

The Relationship between Subject and Object from the Perspective of Activity Theory

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1 Introduction

The general concept of activity and the concept of activity in psychology

The theme to be discussed here has been a recurrent one in the discussions I have shared in recent years with Henrik Poulsen, Niels Engelsted and Lars Hem. It involves an attempt to understand the specific meaning of the concept of activity which, as the name suggests, is the central concept in the Soviet psychologist A.N. Leontiev's (1903-1979) so-called theory of activity¹.

I will start with a general introduction (sections 1-3) and then go on to analyse the concept of activity in psychology (sections 4-5). Next, I will consider the assumptions and implications of this activity concept with respect to the understanding of nature or matter in general (sections 6-7), that is, questions that are relevant to the subject matter of other sciences including philosophy.

Finally (sections 8-10), I will return to psychology and consider the possibilities of reformulating the concept of activity, so as to make more clear its general content with respect to the world's organisation in general, and its *specific* content concerning psychology.

It is, of course, a very ambitious enterprise and I claim in no way to possess a final solution. In the short space available here it will only be possible to present suggestions and problem formulations.

On the other hand, I believe that there is an urgent need to understand what assumptions and implications the concept of activity involves outside of psychology's own field.

Psychology may be seen as a figure on a ground. This ground is made up of other sciences such as philosophy, physics, chemistry, biology and sociology. The possibility of making the concepts of psychology more precise depends upon which ground one is standing on. Among other things the problems which many have in understanding or accepting the meaning and implications

¹ See A.N. Leontiev *Problems of the Development of the Mind* (1981) and *Activity, Consciousness, and Personality* (1978).

of activity theory within psychology have their basis in what I will call a mechanistic understanding of the world in general. This mechanistic understanding comes from outside of psychology. This implicit understanding of the world needs to be made explicit, to be refuted and then replaced by an alternative before we can come any further in the discussion of the conceptual foundations of psychology.

2 The concept of activity and dialectical materialism

Before embarking upon a closer analysis of the concept of activity I would first like to take into account a possible objection.

An obvious objection to my project is that Leontiev himself has already stated the extent to which the concept of activity is bound up with one's understanding of the world and of the different sciences. He has done this by basing the activity concept within the methodological and philosophical framework of dialectical materialism and marxism. According to this objection there should not be any need for a further explication and discussion of the activity concept's and activity theory's general philosophical foundation.

This is an understandable objection, but it also shows why the concept and theory of activity might not have achieved the success they deserve. Dialectical materialism and marxism are certainly a big mouthful to swallow. However, I do believe that to a much greater extent today than during Marx' and Engels' time it is possible to make more precise and concrete that part of dialectical materialism that primarily constitutes the philosophy behind activity theory. Finally, I am convinced that such a clarification includes new formulations and further theoretical developments of this philosophy.

Dialectical materialism as a conceptual framework may at first appear to be pure philosophy and methodology. In terms of a widespread understanding this means that it has an a priori or dogmatic character.

However, I am of the opinion (cf. Mammen, 1986) that in the long run there are no philosophical questions in this sense, and presumably dialectical materialism would also maintain this. It is correct that behind actual scientific knowledge there lies philosophical opinion and understanding. But it is also correct that behind philosophical views there lies actual scientific knowledge and other experience. Philosophy as such is not an a priori science. I will claim that there are no a priori sciences. Not even logic or mathematics ought to be described as a priori sciences.

At any given time during the course of history questions may appear to be a priori or "purely philosophical". But in the long run the questions are bit by bit transferred to real scientific questions that lead to their practical settlement. This process is, of course, a long one, and I do not believe that we can

accomplish this process for all current philosophical questions including problems of the conceptual framework of dialectical materialism. So I will desist from any attempt to either "boil it down" to eternal and unchangeable fundamental principles or "translate" its assertions into more immediately real scientific questions.

I will let dialectical materialism stand as a profound but unfinished generalisation of scientific knowledge for which you have very good arguments, and can hope for still better ones in the future.

3 The psychological concept of activity as a possible paradigm for other sciences

Instead of a more general philosophical treatment of the relationship between dialectical materialism and psychology I will use the concept of activity or activity theory as a kind of probe which I will place into the conceptual fields of psychology, philosophy, physics, etc. in order to see how it relates to each. In this way I can perhaps make a contribution to the cohesion that exists between the various sciences and which we cannot do without.

In *Activity, Consciousness, and Personality* (1978, pp. 141-143) Leontiev discusses the problem of the connections and "transitions" between the different "levels" of understanding of man, which are abstracted in the different sciences, (e.g. physics, chemistry, biology, psychology, and sociology). This problem is of central importance to psychology.

But maybe this fundamental psychological problem, as illuminated by an examination of the activity concept, is also able to make concrete and explain more general and fundamental questions concerning the world's and matter's organisation. Maybe it is now the turn of psychology to make a contribution to our understanding of the world, just as it was physics's turn in the 17th century.

The developments in physics in the 17th century did not simply entail a revolution within physics itself, they also ushered in and legitimated the impressive mechanistic world view of the Late Renaissance and Age of Enlightenment².

Maybe a corresponding revolutionary development within psychology is on its way. Such an optimistic view has been expressed by Niels Engelsted (Engelsted, 1989).

In other words, we will see if the concept of activity involves not only a specific understanding of psychology and its subject matter, but also a more or less implicit, specific and fertile understanding of the field around and under psychology.

² Kurt Lewin (1931) has described this revolution in his famous article on Aristotelian and Galilean modes of thought in psychology.

4 The concept of activity and Leontiev's theory of activity

I use the term "concept of activity" instead of "activity theory" because I do not intend to discuss activity theory in its entirety here. I have in other contexts attempted to deal with activity theory in a broader sense (Mammen, 1983; 1986).³

I will focus here upon a central feature of Leontiev's definition of "activity" as given in *Activity, consciousness, and personality* (1978).

The feature in question is Leontiev's contrast of his "three-stage schema of analysis" or so-called "trinomial formula" with the traditional and more mechanical "two-stage schema of analysis", or so-called "binomial formula". Correspondingly, Leontiev contrasts the concept of activity with what he and the Soviet psychologist D.N. Usnadse call "the postulate of directness" (Leontiev, 1978, p. 47). Along with Dreier (1981, p. 11) one could perhaps say that Leontiev's activity concept implies a "postulate of indirectness".

I will briefly explain what Leontiev means by this three-stage schema of analysis and his "postulate of indirectness". I will take the opportunity, however, to state that I am not quite happy with Leontiev's terminology, since I think it is directing attention away from the essential point. Therefore, I will (in section 5) attempt to reformulate Leontiev's definition.

But let us first see what Leontiev himself has to say.

Leontiev takes as his starting point the famous First Thesis on Feuerbach⁴ by Marx, an extract of which reads:

"The chief defect of all previous materialism (that of Feuerbach included) is that thing (*Gegenstand*), reality, sensuousness are conceived only in the form of the *object, or of contemplation, sensuous human activity, practice*, not subjectively. Hence, in contradistinction to materialism, the *active side* was set forth abstractly by idealism - which, of course, does not know real, sensuous activity as such. Feuerbach wants sensuous objects, really distinct from conceptual objects, but he does not conceive human activity itself as *objective* (*gegenständliche*) activity ..." (Marx & Engels, 1976, p. 615). (Marx' italics).

³ The reader is also referred to discussions of this theory by Henrik Poulsen (1982; 1985), Ole Dreier (1974; 1981; 1983), Niels Engelsted (1984; 1989), Benny Karpatschhof (1984); Erik Schultz (1988) and a number of other Danish psychologists, primarily in the journals *Psyke & Logos* and *Udkast*.

⁴ cf. Niels Engelsted's contribution to this book.

Here Marx contrasts mechanistic materialism's view of the subject as *passively* receiving or contemplating the *external* object with idealism's view of the subject as *actively* creating its object in the subject's own *internal* form. As a dialectical sublation⁵ of this contrast, Marx establishes his own dialectical materialistic view of the subject as active and practically effectual in its connections with the external objects.

Leontiev transfers this to psychology. On the one hand we have the modern versions of mechanistic materialism, which, according to Leontiev, include behaviourism and "cybernetic" psychology and their theories of man as a passive recipient of the environment's stimuli or input. Regardless of diverse internal complications within the individual the basic conception is that of a passive two-stage schema of analysis: External stimulation of the individual and the individual's reaction to stimulation.

On the other hand we have the modern psychological versions of idealism; the "science of the spirit" and "mentalistic" psychology (Leontiev, 1978, p. 45), but Leontiev makes less of these. His main interest is in the more mechanistic, and natural science inspired psychologies, especially cybernetic psychology (in our day - "cognitive science") which he rightly accuses of reductionism and which he generally polemises energetically against.

Just like Marx', Leontiev's activity concept is intended to sublimate (aufheben) the opposition between the two one-sided views of the subject-object relationship - that of mechanistic materialism and that of idealism.

Leontiev dissociates himself from mechanistic materialism by replacing the object's direct determination of the subject. Instead, the subject's object-oriented activity becomes a "middle stage" between the object and the subject. Thus, the relationship between the subject and the object becomes indirect or "three-staged". Or as Leontiev (1978, p. 50) says:

"Thus, in psychology the following alternative was devised: either to keep the basic binomial formula: action of the object ==> change in ongoing condition of the subject (or which is essentially the same thing, the formula S ==> R), or to devise a trinomial formula including a middle link ("middle term") - the activity of the subject and, correspondingly, conditions, goals, and means of that activity - a link that mediates the ties between them."

⁵ "Sublation" (and the corresponding verb "sublate") is here used as a translation of Hegel's and Marx' concept of "Aufhebung" ("aufheben", respectively), which means a creative synthesis of two opposed conceptions that conserves their relative content of truth and at the same time denies their false or over-inclusive generalisations.

The distance to idealism is stressed to a slightly lesser extent, but occurs partly by the assertion that the object, which becomes the object of a subject through the subject's activity, at the same time also exists independently of the subject. It has its "independent properties, connections and relations" (Leontiev, 1978, p. 53).

But these definitions are hardly precise enough to make the concept of activity immune to the reductionism of for example "cybernetic psychology".

Leontiev defines activity's content as human life itself which he specifies in the following way (1978, p. 50):

"But what is human life? It is that totality, more precisely, that system of activities replacing one another. In activity there does take place a transfer (transition, transformation, JM's comment) of an object into its subjective form, into an image; also in activity a transfer of activity into its objective results, into its products, is brought about. Taken from this point of view, activity appears as a process in which mutual transfers between the poles "subject-object" are accomplished. "In production the personality is objectivised; in need (i.e. consumption, JM's comment) the thing is subjectivised", noted Marx.⁶

Leontiev is right, of course, but is it fully convincing? What are these "transfers" (transitions, transformations) that the mechanistic materialists are unable to grasp with their primitive mechanistic concepts? I expect that the most stubborn of them would claim that if they can be precisely explained then they can undoubtedly be simulated with a machine.

Leontiev experiments with more exact formulations of activity's special "circular structure" (1978, p. 53), but in my view, without achieving a conceptual clarification that is basically different from corresponding cybernetic notions of complicated feed-back mechanisms.

I believe that one of Leontiev's difficulties is that he uses a single definition for two purposes. On the one hand he deliniates dialectical materialism's world view from mechanistic materialism and idealism, and on the other hand he deliniates that activity which is unique to living subjects and especially the human subject. He thus says indirectly, on the one hand, that the "three-stage schema of analysis" and the "postulate of indirectness" are not applicable to inanimate nature; almost, in fact, that inanimate nature is passive and mechanically materialistic. On the other hand he is indirectly saying that life's special feature is that it fits with the principles of dialectical materialism.

⁶ In *Grundrisse*. See Marx, 1973, p. 89).

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This resembles, to a disturbing degree, Rubinstein's similar attempt in *Sein und Bewusstsein* (Rubinstein, 1973) to define the object of human psychology as being practically identical with the marxist theory of knowledge (cf. Mammen, 1983, pp. 157 and 163).

5 Activity as (real) abstraction

To untangle these threads one must on the one hand expose the fundamental dialectical materialistic claim concerning material activity which forms part of the activity concept, and on the other hand uncover the special claims concerning the activity of life and mental activity which also lay hidden within the concept - including the assertion concerning that which is specific to human activity.

The key to this task can be found in Leontiev's own work.

In connection with his discussion of the relationship between activity and consciousness (1978, p. 79), it is precisely the postulate of directness which Leontiev contrasts with his own opinion - "that the psychic image even from the very beginning "is related" to a reality that is external with respect to the brain of the subject and is not projected into the external world but more likely is extracted from it. Of course, when I speak of "extracting", this is only a metaphor."

In an article on "Psychology of the perceptual image" (1982) Leontiev uses the same expression - "extract" (in German - "herausholen"), and furthermore he does so in clear sympathy with J.J. Gibson's concept "pick-up" (cf. Mammen, 1986, p. 185).

The point here is that activity (in this case man's), through its special form, practically abstracts or "extracts" its objects from the world's multiplicity. Depending upon its form and direction, the activity brings the subject into contact with different aspects and levels of reality, which then asserts itself upon the subject.

The various forms of matter and their infinite number of properties first become abstracted into objects through the process of activity.

The keyword here is "abstraction". Activity is abstraction, or maybe one should say: Activity is "real-abstraction" so as not to confuse it with thought-abstraction which is a special case.

I think Leontiev would agree to this, and it might have given him an advantage in the discussion with the so-called "cybernetic theorists" (e.g. cognitivists) who basically only concern themselves with an already abstracted world - a world of "oven-ready" or "post hoc" objects in relation to man's experience.

My first assertion then is that *activity is abstraction*.

I am more doubtful as to the extent Leontiev would agree to my next assertion, namely, that *in this fundamental sense all matter is active*.

To go the whole length I will assert that this general activity in matter is a precondition for the special form of activity found in living activity, mental activity, and especially human activity or experience.

My assertion is actually analogous with Lenin's claim that there must be a general reflective capacity in matter as a basis for the special mental reflection (Lenin, 1972, pp. 37, 46, 92)⁷.

I will defend the assertion that activity, viewed as "real abstraction", is a property of matter and not just of life's activity, in the following sections (sections 6-7).

To defend such an assertion is, of course, not easy for me as a psychologist. I am neither a physicist nor a chemist, and one might therefore feel that I should refrain from making this type of claim. In fact, I would prefer not to, but feel forced into this discussion.

As I have mentioned earlier, psychology is a figure on a ground that consists partly of the natural sciences. And it actually appears that there is a more or less implicit view of nature in the psychological theories that I discuss here (e.g. so-called "cybernetic" psychology and apparently Leontiev's psychology as well) that is problematical, and which indirectly determines the definitions of psychology's basic concepts, e.g. the concept of activity.

The view of nature then is already part of the picture, and may therefore just as well be placed on the agenda - the sooner the better.

6 The concept of activity in the natural sciences

I am fortunate that certain natural scientists have pre-empted me by raising the question of what implications one's view of nature has for the understanding of life and man, and conversely, what life's and human culture's reality demand of the understanding of nature.

Here I will draw attention to the Russian-born, Belgian Nobel Prize winner in chemistry, Ilya Prigogine and his book *Order out of chaos* (1984), co-written with Isabelle Stengers.

One of Prigogine and Stengers' main tasks is to demonstrate how aged and inadequate the still commonly held mechanistic view of nature is. In a

⁷ See also Mammen (1983, p. 156) and Niels Engelsted's discussion of the question (1989, volume II, p. 72f), and finally Prigogine and Stengers (1984, p. 82).

brilliant historical review they show what a completely dominating role the classical, Newtonian view of the world as a deterministic machine has played up to the present, not just with regard to our understanding of nature, but also in philosophy and the human and social sciences. One has, therefore, had to choose between subjugation under the all-devastating power of mechanicism, or ignoring nature, with the consequence of alienating man from his natural background.

The authors point out, for example, the schism between our view of nature as something that moves without changing or developing, and our view of history as involving radical change and as something that cannot be turned back.

But that which is most relevant to my present purpose is probably the authors' demonstration of mechanicism's inadequacy within natural science's own central subject area.

The view of nature which they present as an alternative is a picture of a world undergoing qualitative change and development. Prigogine and Stengers talk plainly of an "evolutionary paradigm" (1984, p. 297f). Under certain conditions in which matter is in particular states of instability, there can arise new forms of matter through a process of *self-organisation*. If subsequent conditions allow, these new forms of matter may survive. Depending on chance fluctuations a *selection* (pp. 16, 276), or a *choice* (p. 160) occurs, and matter attains a new order upon the ruins of the old. Prigogine and Stengers talk here about "bifurcations" or about "symmetry-breaking" in which there arise new qualities - *new dimensions* in reality.

There are many examples of the appearance of such new qualities in the development of the universe. For example, the appearance of substance (matter and anti-matter) after the very first seconds of the universe's existence. Moreover, the unequal amounts of matter and anti-matter is a good example of broken symmetry.

The creation of elements from elementary particles and of the chemical connections even later in the earlier stages of the universe's development are also examples of the appearance of completely new qualities or dimensions of reality.

But there is one of these qualitative transformations that Prigogine and Stengers are particularly interested in. It is a property that becomes attached to ensembles or systems of particles. It is a completely new property of such systems, one which did not exist in the individual particles, namely, the system's entropy or degree of "disorder", a concept that is connected with the concept of heat and which is studied in thermodynamics, but which is not completely the same as heat.

The peculiar thing with entropy is that it is a magnitude that in an isolated system can only increase - it can never decrease. This is contained in the famous second law of thermodynamics or entropy theorem. The radically new element in this theorem in relation to the mechanical laws (both Newtonian mechanics and quantum mechanics), is that time is given a direction so to speak. The mechanical laws hold a neutral position with regard to the direction of time. A travelling system that follows mechanical laws, including the laws of quantum mechanics, will also follow them by travelling backwards in time.

The observational situation in quantum mechanics is, on the other hand, irreversible. According to Prigogine and Stengers this is connected with the fact that a change occurs between the microscopic and macroscopic (ensemble) levels, and this last level cannot be derived from the formalism of quantum mechanics (see also Nørretranders, 1985, p. 336).

The entropy theorem introduces an asymmetry in time that was not present at the mechanistic level. Ensembles of particles follow laws that cannot be derived from mechanics. Indeed, Ludwig Boltzmann, who developed a statistical theory of thermodynamics, tried to explain the entropy theorem in terms of mechanical principles. But, it is said that when he discovered his explanation was equally applicable if the system travelled backwards in time, he became so frustrated that he committed suicide. This was in 1906 (Prigogine and Stengers, 1984, p. 253).

Prigogine and Stengers also try themselves to explain the entropy theorem by using the concept of information. As far as I can see, their explanation is one concerning probabilities understood as subjective expectations and this solution is not better than Boltzmann's. My guess would be that the information concept has to be derived from the entropy concept rather than vice versa. Let us hope that if Prigogine and Stengers reach the same conclusion they take it better than Boltzmann⁸!

The interesting point concerning entropy then, is firstly, that it implies that nature's development has fundamentally irreversible features. Secondly, entropy plays a decisive role in the set of conditions which Prigogine and Stengers put forward as being involved in the appearance of new self-organised order (of qualitatively new matter) - including the appearance of life. It is on this point that Prigogine and Stengers are most comprehensive and enlightening, but I will not go into details about this here⁹.

⁸ The English physicist, Stephen Hawking (1988), expresses the same opinion concerning the relationship between information and entropy as I do here.

⁹ cf. Niels Engelsted's contribution to this book.

The crucial thing is the total picture of nature that Prigogine and Stengers put forward, in which new relations or connections create, so to speak, new objects or select them from the possibilities that matter provides. The objects are not determined in advance, whereafter they interact within the boundaries of their once-and-for-all given properties, such as the mechanists imagined it. On the contrary, one can say that the objects are selected or constituted as special objects for each other through their connections. It is not until after this that they interact within the boundaries of their connections.

Here, Prigogine and Stengers come close to Whitehead's "philosophy of *relation* - no element of nature is a permanent support for changing relations; each receives its identity from its relations with others - a philosophy of *innovating becoming*" (1984, p. 95, P & S's italics). They also talk of nature as active (p. 286).

Prigogine and Stengers accept that the so-called mechanical laws (i.e. those that are time-reversible) apply to some connections that objects can participate in, for example, as single particles in certain non-chemical interactions with low energy, and not to others such as ensembles. But they do not accept mechanicism, i.e. the mechanistic view of the world, and its belief that objects exist independently of, and before, their connections. This distinction, and with it the demarcation of the area of application of mechanical laws, has been, according to Prigogine and Stengers (1984, p. 252-53), an unsolved problem for classical dialectical materialism (e.g. in Engels' *Dialectics of nature*. See Engels, 1974).

7 Interim conclusions concerning the concept of activity

The main purpose of my above review was to demonstrate that the activity concept, defined by the so-called "three-stage schema of analysis" or "the postulate of indirectness", is already applied within the realm of inanimate nature. Here, as well as in psychology, one speaks of objects as only interacting within the boundaries of, or of being propagated or mediated by, a particular connection that can assume qualitatively different forms. The connection is also "active" in that it is not totally determined by its conditions, but also houses spontaneous features - so-called symmetry-breaking - that exceed the order or symmetry that existed in other dimensions of connections. This does not mean that inanimate nature is active in the same way as living subjects¹⁰ are, but

¹⁰ It may be difficult to directly see in what way many everyday things, e.g. tables and chairs, are "active". The fundamental point of view here, however, is that matter, as such, is active, and that it is on this basis (like a figure on a ground) that it should be explained why matter, under certain circumstances, can display great stability. Niels Bohr (1958; 1964) also presented the problem in this way, and attempted to discover those properties in the eternally mov-

merely that the concept of activity, as such, is not sufficient in itself to define the specific characteristics of life or of the psyche - or of subjectivity. Reference to the principle of activity - to the "propagated" or "mediated" relationships and to the active connections, is then, merely a general philosophical means of dissociation from mechanicism. This is both justifiable and necessary in a critique of mechanistic psychology. But it is not in itself sufficient as a means of pointing out or delimitting that which is uniquely subjective or psychic - and certainly not that which is uniquely human.

In completely the same way, it is not in itself wrong when Marx and Engels¹¹ say that

"Men can be distinguished from animals by consciousness, by religion or anything else you like. They themselves begin to distinguish themselves from animals as soon as they begin to *produce* their means of subsistence By producing their means of subsistence men are indirectly producing their material life." (Marx & Engels, 1976, p. 37).

Although it applies to more than just man, it is true enough that he, so to speak, produces, defines or abstracts himself through the act of entering into the essential connections in which he came into being and through which he develops. And our task in seeking a *scientific* knowledge of things is, quite rightly, to capture in *our* abstractions the *real* abstractions - the essential or active connections or relations. Marx and Engels formulate a *general* methodological principle and at the same time they apply it to man. But they have not as yet conceptually abstracted or defined man so as to distinguish him from animals. That requires a statement of the specific way in which man produces himself.

It is probably important to keep the more critical and general discussions of methodology apart from discussions that inside the framework of the former are more constructive and specific to a single science, as psychology, even though it may be difficult in the heat of the battle.

8 An illustrative model of activity as real abstraction

In section 5 of this paper I attempted to interpret the concept "activity" as abstraction or "real abstraction". Maybe some will feel that it is a poorly chosen term, especially if it is also to be applied to non-living nature.

I have considered other terms, but could not improve on "abstraction". One could perhaps say that the objects "create" each other and themselves in

ing micro-world that were necessary conditions for the macro-world's relative stability.

¹¹ In *The German ideology*. See Marx & Engels, 1976, p. 37.

their relationships or connections, but that sounds too idealistic. One could also say that the objects "define" each other in their relationships, but I think that sounds too mentalistic. By saying "abstraction" I indicate precisely that the objects do not define or create each other out of nothing. On the contrary, they "extract" each other out of matter's infinite possibilities. Maybe my partiality for the concept of abstraction is also connected with a picture or model that I have used in various contexts as a metaphor¹².

This model, which we may call the "camel-model" is shown in its simplest form in figure 1:

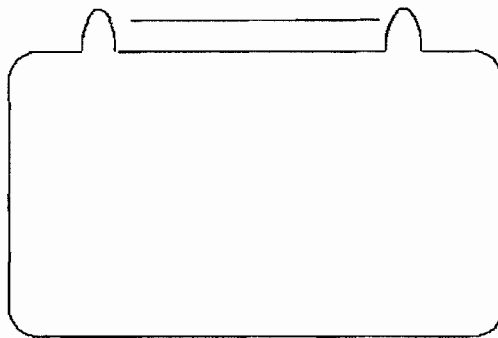


Fig. 1

The two "humps" are objects that are united in an activity, an active relationship or connection, indicated by the horizontal line. The lower continuous or "connected" piece is the objects' materiality, understood as the infinity of connections - the "context" - they engage in, in addition to that activity that defines them as objects for each other in a relationship.

One can also say that the activity, or the active relationship, abstracts the objects as figures on a common ground. The objects are separated out as objects by being connected in the activity. To a new kind of lawful connection there is a corresponding new kind of object. The connections and objects arise, so to speak, with and through each other.

There are many examples of this, as has been mentioned, in physics. Electric force and charged particles arise with and through each other; substance with and through thermodynamics, etc. I will not go further into this here.

Another example is of more interest to us here - the arrival of those special objects we call subjects, with and through the beginning of life-activity.

¹² The same model has been adopted by Fog (1986).

Life-activity is a special active connection which can presumably be defined as a new type of asymmetrical entropy-relation. Niels Engelsted, with reference to Leontiev and others, has discussed this in detail in his writings (1985, p. 103; 1989).

"Above", so to speak, this life-activity, there now arises the special case of psychic activity and therewith another new type of objects in the world, namely, objects that are not merely subjects, but subjects with a psyche¹³.

One might perhaps illustrate this with an elaborated version of the "camel-model" as in figure 2:

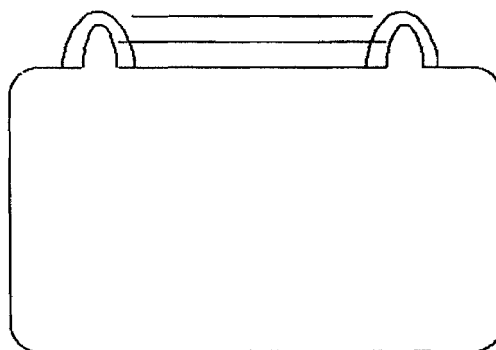


Fig. 2

Notice that at the same time as new subjects arrive, new objects also appear and vice versa¹⁴. Subjects that are equipped with a psyche are able to connect with, and make objects for their activity out of, other and much more comprehensive matters in the world, than subjects without a psyche (e.g. plants).

Figure 2 illustrates that there are simultaneously several qualitatively different "layers" in the individual's relationship to its surroundings, and that the "lower" layers are, so to speak, encased in the "higher" layers.

In section 10 I will return with examples to these qualitatively different layers in activity and therewith in the subjects and objects too.

The drawing in figure 2 is, of course, terribly primitive. That I dare present it anyway is due to the fact that it at least has some advantages over an al-

¹³ Niels Engelsted, Leontiev and Henrik Poulsen disagree slightly about the nature of this new type of activity that abstracts subjects with a psyche. I name them here in alphabetical order, but this order also corresponds, I think, to the chronological stages in the development of the species at which each of them places the arrival of the psyche. See Niels Engelsted in this volume.

¹⁴ The last mentioned implication, i.e. from the appearance of new objects for activity to the appearance of new subjects, is according to Leontiev, the dominating of the two in the development of the species and of the individual.

ternative that is more frequently seen. Two versions of this more traditional alternative are shown in figures 3 and 4.

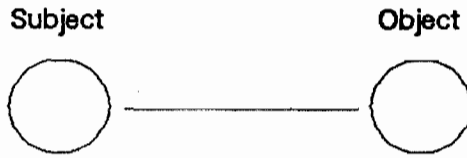


Fig. 3



Fig. 4

In these figures it is very hard to see what distinguishes the relationship between subject and object from simple stimulation or interaction; one could perhaps call it an "external relation", or in Leontiev's words a "direct" or "two-stage" relation.

I have seen attempts in some schematic representations¹⁵ to illustrate Leontiev's "postulate of indirectness" or the "three-stage schema of analysis" by drawing the activity as a particular instance between subject and object, as in figure 5.

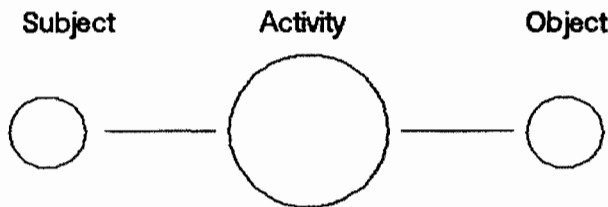


Fig. 5

Such an illustration is, I believe, misleading. Firstly, because it tends to somewhat substantivise the activity concept; secondly, because it still resembles

¹⁵ E.g. Hydén (1984, p. 116). Slightly different versions can be found in Schmidt, Thyssen and Hansen (1983, pp. 22, 24, 27), and Brostrøm (1983, p. 83).

normal mechanical interaction (merely with three stages); thirdly, because it does not indicate how the subject and object are abstracted by the activity; and finally, because it suggests that the connection between subject and object is, in one way or another, indirect, and actually becomes more and more indirect with the activity's growing complexity, whereas the opposite is nearer the truth. This last point is crucial. The development of activity brings us into closer and closer contact with still greater parts of, and still more layers of the world - it makes increasingly more of the world into objects for us.

The three-stage drawing is not far from being applicable as a good illustration of mechanism's particular understanding of the relationship between subject and object, where a particular physical contact surface - a particular a priori communicative stage - is placed inbetween subject and object. I have expounded upon this more thoroughly in my book: *Den menneskelige sans* (The Human Sense) (1983).

It is for the above reasons that (as mentioned in section 4) I am not satisfied with Leontiev's terminology when he talks about a "three-stage schema of analysis" or "trinomial formula" and implicitly about the "postulate of indirectness".

As has been made apparent, I would prefer "the abstraction postulate", or maybe, if necessary, "the postulate of connectedness", or maybe even "the existence postulate". Subjects and objects "ex-ist", they "stand out from" matter by virtue of the connections through which they operate.

One of psychology's most important tasks now, as Leontiev (1978, pp. 141-143) himself formulates it, is to describe the concrete contents of the different levels in the activities that connect subject and object, and these levels' reciprocal relations or "transitions". What are the specific characteristics of life-activity as such?; of psychic activity as such?; of activity at different stages in life's development?. As an attempt to answer these questions Leontiev (1981) has outlined a taxonomy of human activities based on conceptual distinctions between the stages of irritability, sensation, perception, thought and consciousness (cf. section 10). At the same time this is also a taxonomy for the stages of phylogenetic development from the simplest forms of life to man, and a taxonomy for the comparative study of the activities of the different species living today.

Important questions for psychology are not just how all these connections are defined, but also how they are related in man, in whom they all play a role. In figure 6 the different levels in the human subject's connections to his surroundings are schematically represented in a further elaboration of the "camel-model".

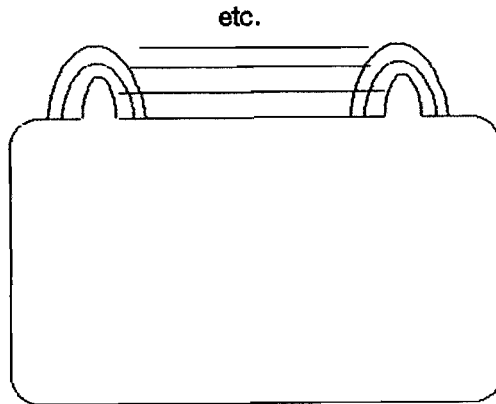


Fig. 6

It is not possible in the space available here to attempt to fully answer the above questions. Instead I present the outline of a basic understanding, within which an attempt at answering them can occur. In section 10, however, an attempt to answer a selected example from these questions will be intimated.

9 The "camel-model" as an explicit repudiation of reductionism (mechanicism, nominalism and epiphenomenalism)

The "camel-model" as outlined in figures 1, 2, and 6 is designed to illustrate an essential difference between a dialectical-materialistic and a reductionistic conception of the connections between subject and object.

The difference can maybe best be seen if we, as a contrast, imagine, as some reductionistic psychologists do, that the relationship between subject and object is like two computers communicating with each other.

Such an alternative mechanistic model which also distinguishes between different layers or levels of communication is shown in figure 7:

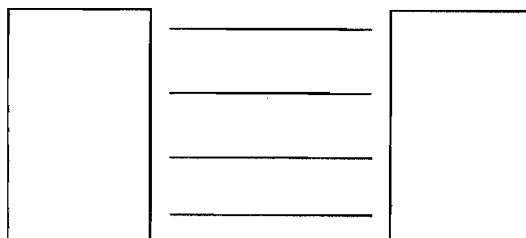


Fig. 7

At the bottom we have a physical process level where communication is described as electrical impulses. At the next level communication is described in

a binary code (e.g. as 0's and 1's). Then there comes, for example, an alphanumerical level with letters and numbers, and finally, a word-level or symbolic level.

Depending upon our purpose, we can choose to conceive of the communication on one or another of these levels. For example, do we intend to monitor "the hardware", or do we wish to understand the machine's capacity to translate from Russian into English?

But regardless of these possible levels of conceptualisation, we have to admit that there does not occur any *real* interaction between the computers above the physical process level. A sufficiently detailed description at this level would be enough to explain the interaction.

In this sense the other levels of communication are, so to speak, *imaginary* - something we chose to ascribe to the interaction in order to make it easier to understand or use the processes involved.

We could then, for example, draw the higher "horizontal" lines between the computers in dotted form, as shown in figure 8, so as to indicate that they are "imaginary", derived constructions, and then in contrast to that, we could draw the real "vertical" connections between the levels within the computers as unbroken lines to indicate the real "translations" or the "coding processes" from level to level. Finally, the lowest "horizontal" line between the computers could also be drawn as unbroken to indicate the computers' real, physical interaction. Any dotted line can now be viewed merely as a convenient "short-cut" description of a process that in reality operates along the unbroken lines.

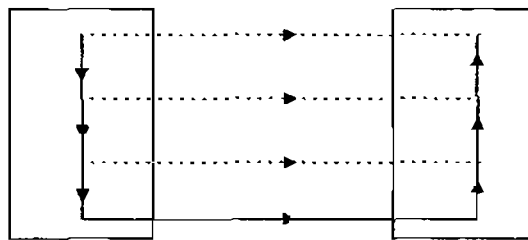


Fig. 8

In other words, the higher "horizontal" connections are in reality "epiphenomenal" or purely derived in relation to the real coding and interaction processes.

As long as we stick to computers we can all agree. But when this computer conception is used as an analogy or as a model for man's relationship to his surroundings it is no longer a statement of computers but of man. This is, in fact, the image of man embedded in modern mechanistic psychology that is supported when the computer analogy is used as a model, as it is, for example,

in so-called "cognitive science" and in the application of artificial intelligence to psychology.

Also in these traditions one talks about different levels of description, corresponding to different purposes or interests (or "stances" as Dennett says). But only one of the levels is considered real, and houses the real interaction or contact between man and his surroundings. The other levels are imaginary, albeit useful ways of describing or designating the systems. The computer model of man's relations with his surroundings is, therefore, a modern version of nominalism.

I will not discuss this viewpoint in detail since I have done so elsewhere (see Mammen, 1983, 1985). I will merely state that an activity theory viewpoint, in contrast to this "nominalism" or "epiphenomenalism", would claim that the different levels of human activity are real and cannot be dissolved in each other; and that certainly makes a difference.

The actual desire to reduce the number of levels, exposed by the computer model, cannot in itself be criticised. The attempt to avoid overcomplexity is a healthy scientific endeavour, and under certain circumstances it fortunately pays off. The method of breaking down or analysing complex relationships into simpler forms has, of course, been able to celebrate indisputable triumphs in the course of scientific history.

But if it can be convincingly argued that the different levels in this particular case cannot be reduced to each other, then it is unreasonable to work with a model that assumes that they can.

10 Psychological arguments for the "camel-model" and against reductionist interpretation of the subject-object relationship

The "camel-model" outlined above is just a skeleton that needs to be clothed in flesh and blood in order to become a psychological theory. To this end it is necessary that the different "levels" in the activities, the subjects and the objects are concretely designated.

For example, we might use Leontiev's (1981) distinction between the following five levels¹⁶.

1. The level of irritability, in which the objects of activity are chemical substances or physical energy in the surroundings that are directly necessary for life.

¹⁶ By using this example I am not saying that there are no more or less than five "levels" in the subject-object relationship. Neither is it my intention to say that a "lowest" level does exist in the relationship between subject and object, or for that matter between objects. These questions are for the time being too comprehensive to allow further treatment of them here.

2. The level of sensation, in which the objects are biologically neutral qualities in the surroundings and the objective connections of these with the substances that are necessary for life.
3. The level of perception, in which the objects are whole objects in the surroundings.
4. The level of intellect, in which functional relationships between whole objects are also objects of the subject's activity.

All these levels are, according to Leontiev, common to man and the highest developed animals, i.e. the anthropoids.

In addition to these levels, there is one more which applies to man alone:

5. The level of consciousness. With the aid of Leontiev (1982) this level can be characterised by the fact that the genesis of the surroundings' objects are also the objects of the subject's activity, or, put another way, the subjects relate actively to the surroundings' "historical deep structure".

There ought, of course, to be an argument for how all these five levels are qualitatively different from each other, and why they cannot be reduced to each other, and how they manage anyway to grow out of each other and operate together within the single individual's total life. Whether Leontiev actually carries out such an argumentation is, to me, an open question, and I will not attempt it here either.

I will make do with suggesting how the last level of activity - the level of consciousness - is separated qualitatively from the lower levels, and how it in principle cannot be reduced to these¹⁷.

The nucleus of my argument is that common to all the levels that are lower than the level of consciousness, is the fact that the relation between subject and object depends on what we may call universal qualities of the subjects and objects. The subjects relate through their activity to, or abstract, a sum of qualities in the object, including the object's quality of being reifiable.

The subjects are capable of learning and remembering, which means that they can relate to objects in ways that depend on whether or not they have had earlier experience with *similar* objects. The subjects can recognise the object's qualities and in a certain sense have an active "history".

As far as the most developed animals are concerned, it is also possible that in a very few areas, e.g. in the relationship to their young, parents or mate, they cannot only recognise these objects' qualities but also their so-called "numerical identity" - their identity with themselves over time - regardless of

¹⁷ I have previously argued more thoroughly for the claims I make here (e.g. Mammen, 1983; 1985; 1986).

the qualities' constancy or variance within certain boundaries. There is in that case not only talk of recurrent recognition but of a more lasting attachment.

Regardless of whether the most developed animals can do this or not within their "spheres of intimacy", it is in any case clear that they are unable to manage such a lasting attachment or maintained connection to objects as such. Animals cannot abstract objects' continued existence in time, or make this into an object for themselves, beyond the single or repeated act of recognition. For example, even chimpanzees have no relationship to their tools (sticks etc.) beyond those situations in which they have needed them. Animals do not make objects in the world into "their" objects in the same way as man does.

Animals are similarly not capable of abstracting an object's genesis - of seeing it as a product with a history or as a cultural product.

On the other hand, man has this ability to unite himself with the objects in his surroundings in lasting connections, or a relationship of solidarity, and thus he transcends, as it were, the purely qualitative recognition of objects.

This ability is the foundation of the whole of man's identity formation, beginning with the relationship to one's parents and the family's "possessions" and ending with the relationship to human culture - its history and its products. For some implications of this view to applied psychology, see Fog (1986), Hem (1986), Bertelsen & Hem (1987, pp. 399-407), and Bertelsen (1988, pp. 25-29).

Concerning the question of the qualitative difference between the human level of consciousness and the levels that are lower in relation to this, it is interesting that from simple and plausible assumptions about the structural or "topological" relation between, on the one hand, objects' qualitative similarities and differences - so-called "qualitative identity", and on the other hand, objects' identity with themselves and difference to all others over time, regardless of qualitative changes - so-called "numerical identity", one can in effect argue logically and convincingly that the conscious relationship (as it is defined here) cannot be reduced to the relationships between subject and object on the lower levels.

And, what is even more important, is that the relations at the lower levels do not "converge" to the higher levels in an orderly, approximating way that is similar to the convergence of physics' simple, idealised models (e.g. the mathematical pendulum) to reality (e.g. real pendulums).

As a consequence of that, the theoretical models developed to describe the lower levels are not to be considered "approximations" to the essential and specific characteristics of man's connections with his world.

On the other hand there is a relation of correspondence between the levels that explains why it has been possible in the history of ideology, philoso-

phy and psychology to find scientific arguments for a reductionist understanding of man.

The more detailed and elaborated argumentation, as I have presented it elsewhere¹⁸, is relatively technical and makes use of concepts from mathematical logic and set theory. I believe that it is the first time - in psychology at least - that the chain of arguments against reductionism has been given that kind of formal exposition. A further gain with this formal procedure is the fact that not only the levels' qualitative differences, but also their mutual dependence and attachment is described. By borrowing the language of mathematics and physics, one can say that the relation between the various levels is not only characterised by "transcendence", but also by "correspondence"¹⁹.

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¹⁸ The argument is presented in my book *Den menneskelige sans* (The Human Sense) (Mammen, 1983), and can be viewed as a critical development of Strawson's logical argumentation in *Individuals* (Strawson, 1964).

¹⁹ I believe it is something along these lines that Leontiev is searching for at the end of his book *Activity, Consciousness, and Personality* (1978, pp. 141-143), where he sets up the further perspective for psychology to study - that which he calls the "transfers" or "transitions" (transformations) between the qualitatively different levels of activity.

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Errata

Page v, line 4:

for concept read concepts

Page v, line 12:

for relation read relationship

Page 27, line 33:

for Walter Grey read Grey Walter

Page 36, line 32-33:

for Walter Grey read Grey Walter

Page 74, line 24-25 should read as follows:

is that thing (Gegenstand), reality, sensuousness are conceived only in the form of the object, or of contemplation, but not as sensuous human activity, practice, not