The fundamentals of psychology, 
and the relationship between psycho-logics and socio-logics

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ABSTRACT
In general, psychology is defined as the study of mind and behaviour, where behaviour is considered to be a stimulus-response connection between mind and environment. Contrary to this view it is argued that the stimulus-response mechanism is only a secondary feature adjusting a more basic relationship between an intentional organism and the objectives of this organism. The basic psychological relationship is that of intentionality. It is, thus, claimed that psychology is defined by intentionality, and that the stimulus response relation between organism and environment is but a mechanism that adjust this basic relationship. Further, it is argued that three phylogenetic levels, sense, mind, and consciousness are identifiable within the realm of psychology. At the level of sense, represented by any animal moving towards its food in order to survive, the basic psychological features are tracking, relating, and transforming, i.e. at this level the organism is able to track down, relate, and transform its objectives because of its knowledge of its environment. At the next level, represented by anthropoid apes, sense is reflected as mind. Because of mind, the organism is in practical terms able to make sense of itself in its environment as well as to reason about it. At the third level, that of humans, the basic features of psychology, conscious systematizing and organizing, must be conceptualized in conjunction with those of sociology. Psychology and sociology are interdependent, but natural kinds, i.e. human psychology and sociology constitute a joint system in which psycho-logics are defined as the micro level in relation to the macro level of socio-logics. What characterizes human consciousness is, for example, its ability to keep in mind chains of events, an example could be a series of economical exchanges in which basic needs are satisfied through others. It is, subsequently, suggested that one of the fundamental ways in which the system of psycho-logics and socio-logics are realized is through language manifesting itself as psycho-logical speech-acts generating virtual socio-logical objects. The phenomenon of ‘price’ (not price tag), for example, does only exist as a discourse on economical exchanges of goods, however, anyone capable of participating in a chain of economical exchanges is able to handle the phenomenon of price with the same naturalness as one handles the exchanged objects. Finally a model of interpersonal organizing and systematizing is presented.

1 Mind, behaviour, and future-directedness, the cul-de-sac of psychology?
On the homepage of the powerful American Psychological Association (www.apa.org), psychology is defined as the study of mind and behaviour. The two characteristics of psychology go hand in hand. This cannot come as a surprise as one of APA’s founding fathers was the well-known psychology professor from Harvard University William James. In his momentous book The Principles of Psychology (2006/1890, p.1), that saw the light of day two years before the foundation of APA, he wrote:

Psychology is the Science of Mental Life, both of its phenomena and of their conditions. The phenomena are such things as we call feelings, desires, cognitions, reasonings, decisions, and the like.
And he continues, “the mental life seems to intervene between impressions made from without upon the body, and reactions of the body upon the outer world again” (ibid. p.5). Thus, within the boundary of psychology:

The mind's relations to other objects than the brain are **cognitive and emotional relations** exclusively, so far as we know. It **knows** them, and it inwardly **welcomes or rejects** them, but it has no other dealings with them. When it seems to **act** upon them, it only does so through the intermediary of its own body, so that not it but the body is what acts on them, and the brain must first act upon the body. (ibid. p.216)

He also asserts that, ‘The pursuance of future ends and the choice of means for their attainment, are thus the mark and criterion of the presence of mentality in a phenomenon” (ibid. p.8).

In sum, James claims that it is the function of the mind by means of bodily sensations to guide action towards some future ends required for survival.

This idea is not entirely new; it actually started with the Greek philosopher Aristotle. After having stated that the, “soul is the actuality of the body”, the soul encompassing nutritive, perceptive and thinking powers corresponding to the life of plants, brutes and humans, Aristotle (2006/350 B.C., Book II, part 4.) wrote:

If we are to express what … the thinking power is, or perceptive, or the nutritive, we must go farther back and first give an account of thinking or perceiving, for in the order of investigation the question of what an agent does precedes the question, what enables it to do what it does. If this is correct, we must on the same ground go yet another step farther back and have some clear view of the object of each; thus we must start with these objects, e.g. with food, with what is perceptible, or with what is intelligible.

He continues (Book III, part 7):

The faculty of thinking then thinks the forms in the images, and … what is to be pursued or avoided is marked out for it, so where there is no sensation and it is engaged upon the images it is moved to pursuit or avoidance. E.g. perceiving by sense that the beacon is on fire, it recognizes in virtue of the general faculty of sense that it signifies an enemy, because it sees it moving; but sometimes by means of the images or thoughts which are within the soul, just as if it were seeing, it calculates and deliberates what is to come by reference to what is present; and when it makes a pronouncement, as in the case of sensation it pronounces the object to be pleasant or painful, in this case it avoids or pursues and so generally in cases of action.

and all in the name of survival.

In my opinion, modern scientific psychology follows the same pattern of thinking. The environment is sensed and acted upon directly or mediated by the mind (see Figure 1).

*Figure 1. Generalized model of perception based mind psychology*
There may be differences in the methods by means of which different schools try to uncover the laws of psychology, and there may be differences in how the schools stress the parts of the model, e.g., primacy of action versus primacy of sensing. There may also be differences in how the various kinds of processes: Mind, perception, acting, and sensing are understood, but at a certain level of abstraction nearly every school of psychology adhere to the model.

The most pronounced difference between James, Aristotle, and their ‘followers’ is found in their conception of the ‘proactive’ subject. In the thinking of James, the subject somehow extrapolate causally from the already experienced in order to project its activity towards an unknown ‘future’, while this ‘future’ in the thinking of Aristotle is already there by virtue of his teleological stance. However, in both conceptions the concept of future is, I believe, a strange bird, because you will never be able to perceive the future whether it is determined by causality or teleology. You can only perceive what is there and mind what has been perceived. Even the Aristotelian subject does not perceive its future, although it is inevitably drawn towards it. It only perceives and therefore minds what is there, because the future is not there to perceive, and cannot be. There is simply no way in which sensing, and by that perceiving and minding, are able to ‘come in contact with’ the future in the general sensing/acting, i.e. stimulus/response-based model of psychology.

And yet, the insistence on future-directedness most often expressed in the term ‘intention’ is common. Thus, most psychologists, and philosophers as well, would agree with, for example, Bratman (1990, p.30) in that intentions are future-directed, and, “As a conduct-controlling pro-attitude, intention is intimately related to endeavouring and action.” However, the same persons would presumably also agree with, for example, Searle (1990, p. 407) in that, “all intentionality … could be had by a brain in a vat”, the point being that intentionality is a natural function of the brain, and with Dennet who states (1987) that intentionality means aboutness, that is, “Phenomena with intentionality point outside themselves, in effect, to something else, whatever they are of or about.” Thereby we are back to square one. Aboutness is about what is there and therefore not the future. If a phenomena points to something encompassing the future, this future must be there and therefore not in the future. However, one way or the other future-directedness is a part of the setup of psychology. Why?

2 The fundamentals of psychology

Most of us would agree to the belief that plants are not future-directed, and that they do not have brains. Most of us would also agree to the belief that bacteria have no brains, however, not all of us would agree to the belief that bacteria lack future-directedness. This idea is coined by my friend and colleague Niels Engelsted (1989, p.43), who through a meticulous theoretical analysis has come to the conclusion that:

… with the arrival of the purely bio-physical phenomenon of auto-kinesis an entirely new relation is brought into existence. Namely, the teleological relation between the subject and the object, meaning that the subject de facto acts with reference to a future goal. This subjective relating is psyche and its qualities are intention, goal, idea, motive, etc, which qualities are brought into existence by sheer fact of autokinetic locomotion. Psyche, thus, is not a substance or a force. It is an expression of a unique material relationship in the world, as are all basic steps on the cosmogenetic ladder, the nuclear, the atomic, the chemical, the living.

Let’s look at an example put forward by Engelsted concerning a bacterium motile by means of a flagellum. Normally the flagellum rotates anticlockwise thrusting the bacterium forward. Sometimes, however, the direction of the rotation is reversed causing the bacterium to tumble. The
new direction of the bacterium is random, but the length of the period between changing of
direction depends upon how favourable a gradient the bacterium is in.

What characterizes the life of such a bacterium contrary to the life of a plant is the necessity
of the bacterium to move in order to survive. It doesn’t stand in its foodstuff like a plant. Because of
the space between the bacterium and its food, the bacterium has to get to that food eventually. And
because of ‘eventually’, the food is not only situated at a space-distance, but also at a time-distance.
This means that the food does not exist here and now as something the bacterium is eating, on the
contrary. The food is not there, but somewhere in the future at a distance. Therefore the bacterium
must be future-directed, brain or no brain. The simple demand that the bacterium has to move in
order to get food makes it future-directed. This means that at some point in evolution, a specific
relationship between an organism and its food emerged. Engelsted and I call this relationship
intentionality. Thus, in our conception intentionality is not something a brain has, but a relationship
between an organism and its food given the necessity of movement. Intentionality is nature’s way of
keeping organism and food together across space and time. Intentionality is in the world as a
relationship that manifests itself in the relationship’s ‘moving part’ as future-directedness. That is,
the bacterium is intentional. Future-directedness is nature’s way of putting the organism on the
track of its food, “endeavouring and action” as claimed by Bratman. Physically, intentionality
manifests itself as thrust and tumble.

In a manner of speaking, intentionality is at the level of biology like gravity nature’s way of
ordering itself. So, one cannot explain intentionality at a lower or higher level of abstraction, it is a
fundamental law of nature. That is, you can neither reduce the unity nor ascribe attributes like free
will, for example, to the unity, an attribute that is often associated with intentionality. Intentionality
is pure and simple a natural relationship different from all other relationships of nature.

To support the maintenance of intentionality, the most advanced bacteria have as mentioned
some kind of sensation. At the lowest level of sensibility, the animal is only able to detect whether it
at present is in a favourable gradient. But still, sensing and by that staying in the gradient is neither
intentionality nor future-directedness, but a functional survival mechanism servicing intentionality.

But, what about the brain then? It is intentionality and sensibility that ‘makes’ the brain, and
not vice versa. The brain supports intentionality as it does sensibility. If the organism has a brain
however small, it is able to differentiate between kinds of food, for example, and it is also better at
handling the signs of food, and by that able to reach the food faster.

2.1 Intentionality, the dynamics of meaning

To ask, what is intentionality is in a sense like posing the question, what is gravitation? The answer
seems to be easy, because since Newton we all think we know what it is, some kind of force that
acts between bodies that has mass. And for all practical purposes this is correct. However, in reality
the ultimate cause of the gravitational force remains an open question although Einstein (1956)
assigning all gravitational effects to space-time curvature was able to bring the solution of the
problem a little closer.

I think that gravitation can be regarded as nature’s way of ordering distant bodies that has
mass. In the ‘same’ way I think that the ‘force’ of intentionality is nature’s way of ordering
organism and food that exists at a distance.

The ‘space-time’ structure encompassing the ‘force’ of intentionality is called meaning.
Meaning is, as distinct from the space-time curvature that brings about gravitation, uni-directing,
i.e. meaning determined intentionality manifests itself in an organism that moves towards food, and
not vice versa. Therefore, not all living organisms are to be found within the realm of meaning.

1 The idea that the fundamental unit of psychology is a relationship between an intentional subject and the things the
subject goes for, so to speak, was simultaneously put forward by Niels Engelsted and me in the early eighties.
plants for example. Even if it looks as if some plants behave like animals caching preys they are reactive in the sense that, for example, a touch triggers a rapid response by a carnivorous Venus flytrap.

The leaves of the Venus flytrap have two hinged lobes, each of which is equipped with three sensitive hairs. When an insect alights on the leaf, it brushes against the hair, setting off an electrical impulse that triggers the closing of the leaf. The toothed edges mesh like a bear trap, snapping shot in less than half a second. (Curtis, & Barns 1989, p.692)

The behaviour of plants resembles a doorbell, more or less. You push the button, and the bell rings. That is, the action has to come to the plant; it doesn’t do anything by itself.

Contrary to plants, animal organisms are proactive, which means that they are towards something. The organism is always on its way towards something, a future that can help it to survive as an individual or as a species.

Thus, intentionality is a phenomenon that manifests itself within the boundaries of meaning in the form of a subject and something the subject goes for in directed space-time, i.e. in a space-direction towards some future.

The geometry of meaning is topological, which means, for example, that all distances are equally long, and time is no clock. Within meaning it is meaningless to ask, how large is the distance between the organism and its food, and how long will it take before the organism caches up with its food? Meaning, and by that intentionality, has no measure, i.e. intentionality has no strength, no size, no duration; it is no quantity; it is a way of being in the world that encompasses directed time and space.

To contain the notion of intentionality as the dynamics of meaning, the notation (Sin-Sma)-unity is adopted. The notation expresses that a directed relationship exists between an intentional subject and subject-matter, the latter being anything the subject goes for. The subject, thus, is determined as being towards something, which is the other-being of the subject. And in this towards lies the notion of future.

The (Sin-Sma)-unity constitutes ecology, and is the fundamental unit of psychological analysis. The ecological unit of psychology is characterized in that the components of the unit are defined within a relationship. If, for example, the subject of the (Sin-Sma)-unity is a fox, it is defined as carnivore because its subject-matter is rabbits, and rabbits are defined as food because the fox eats them. If the fox or any other carnivore did not eat rabbits, the rabbits would never end up in the category of food, that is, subject-matter. This supposition points to the fact that subject-matter has a material as well as an ‘ideal’ relational side to it. The rabbit as food is certainly a material object; otherwise the fox would die of hunger. However, it is also something that exists in the future as a kind of an idea, but as said; it is also out there as something material, something which the subject is towards because of intentionality. In that respect it makes no sense to claim subject-matter, or the subject for that matter, to be either material or ideal, they are both at the same time. Subjects as well as subject-matter are expressions of meaning and by that intentionality.

2.2 The mechanism of sensibility

The ecological unit, i.e. the (Sin-Sma)-unity exists in an environment. The environment is composed of objects that the subject is able to cognize, the ‘food-gradient’ of the bacterium for example. Thus, all instances of subject-matter are objects, but not all objects are subject-matter. Droppings of rabbits, for example, are fox-objects, but certainly not subject-matter. The droppings are something the fox is able to cognize and use as a sign of food, but the droppings are not something the fox
goes for. The droppings as a sign of food is a stimulus, the subject is able to respond to. There is a stimulus-response relation between the subject and the objects of the subject.

To generalise the example of sensibility, the notation (S/O)-function is adopted. The notation expresses that sensibility is constituted by a stimulus-response relation, not a relationship, between a sensing subject and an object. The slash indicates that an interface\(^2\) exists between the subject and the object contrary to the dash of the ecological unit, which indicates the existence of an intentionality determined space-time separation between the intentional subject and subject-matter. There is no space-time separation between the sensing subject and the object. There may be a time-delay between stimulus and response, but there is no space-time separation.

Within traditional psychology from Aristotle and onwards, it is the (S/O)-function that has constituted the fundamental unit of psychology. I do not deny that the (S/O)-function belongs to the science of psychology; it is, however, only a function assisting the survival of the (Sin-Sma)-unity.

Beyond the limit of the environment, things that do influence the environment as well as the ecology exist. There are things in the world at large that matters to the subject, but which are, at least temporary, beyond the reach of the subject.

### 2.3 Sense: meaning with a measure

As previously mentioned, because of some kind of sensitivity to a gradient, the bacterium moving towards food is able to postpone its tumble. Let’s say that it is from the food of the bacteria, the gradient radiates. Because of sensibility, the scent is picked up, and a reaction that blocks the tumbling mechanism is generated. From then on, although still towards, the organism no longer moves randomly, but directly towards the food. It now follows a pattern that does not exist in the topology of meaning.

As said, meaning is a topological structure, where, for example, directedness is not a direction, and all distances are equally long. When sensibility operates on directedness a measure is superimposed on meaning, i.e. space and time directedness becomes dimensions. I call meaning with a measure sense.

Sense has the same logical extension as meaning, that is, ecology. When the measure is superimposed on meaning, directedness becomes directions, and because of directions, subject-matter becomes objectives, and in consequence, the subject becomes an operator. In other words, sense is specified meaning in which a subject operates directly towards an objective.

It is vital to maintain that in superimposing a measure on meaning, sensibility does not take over. The measure does only specify the topology of meaning. The logic of meaning and intentionality prevails.

*Figure 2: The dynamics of sense*

\[ S_{op} \quad \text{Directedness} \quad S_{ob} \]

\[ S_{ob} \quad \text{Resons} \quad S_{op} \]

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\(^{2}\)I have adopted the terms slash-psychology and interface from Niels Engelsted, who refers to the (S\(_{in}\)-S\(_{ma}\))-unity by means of the terms dash-psychology and inter-space.
The notation \((S_{op} \neq S_{ob})\)-system is adopted for the ecological unit of sense. In terms of systems theory, the \((S_{op} \neq S_{ob})\)-system can be depicted as shown in figure 2.

Within the realm of sense, intentionality is there in the form of ‘spontaneous’ directedness and stimulus-response guided directedness, i.e. directions. Sense is not a stimulus-response system, but contains a regulator or a feedback mechanism of the stimulus-response kind. The feedback mechanism of sensibility is not to be confused with reflex arcs; a reflex are being a neural pathway that mediates a sensation and a motor response. In higher animals, these pathways do not pass through the brain, but synapse in the spinal cord. And, they are not part of psychology.

The most simple subject-operator/subject-matter-objective relationship models the single cell organism (protist), the forefather of nature’s most ingenious organisms, human beings included.

One of the protists, the Amoeba is chemotactic, that is, responsive to chemical stimuli. When something edible, an algal cell or a fellow protozoan, is in the vicinity of an amoeba, the amoeba can sense it at some distance, at least the length of its own body anyway. It then sends out a pseudopodium that is shaped quite specifically for its intended victim. A fine pincer like projection will form for a small, quiet morsel; a much stronger and more massive pseudopodium will reach for a large ciliate or vigorously moving object. If the intended victim moves away, the amoeba will remain in pursuit so long as it is close enough to the pray to receive stimuli from it. (Curtis, & Barns 1989, p.474)

As seen, the Amoeba moves, and what the stimulus picks up some way or the other determines how the Amoeba responds. Thus, the directedness is not only transformed into a direction, but also into a specific activity. Because of the ‘what’ the animal behaves in a specified manner. So, at the lowest level of the hierarchy of behaviour, two fundamental biological questions are answered, what is out there and how to respond. However, a third fundamental question is also answered that of why do anything at all? The “why” of the subject is already answered in the directedness of the subject. The subject is there to survive and to reproduce.

At a more advanced level\(^3\), the \((S_{op} \neq S_{ob})\)-system is also able to answer the questions of where and when. It is well known that the honeybee can map the more exquisite eateries and even tell its friends about is. The following shows that it can also tell the time.

The naturalist normally breakfasts on his terrace punctually at 8 a.m. He has grown used to the buzz of bees around the marmalade. Under the press of work, he advanced his breakfast to 7 a.m. and is surprised at first that there are no bees. He knows that they begin their shuttle between nectar sources and hive as soon as the sun rises, so why are they not there when he breakfasts an hour before his usual time? Within a few days, they are there at the new time. Intrigued, he postpones his breakfast to 9.00 and watches to see whether they come at 7:00, which in fact they do; they mostly show up between 6:30 and 7:00. If he puts marmalade out at 9:00 for a few days, the bees begin to show up between 8:30 and 9:00. He infers that the bees represent the time of day at which nectar is available at a given source and time they visits to that source accordingly. (Gallistel 1990, p.1)

I think that an ensemble of answers to the questions of what, how, why, when and where constitute an exhaustive expression of any intentional system at the level of sense.

\(^3\) For a more elaborate description see Asseldonk & Elstrup 2006.
2.3.1 States of sense described as attractors

To survive and to reproduce, the \( (S_{op}\neq S_{ob}) \)-system has to convert environmental energy into ecological, therefore sense can be described in terms of a two dimensional state-space defined by environmental energy concentration and ecological energy dissipation, i.e. as a relation between available energy and work carried out by the \( (S_{op}\neq S_{ob}) \)-system.

The model in Figure 3 rests on the assumption that ecological energy dissipation \((E_d)\) necessary for survival and reproduction is inversely proportional to environmental energy concentration \((E_c)\), i.e. \(E_d = 1/E_c\). The formula expresses that the less energy available the more work the system has to carry out to get it. It is also presupposed that \(E_d\) as well as \(E_c\) has an upper limit represented in Figure 3 by the lines ‘a’ and ‘b’ respectively. You can only work so much, and energy is not unlimited.

Given these assumptions, the states of the \( (S_{op}\neq S_{ob}) \)-system are describable as a state space with two sets of ‘preferred’ or stable states, i.e. attractors (e.g. Kauffman, 1993, pp.175-177), depicted by the curves c and d. At any level of \(E_c\), the system may be in the death zone, i.e. in the unstable states below the ‘c’ line. However, the system can by working harder, which it must in order to survive, move towards the survival line ‘c’, until the system hits the point where line ‘c’ and line ‘a’ cross each other (the ‘e’ limit), the point representing the least stable state. At this point, the attractor represents the limit between life and death. If energy becomes less abundant, the system dies, but if energy becomes more abundant, the state space between line ‘d’ and line ‘c’ becomes available. Now the system needs less ecological energy to get sufficient environmental energy to survive, and in consequence the system works less and by that moves towards the ‘c’ line, representing the set of point attractors in state space where dissipation and concentration are in equilibrium. If the system departs from the equilibrium state by working more than necessary, for example, it will quickly return to the state by lowering its workload. In principle, the model does not allow for fat cats.

Figure 3: Sense described as a state space

By raising energy concentration beyond the ‘f’ limit, reproduction becomes available, represented in the model by the ‘d’ line. However, as the trade off is a substantial rise in the workload, and the risk of loosing the reproduction opportunity is high, most \( (S_{op}\neq S_{ob}) \)-systems do not reproduce before they have moved into some kind of safety zone above the ‘d’ line. They become fat cats. This kind
of behaviour is not describable within the model depicted in Figure 3, because of the attractor landscape characteristics. Any movements beyond the ‘d’ line must inevitably result in a contra movement towards the set of attractors represented by the ‘d’ line. It is, however, by means of a catastrophe model (e.g. Zeeman 1976) possible to model the life of fat cats.

The behaviour plane in Figure 4 depicts a set of stable states determined by the two control-parameters ‘energy concentration’ and ‘energy dissipation’. On the control plane, an area of instability is drawn as a projection from the behaviour plane of an area of behavioural instability (shadowy area).

As long as the energy concentration in relation to energy dissipation is below the c-line the \((S_{op} \neq S_{ob})\)-system is in the death zone. But from a certain point of energy injection and work, the system is able to survive. If the energy concentration and workload rises beyond the d-line, one should expect the system to start reproducing. However, the system follows a trajectory of behaviour towards reproduction that crosses the d-line (the g-trajectory). That is, the system postpones its reproduction behaviour until it is beyond a certain safety line. In the human world it is, for example, a well known fact that nature makes too skinny female athletes unable to reproduce by stopping their menstruation. As a part of a \((S_{op} \neq S_{ob})\)-system they have to have a certain amount of fat in their depots before they are allowed to reproduce. The interesting thing is, now, that should the energy concentration fall during reproduction, the system does not give up its reproduction state, but moves beyond its survival line. Normally, parents do not leave their offspring to die even when they themselves starve.

**Figure 4: Sense described as a catastrophe**

![Figure 4: Sense described as a catastrophe](image)

### 2.3.2 States of sense described as types of activity

The \((S_{op} \neq S_{ob})\)-system exists in time, that is, the system generates a trajectory describable in time, a world line. The world line is an expression of the changes and transformations, the system undergoes during its lifetime, i.e. the way in which sense manifest itself because of the specified dynamics of intentionality. The unit has a history. Here, it is vital to realise that time associated with meaning and sense differs from time associated with the world line of history. Thus, three forms of time exist: The time of meaning, the time of sense, and the time of history. The time of meaning is dimensionless, determined as being towards some future. The time of sense is the time of meaning with a measure, that is, it encompasses an intrinsic system of measurement (Kugler, & Turvey
1987), which means that the system delivers its own system of measurement, so to speak. In time of sense, the system can, contrary to being within time of meaning, determine that it is within reach of food in time to survive. And, in time of sense, for example, all lives are, contrary to the lives in historical time, equally long. You are born, you live, and you die, whether you are a human being or an amoeba. Because of that it is often claimed that seven dog-years equals one human-year, for example, although you in historical time becomes much older than your pet. Historical time encompasses an extrinsic system of measurement (Kugler and Turvey 1987) exemplified, for example, by the bees arriving at different hours in order to lick up marmalade. In sense time, the bees did not arrive at seven o’clock but in time to get something to eat. In historical time they arrived relative to an external determined system of measurement, the clock of the observer.

Basically, the trajectory of the \((S_{op} \neq S_{ob})\)-system is determined by three types of states: tracing, relating, and transforming (Rasmussen, 1994ab; Jensen & Rasmussen, 2004). I think that the three types of states or activity as answers to the ‘how’ question is exhaustive. Tracing refers to a situation in which the subject moves in historical time in order to ‘close the gap’ between subject and objective in time of sense. Thus, the dynamics of tracing manifests itself in the physical world, in historical time as a moving organism hunting down a specified objective already within reach of its senses. The simplest animals do not know, of course, that the food is at a specific time-distance, but it senses that it is within reach.

The concept of objectives implies that in the more complex ecological units, subject-matter is not just subject-matter; different forms of subject-matter exist. Because of sensibility, meaning differentiates in the course of evolution. Rabbit food is not just food, but sense defined objectives like carrots and cabbage, for example. This differentiation of subject-matter, i.e. structuring of subject-matter does of course correspond to a similar structuring of the subject. The subject is able to know the difference between carrots and cabbage.

I think, that the classical article of Edward C. Tolman (1948, p.186) on cognitive maps in rats and men addresses the structure of sense and the structuring of sense by means of tracing.

We believe that in the course of learning something like a field map of the environment gets established in the rat’s brain. We agree with the other school (behaviourism OE) that the rat in running a maze is exposed to stimuli and is finally led as a result to the responses which actually occur. We feel, however, that the intervening brain processes are more complicated, more patterned and often, pragmatically speaking, more autonomous than do the stimulus-response psychologists. Although we admit that the rat is bombarded with stimuli, we hold that his nervous system is surprisingly selective as to which of these stimuli it will let in at any given time.

(…) The stimuli, which are allowed in, are not connected by just simple one-to-one switches to the outgoing responses. Rather, the incoming impulses are usually worked over and elaborated (…) into a tentative, cognitive-like map of the environment. And it is this tentative map, indicating routes and paths and environmental relationships, which finally determine what responses, if any, the animal will finally release.

What Tolman did discover was, I think, that sensibility transforms meaning into a map-like quality encompassing the subject as well as the objectives. In a sense the map is in the brain or rather in the entire organism in the form of patterns of activity most likely co-ordinated by the cerebellum, but only in a sense. The real map is specified meaning, and the specification is already there as argued by James. J. Gibson (1966, pp.3).

The active observer gets invariant perceptions despite varying sensations (the observer picks up permanent properties of the environment OE). He perceives a constant object
by vision despite changing sensations of light; he perceives a constant object by feel
despite changing sensations of pressure; he perceives the same source of sound despite
changing sensations in his ears. The hypothesis is that constant perception depends on
the ability of the individual to detect the invariants, and that he ordinarily pays no
attention whatever to the flux of changing sensations.

Sense is a mapping of directly perceivable ecological objects on meaning. The map is not a brain-
construction, but a set of behavioural search patterns made possible by direct perception of
ecological properties. The mapping quality leads directly to the second type of activity: relating. To
map meaning is to relate objectives by means of activity, the result of which can be a time/space
positioning, when and where, or some kind of estimation or valuation, smaller or bigger, better or
worse, attached to the what-question. Interesting enough even the simplest organisms seem to
possess this quality

One of the protists, the Amoeba is chemotactic, that is, responsive to chemical stimuli.
When something edible, an algal cell or a fellow protozoan, is in the vicinity of an
amoeba, the amoeba can sense it at some distance, at least the length of its own body
anyway. It then sends out a pseudopodium that is shaped quite specifically for its
intended victim. A fine pincer like projection will form for a small, quiet morsel; a
much stronger and more massive pseudopodium will reach for a large ciliate or
vigorously moving object. If the intended victim moves away, the amoeba will remain
in pursuit so long as it is close enough to the pray to receive stimuli from it. (Curtis, &
Barns 1989, p.474)
The amoeba can tell the difference between a large and a small prey.

The third state of the (Sop≠Sob)-system, called transforming, is in the language of dynamics of
meaning the final annihilation of subject matter. In the language of sense described as attractors,
transforming is like tracing and relating describable as a step towards the attractor of survival or an
upholding of an existing attractor. Within the realm of sense, the upholdng of an attractor may
include detours around obstacles, i.e. relating oneself to other objectives, but also going through
obstacle as when a squirrel gnaw through the shell surrounding a nut, i.e. transforming. In that
respect, transforming like tracing and relating belongs to the attractor landscape as well as it is a
part of the mapping of meaning.

In the most advanced units of sense, the subject becomes capable of moving objects across the
boundary between environment and ecology, i.e. able to transform environmental objects into
ecological objectives, and even to generate new forms of objectives by means of objectives,
building a shelter, for example. The organ of this ability to create is, of course, the brain. However,
the evolutionary growth of the brain does not generate differentiation; on the contrary, it is the
differentiation that puts pressure on the brain to grow in size and complexity.

Being in one of the three states of activity, the system of sense constantly sustains and
changes itself as an ecological unit, and by that, it also changes its own environment, and the world
for that matter. Sometimes environmental objects changes into ecological objectives and visa versa.
A rat, for example, that gets ill eating food it has previously preferred will never touch that food
again. The foodstuff is no longer food, but something to be avoided whenever perceived in the
environment. At the highest levels of development, changes in the (Sop≠Sob)-system does not always
result in physical changes of the ecology. Sometime it is only the sense of the system that changes.
If, for example, we use a shoe as a hammer, it is only the sense of the shoe that changes not its
physical structure. In a way one could say that the complex (Sop≠Sob)-system is able find new ways
of being.
2.4 Mind, sense-making and reasoning

In the beginning of the last century, Wolfgang Köhler claimed that the chimpanzees he observed at the Anthropoid Station in Tenerife acted with *insight*. Among other accomplishments, he reported (Köhler 1927, p.18-19) that his most intelligent chimp Sultan was able to act as follows:

The objective (some fruit) hangs in a basket from the wire-roof and cannot be reached from the ground. (…) Before he (Sultan) saw it, the basket was set swinging in a circle which brought it at a regular speed past a beam. Sultan looked up for a second, and followed the basked with his eyes, when he saw it swinging past the beam; he was up there at once, awaiting it.

Sultan not only saw the beam and the swinging basket, I think, but foresaw himself sitting on the beam, catching the flying basket. Of course Sultan didn’t know that he foresaw himself sitting on the beam, but to act with insight at least demands that the subject becomes capable of taking sense as its objective. To direct oneself towards sense means to replicate the principle of sense on sense. I call the system, within which the principle of sense is reduplicated, *mind*, notated $(S_{co}≠(S_{op}≠S_{ob}))$-system, $S_{co}$ referring to a cognizing subject.

![Figure 5: The dynamics of mind](image)

Within the system of mind, intentionality as directedness is cognized as *intentions*. Intentions are notions of ‘wanting’ to realize a specific attractor or in system theoretical terms to realize a set of sense states of activities that accomplish a cognized outcome. When, for example, Sultan (Köhler, 1927) becomes aware of a banana that is out of reach of an arm, and at the same time sees some sticks with which he normally is able to reach the banana, he will not hesitate to use the sticks to get hold of the banana. In that situation Sultan expresses a specific intention guided by feed back from previous experiences he has had with bananas and sticks. Sultan simply accomplishes a *task* that he knows very well. If, however, the banana is still out of reach, Sultan is confronted with a *problem*. In this case, he actually solved the problem by joining two sticks, and later on he did not need to think twice before he assembled his tool for banana-collection. The problem was transformed into a task by means of the feed-back mechanism. Thus the cognitive dynamics of mind can be described as *problem solving*, and *task accomplishment*.

In assembling the two sticks, Sultan actually produced a new object in the environment and, of course, in ecology. And the two-sticks-instrument became as a new product an objective to go for, to go for bananas. This problem solving ability in which sense are made, I call *sense-making*, and the ability to utilize sense made in task accomplishments, I call *reasoning*. Thus, guided intention takes two forms sense-making and reasoning, where reasoning is sense-making with a feed-back from former experiences. It is, of course, true that Sultan did not reason about his activity in any human sense, but in any practical sense after having solved the problem he actually carried out reasoning of the type “If two sticks are put together then bananas at a distance can be fetched by

\[^{4}\text{That mind also encompasses emotions is of no concern here. For a theory of how mind developed phylogenetically see Engelsted (1977).}\]
means of the two-stick-instrument”. But, again it wasn’t because of reasoning that Sultan found the two-stick solution, i.e. he didn’t produce the premise ‘sticks put together’ by reasoning, but by sense-making.

One can picture sense-making as a process that sustains and transforms a continuous mind-landscape in which reasoning lay down a system of roads between special selected objectives. As said, reasoning are the mode of the \((S_{co}\neq(S_{op}\neq S_{ob}))\)-system that we normally associate with logic. You don’t need logic to survive, but it is nice to have, because by means of logic you are able to lay out past experiences as routes to the future. Reasoning cannot do anything that has not been done by sense-making, but it can do it more efficiently.

Because the \(S_{co}\) component is active in relation to the \((S_{op}\neq S_{ob})\)-system, it is capable of pointing to the future on the basis of past experiences. The cognizing subject simply picks-up the realized future as something already passed and hurls it forward as a guided intention. The \((S_{co}\neq(S_{op}\neq S_{ob}))\)-system cares for its unfulfilled future by means of it’s remembered past. In that field of tension, the system brings the \textit{now} into existence as a relationship between past and future. In the \((S_{co}\neq(S_{op}\neq S_{ob}))\)-system, the past becomes the future and the future the past through the \textit{now}. And this is exactly what mainstream psychologists, the successors of Aristotle and James, for example, failed to recognize. They did not realize that minding the future demands the cognizing of something in which the future is inherent.

In my opinion, the structure encompassing meaning/sense/mind is complex. By complex I simply mean that the phenomenon comprises a considerable amount of interdependent elements ‘ruled’ by nonlinear dynamics, which implies that the outcome of some system process is difficult to predict from its initial state. Therefore sense-making cannot be studied by means of conventional methods that view all psychological phenomena as being within the realm of linearity. Reasoning on the other hand is like any other psychological phenomena difficult to study because it is complicated, but it is \textit{not} complex. The entire ‘idea’ behind reasoning is that it is predictable. Nothing new sees the light because of reasoning.

\textbf{2.4.1 The nature of sense-making}

To make sense means to develop a possible scenario for a set of future activities and test it in order to solve a problem. In that respect there is an aspect of trial and error involved in sense-making, but sense-making is more than that. It is something like finding a route to a solution, which is there in the future. You don’t know the solution, but it is there somewhere. It is as in science where we try to discover something already there; we do not try to invent things, but to find solutions among objectives already there. In the case of Sultan, the problem was a banana lying out of reach. All the ingredients to solve the problem were there, but they just didn’t make sense. First Sultan tried to reach the banana with one stick pushing the stick and his shoulder through the bars of the cage (Köhler 1927/48, p.125-27). Then he pushed one stick towards the fruit by means of the other stick until he was able to push the banana away from him. As his efforts were in vain he gave up, and started to play carelessly with the sticks.

While doing this, it happens that he finds himself holding one rod in either hand in such a way that they lie in a straight line; he pushes the thinner one a little way into the opening of the thicker, jumps up and is already on the run towards the railings, to which he has up to now half turned his back, and begins to draw a banana towards him with the double stick.

Suddenly the solution was there, and afterwards Sultan had no problem in utilizing his new tool in a reasonable way.
When making sense, the subject is not only able to trace, to relate, and transform objectives, but also to trace and relate transformations, for example. The subject is able to put forward strings of activities and relate activities into testable scenarios. What makes problem solving and by that sense making complex is that almost all problems have a solution space greater than one. Sultan could, for example, have found a way of ‘persuading’ Köhler to hand him over the banana by screaming, a trick any child is able to utilize when educating his or her parents.

2.5 Consciousness, psycho-logics and socio-logics

It has with vigour, and sometimes open hostility, been discussed how anthropoid apes differ from human beings, and how the difference came about.

In my opinion, the result of the transition must be described at a psychological micro as well as a sociological macro level. I also think that the two interdependent levels of description are anticipated in the agreeing disagreement between Hegel and Marx. In Vorlesungen über die Philosophie der Geschichte, Hegel [1972/1828] states that man is free or better will be free as a human being when he becomes self-conscious, that is, becomes a self-referential being who understands how he has become self-conscious. And in Zur Kritik der Hegelschen Rechtspolitologie, Marx [1974/1843] states that human essence can only express itself as many subjects as no single subject can encompass the sphere of subjectivity, i.e. the subject cannot encompass all sociological positions at the same time. Between them, Marx and Hegel states that the individual subject must be (self)-conscious to exist in a world in which division of labour is a reality.

To understand the concept of division of labour, we have to return to the concept of mind notated (\( S_{co} \neq (S_{op} \neq S_{ob}) \))-system. If we look at mind in terms of socio-logics\(^5\), the cognizing subject (\( S_{co} \)) is, when operating towards an objective (\( S_{op} \neq S_{ob} \)), producing a product. When Sultan assembled his sticks and dredged the banana towards him, he generated a banana that was more than a banana; it became a mind-product. The banana is of course still a banana, but because of the cognitive effort, the fruit is transformed into ‘a banana fetched by means of an assembled stick’. And in consequence, the banana becomes a consumable when eaten; it is no longer a ‘casual’ banana, but a banana with a history. In terms of socio-logics, the (\( S_{co} \neq (S_{op} \neq S_{ob}) \))-system can be described as production, notated (\( S_{pr} \rightarrow O_{pr} \)), and consumption, notated (\( S_{pr} \leftarrow O_{pr} \)). In the world of mind, production and consumption is only separated in time never in space given that some officious neighbour monkey do not steel the product, that is, the producer is also the consumer. And in consequence, socio-logics do not really exist at the level of mind. Anthropoid apes may be social in the sense that they are dependent on each other in an emotional way, but not in any economical.

As the anthropoids moved from apes to humans, a space/time division between production and consumption took place\(^6\). In terms of socio-logics, the product of one subject became an externalized asset that was appropriated by another subject. In the words of Marx (1974/1890), a division of labour took place, and in that process, the producer became a labourer and the consumer a capitalist. In more general terms, the producer alienates his product, which becomes an asset appropriated by the consumer, notated (\( S_{a} \rightarrow O_{a} \rightarrow S_{ap} \)). Thus, the alienation and appropriation of the asset respectively posit the class of alienating producers and the class of appropriating consumers.

It is essential to understand that in terms of Marx, the relationship between capital and labour is within human essence, or the being of humans. The relationship between capital and labour, and by that the relationship between capitalist and labourer is not just a division of work among people doing something different, bakers and coopers for example; it is a polarized partitioning of human

\(^{5}\) I use the concept of socio-logics instead of economics to broaden the perspective of the relationship between micro and macro fields of the being of humans.

\(^{6}\) In my opinion, the most plausible explanation for the transition is found in Engelsted (1984).
essence (being). The polarized partitioning is called a contradiction in the language of dialectic logic. Within the contradiction of capitalism, for example, capital and labour are opposites, but identical in being human essence\(^7\). The capitalist may be inhuman, but not non-human.

Thus, what Marx coined was that at a certain point in history a new natural structure emerged that of socio-logics. The primary force of the field of socio-logics is alienation/appropriation. However, society cannot sustain itself if every human being belongs either to the class of alienating producers or the class of appropriating consumers only. The alienating producers would die of hunger very fast. Therefore socio-logics cannot exist without some kind of stabilizer or equalizer. Either some of the products do not enter the sphere of socio-logics (you keep a portion for yourself) or some of the alienated goods must return to the producer. This second mechanism is of course exchange, i.e., buying and selling of assets notated \((S_{b/s1}\leftrightarrow O_{c01/2}\leftrightarrow S_{b/s2})\), where \((S_{b/s1})\) stands for subject 1 being buyer and seller, and \((O_{c01/2})\) for either commodity 1 or 2 changing place during the exchange. In modern society, the division of labour is of course stabilized by buying and selling of the working-powers of man. In my opinion, the division of human essence, i.e. alienation/appropriation, and in consequence exchange is the condition of human life. Society is the nature of human being. When we as human beings go for something, we go for products moving in the sphere of socio-logics, and most often we are only able to go for something by contributing to socio-logics ourselves. Thus, we are as humans generating our own ecology and by that our own environment. By producing our own ecology, we are in some respects in control of a part of our environment, but no single subject is in control of the entire human environment, and in consequence, socio-logics are driven by its own set of laws that in some respects control human conduct.

In system theoretical terms, the dynamics of socio-logics and psycho-logics can be depicted as shown in Figure 5.

The Figure shows that a field of psycho-logics, that is, the entire set of humans, through production incessantly generates the field of socio-logics, which in turn affect the field of psycho-logics through consumption.

*Figure 6: The dynamics of socio-logics and psycho-logics*

To cope with the societal conditions described as socio-logics, the subject must, as Hegel suggested, be conscious, that is, able to contain the space/time gab between production and consumption. You cannot, for example, lend your friend some money without the conscious notion that you will get them back at a later point.

As I believe nature is parsimonious, I think that somehow the ‘principles’ of sense is repeated once more generating a \((S_{kn}\neq(S_{co}\neq(S_{op}\neq S_{ob})))\)-system, in which \(S_{kn}\) stands for the knowing subject, and the entire system for consciousness.

\(^7\) For a more elaborate description see Rasmussen (1994a)
The idea is that at the point of evolution when the sphere of socio-logics emerged, the
\((S_{co} \neq (S_{op} \neq S_{ob}))\)-system underwent a kind of ‘aufhebung’:

By aufgehoben we mean cleared away, or annulled: thus, we say, for example that a law
or regulation is aufgehoben. But, on the other hand by aufgehoben we also mean
preserved. (Hegel 1970/1828, p. 204)

Eo ipso the aufhebung, the entire \((S_{co} \neq (S_{op} \neq S_{ob}))\)-system, i.e. mind became the objective of the
knowing subject. In the process of aufhebung, the knowing subject becomes capable of reflecting
itself as a cognizing operator. One could say that like mind is the negation of sense, consciousness
is the negation of mind, and by that the negation of the negation of sense. In that manner,
consciousness is a kind of repetition of sense at a higher level. The subject no longer goes for
objectives in nature but for assets in society, assets that the subject itself takes part in providing, and
which is only there because of other subjects. And you have to will in order to get what you want,
but you are guided by what you perceive that you get. So, the subject is constantly producing its
own environment, by itself and through others, and by consuming, the subject is transforming that
environment into its own ecology. And just to repeat myself: Socio-logics and psycho-logics belong
to the same system. You cannot understand socio-logics without understanding guided volition, and
you cannot understand psycho-logics without a deep understanding of the division of labour and
systems of exchange in society.

As in ‘mind-setting’, consciousness has two forms competence and qualifications. Sense-
making has its volitional counterpart in competence by means of which objectives are organized
into a functional whole of interdependent socio-logical and psycho-logical parts in order to solve
some more or les definite problem. Reasoning has its counterpart in qualifications by means of
which socio-logical and psycho-logical objectives are systematized in accordance with a definite
plan in order to fulfil a specified task.

When organizing, the subject simulates different scenarios by building a more or less complex
network of interdependent objectives, for example: The day when I am going to be a pensioner is
closing in on me. Just now, I would like to stop working within the next five years. I am, however,
not entitled to any substantial pension within the next seven years. On the other hand, if the prices
on real property goes up at the same rate as it does now, I might be able to live on my savings a
couple of years if I sell, especially if I move to the provinces where the price on houses are much
lower. But can I stand to move out of the roaring capital, where I have lived most of my life, and so
on and so forth. The network of psycho-logical and socio-logical interdependencies concerning the
problem of pensioning is more or less infinite. Nonetheless, if the most important nodes are
accounted fore, the entire landscape makes sense; its potentialities can be tested, at least up to a
point, and the problem could be solved by muddling through. This wouldn’t be especially efficient,
but effective enough to make me survive as a not so well off senior citizen. But at a certain time in
life, I might be better off if I had a specified plan, therefore, to be efficient I have to convert my sense-making model into a reasonable calculus.

When systematizing, I actually produce a calculus that rests on a set of fixed premises, for example: Houses of the same quality are always cheaper in the provinces. In recent years, I have come to prefer quietness and nature to the roaring capital. There is calmer in the provinces, and nature is closer at hand. You never know when the boom stops. Therefore, buy a cheaper house in the provinces now, see what you get out of it money wise, then let the amount of ‘surplus-value’ decide the date of pensioning.

2.5.1 Language: the carrier of consciousness

At the level consciousness, the subject expresses itself in socio-logical language by means of psycho-logical speech acts\(^8\) that are capable of ‘simulating’ intended directedness.

It is the most vital characteristic of consciousness that in organizing and systematizing, words are put on sense-making and reasoning respectively. In general, language production follows the structure of consciousness as in ‘the subject knows (S\(_{kn}\)) that the subject thinks (S\(_{co}\)) that the subject can buy a shoe and use it as a hammer (S\(_{op}\neq S_{ob}\)’). When we talk, we normally omit the (S\(_{kn}\)) part; it is simply implicit in any organizing or systematizing that we know that we are saying what we are saying. On the other hand, we only know what we think when we have said it. You don’t know it, if you haven’t said it. To know something, you either have to talk to yourself through others, i.e. by means of socio-logics or talk to yourself through yourself, that is, by means of psycho-logics.

We can cognize and operate without knowing, but anything we cognize and operate on is knowable.

By using language, we are able to transcend the ecology of the knowing system in an ideal way. By means of language, we are as humans capable of producing what I call virtual objects, i.e. we encounter the field of socio-logics by means of psycho-logical speech acts. When the knowing system starts to produce language two things happens at the same time. In the form of a text-string, the knower firstly starts either to organize by means of sense-making or to systematize by means of reasoning about sense made. Secondly, the knower monitors its own sense-making or reasoning, and adds more text, that is sense or reason until the text-string makes up a more or less complete but re-cognizable virtual object. That is, we stop talking the moment we are able to pick up what we have said in the form of a virtual object that makes sense or is reasonable in the sense that our immediate world is either organized or systematized.

The virtual object exists in the expanded now, limited by the start and the end of a text-string. In this expanded now a virtual object is build up until the knowing system knows what has been said and stops. Actually to know something is to perceive directly you’re own or your neighbour’s virtual objects and transform them into ecological sense or reason.

2.5.1.1 Virtual objects: an example

To know the assembling of a virtual object, one has to know the socio-logical context in which the object is produced. The example below originates from an experiment conducted by me, and my friend and colleague Jørgen Aage Jensen, in which students of economics were to handle the build up of a Company in competition with other firms.

A task environment which simulates an entrepreneurial enterprise is presented to three, two member, teams. The task comprises plant construction, production of goods,

\(^8\) The concept of speech act is originally coined by the English philosopher J.L. Austin (1975). Here the concept is used in a broader sense than intended in the theory of Austin.
product development, and selling of goods (computers and chips) on the world market, consisting of three areas (US, EU and Brazil), each with their own currencies. The firm operates from its headquarters situated at Liechtenstein (currency: Swiss Franc).

Manuals provide the conditions for operation. (Jensen, & Rasmussen, 2004, p.480)

At some time during the experiment one of the participants said as follows:

1. We have to make such plans about what it really is, we are going to sell.
2. We cannot stake entirely on production and sales of chips.
3. So, we have to find out whether we are going to produce our chips ourselves or whether we are going to buy them some place.
4. That is, it becomes a choice between, well yes but are we going to stake on a re-technological developmental-product i.e. on a multi-product, or whether we should stake on making the decision ourselves and get it over on the market.
5. But it is, well, also somewhat like given because there are some market-characteristics given, where Brazil of course is is exiting.

At the moment, there exist no rigorous way of analysing a text and express the text in the form of a model of a virtual object, therefore the following is a tentative attempt to find a point of departure. What I try to do is to make a model that picks up the assembled objectives and the functions between them.

I think that the first text fragment (1) encompasses three pointers to assembled objectives: ‘make plans’ (planning), ‘what’; which in this context can only refer to commodity (commodity), and ‘going to sell’ (selling), and a set of functional connections between them so that a model of the sentence could be ‘planning of selling of commodity, in which planning implicates selling that implicates commodity. So, the first text-fragment could be expressed graphically as shown in figure 6, stage 1, where the squares indicates activity oriented objectives, the circles object oriented objectives, and the arrows functional connections, in this case implication.

In the second text fragment (2) ‘stake’ refers to planning, I think. The link from planning to selling is strengthened, and producing is added in such a way that selling and producing are connected through chips that specifies commodity and product respectively. It is true, that the concept of product do not appear directly in the text fragment, but to differentiate between chips as a product and as a commodity, the concept of product has to be introduced in the model. Therefore, it is assume that the product-objective is there without being expressed directly. In stage three (3), the plan/producing/product/chips connection is strengthened, and a new connection introduced: Planning/buying/commodity/chips. And because of ‘some place’ the concept of marked is added to the model. The fourth text fragment (4) is difficult to see through. The terms ‘re-technological developmental-product’ and ‘multi-product’, for example, do not refer to anything in the task-environment or in economics in general for that matter, they are self-invent designations of something concerning products. It is also difficult to decipher what ‘making the decision ourselves’ refers to. But, if ‘that is’ do refer to the preceding text, the sentence must refer to buying and producing chips, wherefore these connections are strengthened in the network. The text-fragment also ties the chips to the marked through commodity. And in the fifth text-fragment (5), the marked is specified by the objective ‘Brazil’.

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9 That the text is a little peculiar isn’t due to an unsuccessful translation. When making sense, people often express themselves in a way that is a little different from how they talk when reasoning. In a conversation, we do seldom take notice of the differences that are quite distinct when being put on paper.

10 Words in italics points to objectives included in the virtual object.

11 A model is a consciously simplified representation of reality.
To model a text is a way of deciphering the virtual object at the level of socio-logics. The model do not pickup what’s ‘in’ the mind, i.e. sense or reason in their pure state. The model does only show the socio-logical denotations of sense and reason, not the rich psycho-logical connotations of mind.

In general, the model in figure 6 is characterised by a central objectives: ‘planning’, which is functional connected to any other objective in the model. As none of the functions are of the if-then kind, the virtual object is assembled in the process of sense-making not reasoning.

3 Interpersonal organizing and systematizing

Now, it is possible to sketch a model of interpersonal organizing and systematizing by means of language.

In Figure 7, P denote the \((S_{kn} \neq (S_{co} \neq (S_{op} \neq S_{ob})))\)-system, called person for short. Ov refers to virtual objects. The model indicates that Person 1 produces a virtual object that Person 2 consumes, that is, Person 2 perceives the object like any other environmental object in the field of socio-logics.
and moves the object from the environment into the sphere of ecology, i.e. transforms the object into a conscious objective. In this process, the virtual object becomes susceptible to competence and qualifications, and by that to organizing and systematizing. Now being part of P₂’s setup, P₂ is able to produce another virtual object, which in P₂’s personal manner becomes an ‘answer’ to P₁’s ‘throw-out’. Thus the psycho-logics of P₁ & P₂ are coordinated as in a dance at the level of socio-logics. In general two kinds of coordination exist: the symmetrical and the asymmetrical. In the symmetrical form, virtual objects are exchange, and by that generalized into concepts just like commodities are generalized into the general equivalent of money. In the asymmetrical form, virtual objects are handed over to someone else. This kind of structure constitutes the basis of any pedagogical encounter.

*Figure 6: Interpersonal organizing and systematizing*

Because two different types of virtual objects exist: the organizing and the systematizing types, two different types of coordination must exist. I think that the two types are those van Eijnatten (2003) calls “Dialogue” and “Discussion”. The primary distinctions of dialogue is “Seeing the whole among the parts”, and “seeing the connections”, and the primary distinction of discussion is “Breaking issues or problems into parts”, and “Making distinctions”. I think that a dialogue depends upon virtual objects of the organizing kind, whereas discussion depends on the systematizing kind of virtual objects.

The goal of joining a dialogue is to produce common sense, that is, the common truth of life, while the idea behind true discussions is to extract the common laws of life. Other interpersonal constellations exists, power play for example, but that is quite another story.

### 4 References


