or drama-game together with a group of 20 children between 5 and 6 years. There were many questions raised: does the more organized drama-game demand too much expanding? Will it cause a storm in the zone of proximal development? Will the drama-game bring the child high above the top of the wave? In other words, will the collective organization of the drama-game go beyond the children's capacity and create a zone of proximal development? Will the children be brought in to an activity which is characterized by motives which in Leont'ev's words are "only understandable" (Leont'ev, 1981, p. 402)? Will the play's character of independence, creativity and its voluntary aspect be spoiled, and with that bring a function of adjustment?

### **Dialogue: Playing Hospital and Fire Station**

Following field trips to the local hospital, the fire station and the first-aid station the children expressed a desire to play hospital. The children had a good idea of the technical aspects of a hospital, but lacked an understanding of the human relations involved. Because a play indicates that knowledge about human relations strengthens the children's play (Launer, 1968), the teachers under the field trips helped the children to observe and appropriate the human relations, for example, the relation between doctor and patient, and between fire chief and firemen. On the basis of these experiences the children prepared a big play activity about activities in a hospital and a fire station.

The children discussed roles and actions and very quickly formed small groups to prepare their activities and to work out the necessary equipment and costumes.

The following morning the children started to change the rooms. In the hall they worked out some important functions: Two tables made a control table, where they placed a telephone and an alarm made of a red bicycle lamp. In the middle of the room some children constructed an ambulance out of two rows of chairs on which they placed a mattress as a stretcher, and in front two chairs as a seat for the drivers. Finally, the fire engine was constructed of two rows of chairs with the backs against one another for the firemen. The children's classroom was transformed into the hospital's emergency room. Two girls placed a mattress on a table for the patient, and they set up a first-aid box and three small baskets with operating instruments, dressing materials, etc. Moreover, they installed a lamp as an X-ray machine and a row of chairs as a waiting room. In an adjoining room a number of mattresses served as a sick room.

Two children, Jesper and Nema, both wearing fire helmets, used a green garden hose as a fire hose. Some children tugged on the other end of the hose and they all quarrelled and fought over the hose. One of the teachers remarked: "Just wait until the fire chief shows up, then he will set you to work," and the children accepted this solution. As the preparations fell into place the children started playing. Nobody said, "Now we play," rather, the preparations merged slowly into play.

### Quick Response

In the fire station, fire chief Frederik sat at the control table typewriting, while the drivers Jesper and Mads waited eagerly. Nema and Lennon as firemen sat in the fire engine, and Nema made a call on the walkie-talkie:

**Nema:** I am going to call the chief.

**Lennon:** What? I will do the same thing. You know something? I will call you.

**Nema:** Lennon don't. Now it is my turn.

**Lennon:** I haven't tried. (Lennon makes a call to the control table, where Anders is placed.)

**Lennon:** Anders, Anders!

**Nema:** Firemen won't do like that (Frederik picks up the call and turns towards Anders).

**Frederik:** Then you will say.

**Anders:** Hello, hey fireman (Nema accepts that Lennon receive the call).

**Nema:** Hurry up! Answer the call. (Lennon picks up the walkie-talkie.)

**Lennon:** What's going on? (Anders thinks they have been out driving.)

**Anders:** It's O.K. to return. Return.

**Lennon:** Oh well, hey.

After this dialogue the children sat waiting. Apparently because no alarm came in, Nema took the initiative to drive the fire engine.

**Nema:** We go for a drive, you drive. I call the fire station. (Frederik picks up the message)

**Frederik:** Hello.

**Nema:** I call you, I want to speak with you, boss.

**Frederik:** Hey, it's the fire-fighting service.

**Nema:** Shall we return?

**Frederik:** Yes.

**Nema:** O.K. we will do it, hey.

**Lennon:** (In a correcting way) Nema when you do this, don't do it like this.

An observing teacher warned the boys at the control table that there would soon be a fire. She switched on the bicycle lamp, which she placed under some red tissue paper. The chief fire officer grabbed the phone.

**Frederik:** Hey, it's the fire station, return quickly, there is a fire. Bring the fire engine to the scene of the fire.

Nema and Lennon, sitting in the fire engine, made sounds like a siren, jumped off the car and dragged the fire hose through the room. They uncoiled the hose; Nema grabbed it and climbed the ladder.

**Nema:** Where is the fire?

While he searched for the fire, he observed Anders running around with the bicycle lamp and the tissue paper. Then he climbed off the ladder, catching the hose in the ladder and turned, irritated, to Lennon.

**Nema:** Now you fix the hose with me.

**Lennon:** Nema, you will put out the fire all the time.

**Nema:** (He ignores this objection) I tell you what, we have to hose with water, lots of water.

Lennon felt too controlled, but before the conflict expressed itself a child shouted: "There is a fire in the hospital." Another boy added: "We only pretend." At the control table Frederik talked to Anders.

**Frederik:** Anders, Anders, we have a call. Won't you come? We will take a ride to the hospital.

**Anders:** I have to tell the man in the hospital.

**Frederik:** Yes, No, tell the firemen.

After this mission was finished the fire engine was ready for the next task. A new call came: "My cat is in the top of a tree, I can't fetch him." Later a call came about a car which wouldn't start; then a call about a fire in a refrigerator; and one about a fireman who broke his leg.

### At the Hospital

Parallel to the activities generated from the fire station, we saw a corresponding activity in the hospital. The house was humming with activity. Stine, a girl of five, imagined she has fallen and hurt herself. "Help! I have broken my leg," she cried, while she simultaneously smiled with joy. A teacher called in an ambulance. Jesper and Mads appeared as ambulance drivers. They opened the door of the ambulance, Jesper climbed on to the chairs and got the mattress and with great precision and skill he pulled it out. Very carefully they lifted up Stine and placed her on the stretcher. With the stretcher between them they brought her to the hospital, where they placed her on the examination couch. Jesper, the driver, stayed to observe the doctor and the two nurses, who now examined Stine. The nurse, Gitte, asked Stine about her fall.

**Gitte:** What's the matter with you?

**Stine:** I'm sick.

**Gitte:** You have to sit in the waiting room. Where have you hurt yourself?

**Stine:** I have broken my leg.

**Gitte:** I will give you a bandage, or put your leg in a cast.

The doctor and the two nurses searched for tools. Their bodies expressed concentration and involvement. They were very absorbed in using the tools (the plaster, the syringe and the gauze bandage). At this point the objects were much more important to the nurses than their contact with the patient. But Stine did not miss the communication, she lolled on the couch, looking as if she enjoyed the treatment. At the same time the nurses spoke about the tools.

Does this stick correctly?

Certainly.

Lots of people are waiting outside.

You have water in this one? Shall I fill up?

No.

I would like to apply a plaster.

Where are the small plasters?

Well, where are they?

After a while Stine was wrapped up in gauze bandages, and Jesper helped her to enter the sick room, where three girls at once included her in their fellowship. The four patients were on mattresses with pillows and sleeping quilts.

Let us say we have been friends for a long time.

Indeed, we four have been friends.

Four children who have been hurt.

Four children who have been good friends and who have been playing together.

As they talked, the girls snuggled down in the sleeping quilts and lay close together. Their body language showed that they really felt comfortable and were enjoying themselves. They started talking about the time they went camping with the preschool, and for a while they dropped the role of patients.

After about ten minutes the four girls returned to the play world through the appearance of Sofie as nursing aide, who interrupted their coziness.

**Sofie:** Would you like something to drink?

**Maja:** Yes, please.

**Sofie:** (Sofie fills up a glass with juice and drops a little.) Oh shit.

**Line:** I would like something too.

**Sofie:** It's empty. I go and get some more, and food too. (Sofie returns with juice, fruit and some crackers) More juice and clean mugs?

**Stine:** Why do you bring me food, I should not have anything. I would like to read in a book.

**Maja:** Can I put my mug over there?

**Line:** I need more food (And with this remark Maja and the fourth girl cry out): More food. I have not finished.

**Sofie:** It's O.K. but it won't be the same, we miss fruits.

Back in the hospital there was still a lot of activity. A teacher and two children entered the waiting room. The teacher groaned that she was overcome by the smoke and about to faint. Mette the doctor got busy. She measured the patient's blood pressure and raised her arm. The teacher asked: "And afterwards, what is going to happen?" The doctor did not reply, but turned to the two nurses. But the teacher carried on: "I feel sick, I have asphyxiation." One of the nurses caught this remark and fetched a pail for her to vomit into. The teacher acted really sick, coughing, vomiting and coughing again. The nurses helped the teacher to the Xray machine. While the nurses worked,

Camilla, age five, entered with a big smile: "Look at me, I'm cleaning." She imagined the role and identified herself with the role. She wrung the water out of the mop and washed the floor in the sick room. She was a cleaner.

### Analysis

The play activity consisted of a row of isolated episodes: The firemen responded to a fire, the doctor examined the patients, and the cleaner mopped the floor. But we can also see coordinated play actions: The teacher set something on fire, after which the children raised the alarm, the chief fire officer answered the phone, turned on the red light on the control table and the firemen went into action. Or the patients moved from the waiting room into the hospital and then they ended up in the sick room. This play sequence took about three hours and contained quiet periods as well as action situations.

### Motives, Emotions, Involvement and Personal Sense

In the episode "firemen in action" the firemen Nema and Lennon took the initiative themselves. First they made a call to the chief fire officer and later they arranged a drive. Apparently the play actions were carried through by means of genuine feelings, motivated by what Leont'ev's called "really effective motives" (Leont'ev, 1981, p. 402). For example Nema took a number of initiatives: He called the chief, he climbed up the ladder in order to put out the fire. He placed himself in the center of the events, created exciting activities, and presumably he saw himself as an active subject. He was a fireman, and for him it was meaningful to put out a fire. Using Leont'ev's terms, the object of the process coincided with the objective that stimulated the subject to his activity (Leont'ev, 1981, pp. 399-400), and therefore the subject experienced a feeling of meaningfulness.

But what about Lennon, who is one year younger? He complained that Nema put out the fire. Was he so dominated by Nema and others that the role of fireman was less meaningful to him? I don't think so. Though Nema made the call to the chief, Lennon actually carried through the call, and later when they took a ride, Lennon drove the car. So Lennon was involved in the play, which gave him a feeling of personal sense.

The characteristic involvement and personal sense was expressed by the two nurses and the doctor through their body language and their power of concentration concerning use of tools and the interaction with the patients. All the children were absorbed in their role, they elaborated actions which corresponded to the role, and

they expressed consciousness, joy and involvement. The children's play activity felt meaningful. Take for example Camilla, who created the role of a cleaner. In an subsequent interview where we together looked at some photos, I asked her: "What do you see in the picture?"

That's me, I am a cleaner.

How did you get this idea?

Well, it just came into my head. We have to clean the house.

You like to clean?

Yes, because I use water, real water.

According to Leont'ev's object-motive categories Camilla's play was meaningful because her motive coincided with the objective: Camilla says first she got the idea to be a cleaner (motive), then she wrung out the mop and washed the floor (play actions), through which she realized the object of being a cleaner.

### Whole, Complexity and Consciousness

In "firemen in action" the boys were conscious of the coherent play pattern: Call to the chief fire officer, alarm, firemen on their guard, response, fire-fighting and back again. Nema demonstrated this consciousness. He was eager to put out the fire but he managed his patience. He knew he had to wait for instructions from the chief fire officer, so he used the waiting time making walkie-talkie calls and taking a ride. He was conscious of the rules of reality and of play, and he accepted these. We see a corresponding consciousness in Frederik, when Nema asked him to return in a call. "Yes," Frederik replied, because he thought the fire engine ought to be in its place. This consciousness was inside the command: "Fire station here, return, we have a fire." And later when there was a fire in the hospital and Anders asked if he should tell the man in the hospital, Frederik rationally responded: "No, tell the firemen." In the play "hospital" the children also expressed a coherent understanding. Stine and Jesper participated in all the phases of the activity, from Stine's fall to the coziness in the sick room.

### Expanding Play

In play, children reflect their experiences, and they take independent initiatives. They play up to each other, and understand how to make use of these challenges. They bring each other into a zone of proximal development, but they do not exceed the zone, even when the teachers enter into the play. In the situation where the teacher was overcome by smoke, she challenged the doctor Mette with questions, and though Mette did not reply, the teacher

carried on. Thus, the teacher enriched and expanded the play, but always on the grounds of the children's premises, and without going beyond the zone of proximal development.

Most of the play actions are worked out in agreement with the children's experiences and the frame of the play, but some new actions come into existence, for example in the sequence with "the four friends." The drama-games also form the basis for the emergence of new games when the concrete drama-game ends. The children may use the equipment and costumes for developing a complete new play.

### Educational Principles

Generally the characteristics of drama-games in pre-school are:

The child's motive is in accordance with the object, consequently the activity is meaningful.

The children are engaged in the activities and they express genuine feelings, that means the motives have the character of "really effective motives."

The children understand the whole of the play, and they are able to take in the connections between the single play actions.

The contents and elaboration of the play challenge the children, but do not exceed the zone of proximal development.

Because of these qualities, the drama-game "Quick Response" has the potential to contribute to the children's psychological development. A drama-game will have this stimulating function assuming the following criteria are met:

1. The theme of the drama-game has to be formulated on the basis of the children's interests and motives, for example in extension of an earlier project work or a joint excursion.

2. In order to build up the common frame and to play on the basis of the theme, the children must have insight into and experiences in connection with the subject of the play. The very best foundation is the children's own physical experience. For example, through an excursion to the hospital, the harbor or the airport where the children have an opportunity to study the relations between the acting people.

Naturally, a drama-game can be established on the basis of a story or a movie, but six-year-old children prefer the first-hand experience.

3. In connection with the arrangement of the drama-game the teachers are responsible for encouraging and supporting the children and for promoting a good atmosphere.

4. The children have to express the frame of the drama-game themselves. The teachers should support and guide, but they have to be very gentle in the way they make suggestions and introduce play-scenarios and ideas for the frame of the play activity.

5. In order to inspire the children to play, the teacher has to take an active part in the play through a genuine involvement. The teacher has to be sensitive about the children's response, and has to find the balance between inspiring the children and drowning the children with ideas, which will impede the children's own initiatives. The teacher's roles in play are to support, enrich and expand the play—but without exceeding the zone of proximal development.

On these premises, the organized drama-game has the potential to contribute to the development of qualitatively new structures in the child's psyche.

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## Formalization as a Social Project<sup>1</sup>

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Formalization is, among other things, a discursive operation. One can talk about bridges and shops and cold fronts in many ways and for many purposes. Technical people, though, want to talk about these things in a particular way—formally—and for a particular sort of purpose—instrumental appropriation. Technical discourse stands in special relationships to other kinds of discourse, most especially what I will provisionally call “ordinary language.” Technical discourse, much more than ordinary forms of language, participates in strictly regulated structures of authority and ownership: only an accredited technician can use technical language felicitously, yet the goals and products of technical work are explicitly the

property of the institutions that pay the bills. At the same time, technological research often marks its progress in relation to the world of ordinary experience, precisely by its success in applying formal reason to matters previously left to the informal judgement of ordinary people. Presentations of technical research papers are often organized around this transition from ordinary experience to formal reconstruction. In the course of this transition, they construct a definite social organization of language use around a series of oppositions: ordinary versus technical, informal versus formal, vague versus precise, unaccredited versus accredited, and unregulated versus appropriable. As an example, consider the following passage, about which I have written elsewhere:<sup>2</sup>

Consider how an ordinary day is put together. You awaken, and as you lie in bed, or perhaps as you move slowly about in a protective shell of morning habits, you think about what the day will be like—it will be hot, it will be cold; there is too much to do, there is nothing to fill the time; you promised to see him, she may be there again today. If you are compulsive, you may worry about fitting it all in, you may make a list of things to do. Or you may launch yourself into the day with no clear notion of what you are going to do or how long it will take. But, whether it is crowded or empty, novel or routine, uniform or varied, your day has a structure of its own—it fits into the texture of your life. And as you think what your day will hold, you construct a plan to meet it. What you expect to happen foreshadows what you expect to do.<sup>3</sup>

This is the opening paragraph of one of the most influential early works of artificial intelligence. The theme of ordinariness appears in this passage in several ways. The opening sentence appeals to us to consider how an ordinary day is put together. The ordinariness of this day is motivated through lists of mundane considerations, which together serve quite compactly to project a definite social order, not least with reference to social relations of gender. One is reasoning about one's day, and the ordinariness of this reasoning is conjured through the colloquial phrases and lilting rhythms of the language. At the same time, the paragraph also enacts a trajectory from these ordinary modes of language and reason to the technical modes of language and reason that will occupy the book. This trajectory will be obvious to the trained technical reader, but it is otherwise wholly obscure. It helps to know that the project is to motivate a technical notion of “plan,” roughly a computer program in one's head that is the cause of any given structure or regularity in one's outward behavior.<sup>4</sup> It is this knowledge, for example, that allows one to make sense of the overt contradiction between the propositions that “you may launch

yourself into the day with no clear notion of what you are going to do or how long it will take" and that "as you think what your day will hold, you construct a plan to meet it"—the answer being that an empty plan is still a plan, in the technical sense, just as an empty set in mathematics is a set.

Technical language, as I will use the term, involves a systematic ambiguity between two domains of reference: that of the territory being formalized and that of the Platonic realm of mathematics. One paradigm case of technical language occurs in story problems. The snails and horses in a story problem function as mere ciphers in an allegory of integers and cosines.<sup>5</sup> Story problems thus call for special forms of reading, not ordinary imaginative story-reading but a sort of decoding that reveals the math behind the narrative. Political allegories tell of farm animals; technical allegories tell of scenes from ordinary life. Yet whereas a political allegory can be decoded to obtain a critique of an actual king,<sup>6</sup> technical language is strangely dependent on the "ordinary" language which it constructs and then purports to replace. The integers and cosines in a story problem are abstract mathematical quantities: they are not themselves the cables and pulleys and engines and bearings which figure in the actual practical problem that forms the instrumental test of technical reason. A formalization, in short, can never exhaust its object. In order to speak of actual material things, technical discourse must rely on its embedding in the discourses and practices of the surrounding institutional context. If economics is to speak of a shop's finances, or if meteorology is to speak of an advancing front, or if mechanical engineering is going to tell us whether a certain bridge will remain standing, then somebody must engage in the situated interpretive effort to gloss his or her concrete circumstances in ways that can be assimilated to technical terminology. Different technical fields understand this necessary interpretive effort differently, but none of them understands it very well.<sup>7</sup>

In this light, let us reconsider the ideological oppositions that, I have claimed, structure technical discourse. The discourse of formalization constructs itself as technical, formal, precise, accredited, and appropriable, and it constructs its other as ordinary, informal, vague, unaccredited, and unregulated. This figurative alter-discourse, it turns out, is not the discourse of "ordinary" people. It is, rather, the shadow side of technical discourse itself. Technical language is perfectly formal and precise in its reference to mathematical quantities (integers and cosines), but it is also extremely informal and vague in its reference to the objects of formalization. The use of a technical word like "plan," for example, is constrained only by the possi-

bility of producing a technical gloss that "works" — that is, that is understood by some sponsoring agency to solve its problems. In this sense, technical language is not simply indexical (like any type of language) but is in fact continually reorganized within a reflexive totality wholly subordinated to the specific institutional setting whose "problem" demands a "solution."

Technical language, then, figures in a project of instrumental appropriation. This project has a dual structure, in which "the technical" figures as an ideological "high" term and "the ordinary" figures as an ideological "low." "The technical" marks itself as privileged in relation to "the ordinary," and moreover makes "the ordinary" the object of a colonial project of reform. Yet in reality these opposed terms are two sides of the same coin, joined in a relationship that cannot be either stabilized or eliminated. What the social project of formalization produces is this coin itself.<sup>8</sup> The raw material for this project, the actual pre-technical state of language and practice, is neither "technical" nor "ordinary," neither "precise" nor "vague," indifferent to accreditation, and regulated not by the universal leveling of pure appropriability but by whatever configuration of power and ideology happens to operate in a given social locality.

The manifestations of this social project are clear enough, but who exactly is the subject of this project? Whose project is it? It is easy enough to find positivist fundamentalists who profess such views; many of them have even dedicated their lives to the ideologically conceived project of reform which is the banner of formalization. A substantial twentieth-century tradition, all the way across German philosophy from the phenomenologists to the Frankfurt School, has been willing to identify technical rationality as the defining trend of the age. But this is a mistake, for two reasons. Formalization is not the only colonial project on the block; marketing, for example, is a powerfully driven social force with its own designs on the conceptions of self and other of "ordinary" people. Indeed, within the average large corporation one can readily identify the conflictual border between these contrasting colonial practices, each with its gaze set on its own ideological objects. And in relation to each of these social projects one can readily discern resistance. The very contradiction between the two of them provides abundant evidence for the social cognition and political consciousness that would identify and refuse them both. The process, however, is neither simple nor uniform. The disparate forces and their contradictions show up in different ways in each of the steadily multiplying localized sites of social practice: in professions, in laboratories, in medi-

cal examinations, in front of the television. The challenge for critical thought is to identify the multiplicity and the unity of these disparate sites of social practice and to re-specify the specialized epistemology of the accredited practitioner as the political consciousness of the disciplined subject.

## Notes

<sup>1</sup>This is a slight revision of a position paper I wrote for a symposium entitled "Knowing and Knowledge: Re-Specifying the Role of Formalization in Computer and Social Science," organized by Elin Pedersen and Lucy Suchman and held at Oksnoen, Norway in June 1991. I have so much writing to do that I am unlikely to publish its ideas at full length for several years. So I hope that this informal version might be of some interest in the meantime. I am grateful for comments by the participants in the Oksnoen workshop, in particular John Bowers and Reinhard Keil-Slawik.

<sup>2</sup>See Agre (1990). Copies are available from me at [pagre@weber.ucsd.edu](mailto:pagre@weber.ucsd.edu) or Department of Communication D-003; UC San Diego; La Jolla CA 92093.

<sup>3</sup>Miller, Galanter, and Pribram (1960: 5).

<sup>4</sup>For a general discussion of plans in the technical tradition descending from Miller, Galanter, and Pribram, see Agre and Chapman (1991). I will also discuss this tradition more fully in Agre (forthcoming).

<sup>5</sup>For a fascinating account of this point and its consequences for math teaching see Voigt (1989). See also Robinson (1991) and Walkerdine (1988).

<sup>6</sup>This isn't really right about allegory. For a historical survey of more interesting views see MacQueen (1970). For the contemporary interest in the general issue of allegory and representation see Greenblatt (1981).

<sup>7</sup>This point is terribly difficult to state accurately, much less to defend. I will take it up at greater length in a paper on technical language currently in preparation.

<sup>8</sup>This argument was inspired by Stallybrass and White (1986).

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