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PSYCHOLOGICAL METATHEORY: The historical development and the present situation of psychological theorizing[1]

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Introduction

In the first part of this paper we shall present a brief *historical overview* of the development of theorizing in the last 130 years since the establishment of modern, experimental psychology. Then, in the second part, we shall present a *systematic classification* of some representative psychological theories. This classification is based upon a comparative metatheoretical taxonomy called »Systematology«.

The Historical Development of Theorizing

Introduction

Psychology has *not* developed isolated from other sciences and philosophy. Therefore, theorizing in psychology has developed under the influence of other sciences and the contemporary philosophy of science. Since the middle of the years of 1800 there has been a remarkable evolution in the philosophy of science, which may roughly be divided into three periods: the *positivistic* period (1850-1914), the *neo-positivistic* period (1914-1960), and the *post-positivistic* period (1960-).

The Positivistic period

Positivism in philosophy of science. When psychology was established as an independent science in the last half of the 1800 years, the most influential philosophy of science was *»positivism«*. This term is here used as a common term for the philosophy of the French philosopher *August Comté* (1798-1857) and the British philosopher *John Stuart Mill* (1806-187/3), which dominated continental Europe and The Anglo-American world

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respectively. The common main theses in Comté's »positivism« and Mill's »empiricism was that *scientific knowledge is completely based upon empirical research* (observations, experiments, etc.). This scientific knowledge consists of *descriptions of »positive« facts (»data«) and empirical generalizations (»laws«)* made by *inductions* from observed facts. Especially Comté was rejecting every kind of »metaphysical explanations« (and of course also magic or supernatural explanations). The *empirical* scientific methods, especially the *experimental method* was conceived as the central, defining element in science.

Positivism in Psychology. The pioneers in the first generation of experimental psychologists were *G. Th. Fechner* (»Elemente der Psychophysik«, 1860), *W. Wundt* (establishment of the first psychological laboratorium 1875-79), and *W. James* (»Principles of Psychology«, 1890). Many others could be mentioned, but these three were the »paradigmcreators«. They were all influenced by empiristic philosophy of positivism. They conceived *scientific* knowledge to consist of *descriptions of observed facts* (=»data«) and empirical *generalizations* (-»laws«). They don't explicitely define any *hypothetical terms or hypothetica propositions*, which represent *transempirical* constructs. When they *explain* the observed facts, they use *physiological* terms as well as *phenomenological* terms. The physiological terms may represent physiological *data*, but the phenomenological terms are more difficult to classify. If the phenomenological terms refer to the psychologists own consciousness they are *data* (however private). If the phenomenological terms refer to other persons' consciousness (e.g. the consciousness of experimental subjects), they are *hypothetical* terms, as they refer to something, which cannot be observed (directly). Thus, they are *transempirical*, as they are *inferred* from verbal reactions or other public observed behavior.

Thus, a thorough, systematic, metatheoretical analysis of the main works of Wundt (»Grundzüge der physiologischen Psychologie«,1874) and James (»Principles of Psychology«, 1890) demonstrates that they do not have a precise distinction between empirical *descriptions* (»data«) and hypothetical *explanations* (»theory«).They have the natural sciences as an ideal and believes that they are presenting the results of empirical research (see Madsen, 1988).

This positivistic philosophy was also dominating in the first part of the next period with *school-formations* (1900-1933).

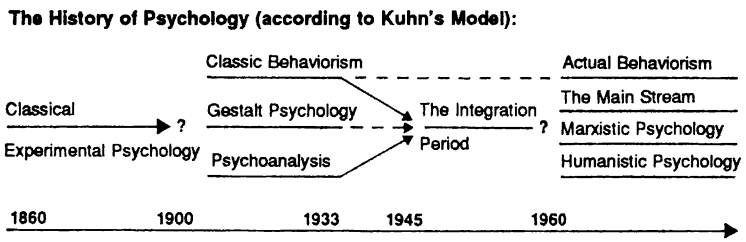

Fig. 1. Diagram showing the development of psychology and its various school in accordance with Kuhn's theory: a normal period is followed by a period of crisis with formation of schools and so on.

One school, the *Gestalt-psychologists* (Wertheimer, Koffka, Köhler, a.o.) also studied *consciousness* (like the classical experimental psychologists), but they had a different, more holistic conception of consciousness. But they had the same empiristic conception of science.

Also the other school, *Behaviorism*, including Reflexology (Pavlov, Thorndike, Watson a.m.o.) had a similar positivistic (empiristic) conception of science. The difference was that this school regarded descriptions of *behavior* as the only acceptable scientific *data*, while consciousness was conceived with some spicuousness as more or less illusoric phenomena, which at least was not useful as *scientific* data.

The third main school in this period, *psychoanalysis*, had a quite different philosophy of science, which was more like the *post*-positivistic philosophy. This difference in philosophy of science was one of the reasons that psychoanalysis was *not* accepted by the other schools as *scientific* psychology.

The post-positivistic philosophy will be described later. But first we have to present the *neo*-positivistic philosophy.

The Neo-Positivistic period.

Neo-Positivism in philosophy of science. Around World War 1 there was a new development in philosophy of science. The main inspiration came from *Bertrand Russell's* analysis of mathematic (and logic) as a science. This was elaborated to a new philosophy by Russell's followers Ludwig Wittgenstein, Rudolf Carnap, Otto Neurath, a.o. members of the so-called »Vienna-circle«. The main thesis in this philosophy is: *Science consists of two activities and their products:* 1) *Empirical research resulting in descriptions of observations*, and 2) *logical thinking resulting in explanatory theories*. The ideal of scientific theories was the axiomatic systems in mathematic like Euclid's geometry. When the ideal was applied in natural sciences, like physics, the ideal scientific theory was a *hypothetical-deductive system*, i.e. a logic system of hypotheses from which propositions about observable phenomena were deduced. This deduction should be used

for *verification* of the hypotheses. Thus this neo-positivistic philosophy accepted both *empirical* research and *logical* theorizing as defining elements; therefore it was often called *logical Empiricism.*

A slight different version was later developed by *Karl Popper* under the name of *»Critical Rationalism«.* Here the term »empiricism« was exchanged with the term »rationalism«, because Popper regarded *the rational element, the hypothesesformation, as the primary,* and the empirical (»critical«) element as the secondary. But he required a more strong empirical procedure, as he required *falsification* of hypotheses in stead of verification. According to Popper *scientific hypotheses* (and theories) are hypotheses, which are *falsifiable,* but not yet falsified. With this version Popper has brought the philosophy of science closer to the next phase, the post-positivistic. But first we must present the Neo-Positivism in psychology.

Neo-Positivism in Psychology. The neo-positivistic philosophy of science influenced psychology during the 1930's. The most well-known example of an application of neo-positivism in psychology is proposed by the American Neo-Behaviorist *Clark L. Hull.* In his main work »Principles of Behavior« (1943) he presented a psychological theory consisting of 17 so-called »postulates«, which were the main hypotheses, and 133 »theorems«, which were *deduced* »data-theses« or at least more directly testable hypotheses. The postulates and many of the theorems were formulated both verbally and mathematically. This theory was regarded as a general psychological theory emphazising learnt behavior in mammals (including human beings). In the 1940's and 1950's Hull's theory was by many American psychologists regarded as the *ideal* of a psychological theory.

Hull was to some extent influenced by another American psychologist *Edward C. Tolman,* who in his main work »Purposive Behavior in Animals and Men« (1932) introduced »intervening variables« as fruitfull concepts in scientific psychological theory. Hull and many other American psychologists used this concept in their theories (sometimes under various names as »hypothetical constructs« or »theoretical terms« etc.). These hypothetical, intervening variables were the main components in the explanatory, *hypothetical level.* This part of a scientific »theory« was added to the descriptive, empirical or *data-level,* which was the only level of scientific discourse in the »classic«, positivistic period.

Tolman was to some extent influenced by the German-American psychologist *Kurt Lewin,* who in the 1930's and 1940's introduced, what he called »empirical-constructive theories« applying mathematical (especially topological) concepts.

Hull, Tolman, Lewin, were together with Henry A, Murray and Robert S. Woodworth the main figures in the *»Integrative Psychology«,* a period from about 1933-1960, which succeeded the period of school-formation (a. 1900-1933) . The integration period was later (a. 1960) succeeded by

a new period of school formation, with a new philosophy of science, which we now shall present.

The Post-Positivistic Period

The Post-Positivistic Philosophy. In the Neo-Positivistic period the logical Empiricism was the dominating philosophy of science in the Anglo-American culture. And in this period (especially in the 1940's and 1950's) was the American psychology dominating in psychology. But about 1960 there was a new development in the philosophy of science. The most well-known pioneer is *Thomas S. Kuhn* with his mainwork »The Structure of Scientific Revolutions« (1962). But many other philosophers have contributed (e.g. Norwood R. Hansen, Michael Polany, Imre Lakatos a.o.). The concept of »science« was once more *extended. A third component* or level was added to the scientific discourse (or text). The *positivistic* period regarded *»science« as consisting exclusively of the empirical level:* descriptions of empirical research. The *neo-positivistic* period regarded *»science« as consisting of two levels: the empirical level* and *the hypothetical (theoretical) level:* the transempirical, explanatory hypotheses. The *post-positivistic* philosophy regards »science« as consisting of *three levels:* the *empirical* level, the *hypothetical* level and the *philosophical* level. This level contains the *philosophical presuppositions* about the world (Ontology, metaphysics or »Weltanschauungen«) and about science. As this level is dealing with the two other levels it could be called *»the Meta-level«.* This philosophical level (or Meta-level) is the main part of Kuhn's »paradigm«.

A new idea in the post-positivistic philosophy of science is that *the most important component of science* is the *philosophical Meta-level* - not the empirical level. Science is »steered« by the philosophical presuppositions, which determine the kind of hypotheses (and explanatory models), that is formulated, and the kind of empirical data, which the scientists are seeking for to test the hypotheses. But science is still differing from philosophy by the striving for empirical *testing* (verification/falsification) of the hypotheses. Philosophy is not interested in empirical testing.

The Post-Positivistic Psychology. In the period after about 1960 psychology has again been divided into several schools.

The school, which first and most clear announced the new, post-positivistic philosophy, was the *Humanistic Psychology* with *Abraham Maslow* as the leader. In his book »The Psychology of Science« (1966) Maslow presents in details the philosophy, that already was touched upon in his earlier book »Motivation and Personality« (1954). The main thesis is that science is a product of the human nature of the scientists. Therefore, the scientist's *»Weltanschauungen«* - and especially his *conception of Man* is determining, which conception of science he prefer, and this in turn

determines, which kind of theory and empirical methods is applied. Maslow's main exampel is that a biological (Darwinian) conception of Man may minimize the differences between Man and (other) animals. As a consequence of this it favours the use of animals - especial rats - as experimental subjects. Furthermore, the Darwinian conception of Man permits to *generalize from animal to Man.* Maslow's alternative to the Darwinian concept of Man is a »classical«, pre-Darwinian *humanistic conception* of Man, which considers Man as fundamentally different from animals.

A different conception of Man is presented in another psychological school, *the Marxist psychology* which has been dominating in Sovjet and Eastern Europe countries until recently. According to this philosophy Man is different from (other ?) animals by being determined by the society and its historical development. Man is not entirely a product of the biological evolution, but on top of the biological evolution Man is determined by the socialhistorical evolution. It is demonstrated in the book of *A. R. Luria*: »Cognitive Development: its Cultural and Social foundation« (1977). Other important Marxist psychologists are *Rubinstein, Vygotsky,* and *Leontyev*. The last mentioned has made a synthesis of all the mentioned main theories in Marxist psychology (see Madsen, 1988).

A third school, *Radical Behaviorism,* has *B. F. Skinner* as a leader. He has in opposition to the two mentioned schools preserved - even emphazised - the biological, Darwinian conseption of Man. Furthermore, Skinner has strongly advocated a positivistic, radical empiristic philosophy of science. He fought against any kind of transempirical, hypothetical explanations. But, it must be admitted that Skinner was aware of the fact that this anti-theoretical conception of science was part of a philosophy. He regarded Behaviorism as a philosophy, the philosophical presuppositions of the experimental science of behavior. Thus Skinner thought there should be *two levels* in a scientific discourse: The *empirical,* descriptive level and the *philosophical* (Meta-)level. But he would not accept the middle level, the hypothetical level as a part of a scientific discourse.

In addition to the three mentioned schools, there is a fourth big group of contemporary psychologists, which may be called *»the Main Stream«* (see fig. 1). This group is not organized as a separate school, because the members regard themselves as the continuation of the integrative psychology, and they have the same Weltanschauungen and the same philosophy of science. But influenced by the post-positivistic philosophy, they are *conscious* about there philosophical presuppositions and regard it as one among alternative philosophies of science.

The most important leaders from the Main Stream are Jean Piaget, Karl Pribram, Georg A. Miller, Neal E. Miller, Daniel E. Berlyne, David C. McClelland, John W. Atkinson, Raymond B. Cattell, H.-J. Eysenck, Joseph R. Royce a.m.o.

The second period of school-formations is perhaps about to be substituted by a new normal period with one common paradigm. This will probably

be dominated by a post-positivistic philosophy combined with systems-theory and information theory. *Joseph R. Royce's* theory could be regarded as a representative for the new paradigm (see Madsen, 1988).

We may conclude this survey of the historical development of theorizing in psychology with pointing to the fact that *theorizing has gained in importance as supplement to empirical research.* This fact is demonstrated by the formal organization of *theoretical psychology* as a discipline by the establishment of the International Society of Theoretical Psychology (1985) and the journals: Annals of Theoretical Psychology (1984) and Theory and Psychology (1991).

Metatheoretical Classification of Theories.

Introduction.

After the historical survey we are now turning to a description of the »present« situation in psychological theorizing. The »present« is extended to the last half hundred years with an increasing numbers of theories. The present author has during the last four decades made comparative, metatheoretical studies of 49 theories. They are analyzed and classified according to a metatheoretical taxonomy called *»Systematology«*. This metatheoretical system is presented in the following section. A main result of this metatheoretical analyses is a classification of the theories in three *»patterns of preference«* or *»paradigms«*. Although this classification is made several years before the present historical survey, there is an interesting relationship: the three historical periods represent the same three philosophies of science, which are found in the three paradigms. Thus the *positivistic* philosophy is similar to the *empiristic paradigm,* the *neo-positivistic* philosophy is similar to the *rationalistic paradigm,* and the *post-positivistic* philosophy is similar to the *intuitionistic paradigm.* This relationship may partly be explained (historically) by the Zeitgeist, which dominates the periods, when the theories are constructed. But in the same period of time there are psychologists, who have different patterns of preference (paradigms). This may be explained (psychologically) by the different personalities of the theory-constructors. This explanation shall be presented more detailed in the next section.

The Frame of Reference.

The comparative study of scientific theories – which I call »systematology« – is regarded as a discipline within the broader field of *Metascience.* Systematology is the study of scientific products, i.e., »theories«. We use the term »theory« in a very broad sense including all *scientific discourses*

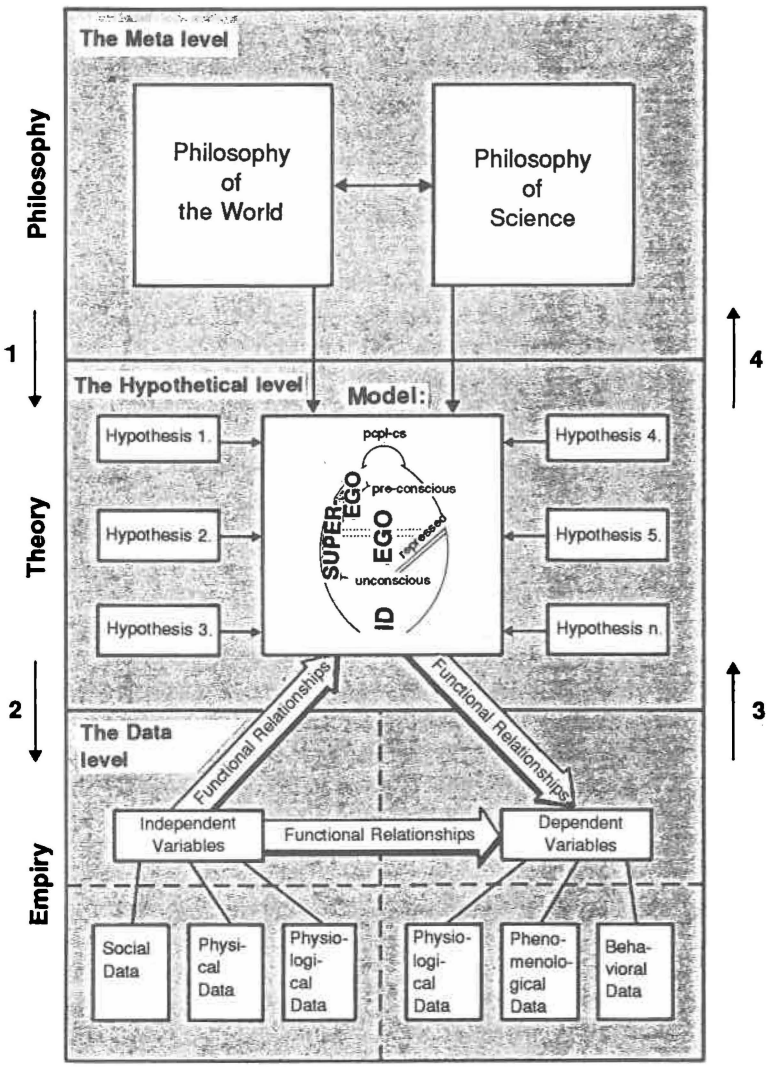

Fig. 2. The hiearchial structures of a theory. This diagram illustrates the three strata of a scientific text: »M« = »M-level« or »Meta-stratum«; »H« = »H-level« or »Hypothetical stratum«: »D« = »D-level« or »Decriptive stratum«. The four arrows (1, 2, 3, 4) indicate that the top level influences the bottom level. But there is also a »feedback« of influence from the D-level to the H-level and the M-level (otherwise it would not be a scientific theory).

or texts. A scientific text may roughly be divided into three parts, levels or strata (cf. Fig 2.)

1. The Descriptive Stratum – or »Data Level« – is that part of the text which includes concrete descriptions of data from experiments and other kinds of empirical research. The specific concrete descriptions were called »protocol sentences.« In addition, the data level includes the general abstract descriptions of relationships between data – the so-called »empirical laws.«

2. The Hypothetical stratum – or H level – is that part of the text which contains formulatins of *hypotheses* and constructions of *models* for explanations and predictiolls. The H level constitutes the »theory« in the narrow and conventional sense of the term.

3. The Metastratum – or M level – is that part of the text which contains the *methodological* principles regarding empirical research methods and the *metatheoretical* principles regarding theory construction. In addition, the M level may also include some *philosophical* presuppositions, such as *epistemological* propositions about knowledge in general and *ontological* propositions about, e.g., the »Mind-Body Problem.« These philosophical propositions are usually not explicitly formulated but are found to lie »behind« the principles and hypotheses implicitly.

Although these philosophical presuppositions are frequently implicit, we believe that they are very important as determinants of the whole theory.

In accord with many historians and philosophers of science, we conceive of scientific theories as being determined not only by thc *empirical data* obtained from research, but also by the *philosopyhical pressuppositions* which the scientists possess before they start on their research. Furthermore, these philosophical presuppositions influence the whole scientific »strategy«: the metatheoretical and methodological positions selected, the kind of hypotheses and models preferred, and the kind of empirical data that are the object of the rescarch.

Patterns of Preferences.

From the above exposition, it is clear that the philosophical presuppositions determine *metascientific patterns of preferences.*

We believe that these patterns of preferences are strongly influenced by *the personality of the scientist.* We base this upon the »psycho-epistemological« theory of Joseph Royce. He claims that there are three main theories of knowledge: *empiricism, rationalism, and intuitionism* (or »metaphorism« as he also calls it). On the basis of a questionnaire and factor

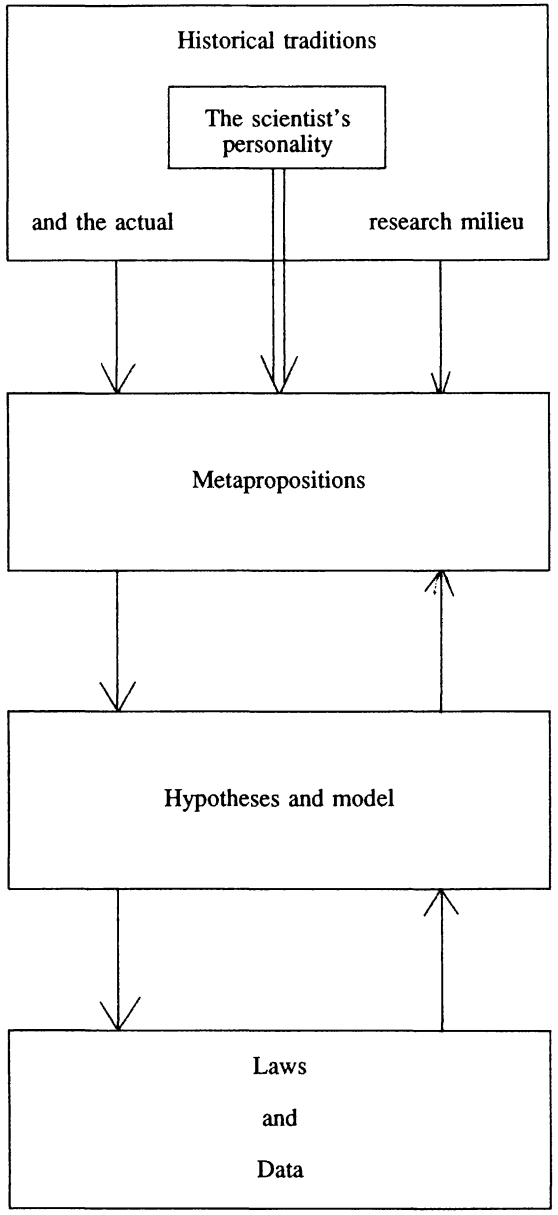

Fig. 3. A model of the general metascientific theory: The personal, social, and historical factors determine the M, H, and D levels of the theory. We presuppose critical feedback between the three levels of the theory, but not feedback to the determining factors.

factor analysis he has found three personality factors. These factors vary in strength from scientist to scientist, and each scientist has his individual »psycho-epistemological profile.« This pattern of personality factors determines which main theory of knowledge the scientist adopts.

We think that Royce's psycho-epistemological theory can be expanded into a general metascientific theory: The scientist's personality determines – together with social and historical factors – the metapropositions he prefers, and as a consequence of this what kind of theory he constructs, and what kind of data he collects. We can illustrate this metascientific theory by means of a graphic model (Fig. 3).

After this generalization of Royce's theory into a more general metascientific theory, we return to our comparative study of theories in order to present evidence for our metascientific theory. For this purpose we find it convenient to differentiate between two categories of empiristic positions: »radical empiricism« (or »positivism«), and »rational empiricism« (or »logical empiricism«).

We can now apply this classification of epistemological positions to the modern and earlier theories of motivation which we have studied. This is presented in the following classification (Table 1).

Table 1

Classification of the modern and earlier theories of motivation according to their presupposed theories of knowledge. Of the earlier theories we have selected 12 of the 20 studied.

Theories of knowledge	Radical empiricism	Rational empiricism	Rationalism	Metaphorism
Modern theories	Duffy? Bindra?	Berlyne, Cattell Konorski, Atkinson Pribram Miller Brown Woodworth Festinger		Maslow?
Earlier theories	Skinner Young? McClelland?	McDougall Tolman Lewin Murray Hull Hebb Tinbergen		Allport? Moore

The Mind-Body Problem

The most important ontological problem for psychologists is the psychosomatic or »mind-body« problem. Psychologists are a little more explicit in their theories about this problem than when dealing with the epistemological problem. Of the different theories about the mind-body problem we have only found the following three included in the theories we have studied: *materialism, neutral monism, and dualism.* The last one is not formulated so explicitly that we can decide whether it represents parallelism or epiphenomenalism. But we think that the third possible version of dualism, the interactionistic theory, can be excluded, as it is very difficult to defend on the basis of modern scientific knowledge.

We present our classification of the modern and earlier theories of motivation in the following classification scheme (Table 2).

Table 2

Classification of the theories according to their presupposed psychosomatic theses. The question mark after some of the names indicates doubt about the classification.

Psychosomatic theories	Materialism	Neutral monism	Dualism
Modern Theories	Duffy? Bindra? Kornorski?	Pribram Miller Brown Woodworth Festinger Cattell Atkinson Berlyne	Maslow?
Earlier theories	Hebb Tinberger Skinner	McDougall Murray Lewin Young Tolman Hull McClelland	Allport Moore

The Cognitive Status of Theories.

In his well known work about *The Structure of Science,* Ernst Nagel (1961) has a chapter with the same title as we have used for this one. In this chapter he deals with a very important problem, which has also been discussed among theoretical psycholologists, namely: What relation do

theories have to »reality«? Nagel maintains that there are three different positions, which he describes as the »descriptive,« the »realist,« and the »instrumental« views of theories.

The descriptive view can be equated with the metatheorical position which conceives of theories as systems of abstract descriptions of observations.

In psychology we find this view among those who – like Skinner – limit the task of science to descriptions of single events or of regular relationships between events (»laws«).

The realist view can be equated with the metatheoretical position, which conceives of theories as representing certain unobserved, hypothetical, but »real« entities behind the observed phenomena. In psychology this view is shared by two different groups.

There are those psychologists who have as their final goal the »reduction« of psychology to physiology. If this goal were realized the result would be a physiological, descriptive theory which would belong to the first view. But nobody believes that this goal was reached, and therefore conceive of their theories as hypotheses referring to the neurophysiological structures and processes behind behavior – the »conceptual nervous system« as Skinner ironically called it. This view is shared by those – like Hebb and Karnovski – who employ hypothetical terms with physiological surplus meaning (S-O-R theories). Merle B. Turner has produced a very detailed and thorough argumentation for the reductionist view (Turner. 1967).

The other group sharing the realist view is composed of psychologists who conceive of theories as referring to the mental stuctures and processes behind behavior and conscious experiences. This view is held by those who use hypothetical terms with mentalistic surplus meaning (S-M-R theories).

The difference between the two subgroups of psychologists sharing the realist view is to be found in their presupposed theory of the psychosomatic problem. Thc mentalistic realists have a dualistic theory of the *mind-body* problem, whereas the reductive realists have a materialistic or a neutral monistic theory of this problem.

The instrumentalist view is the metatheoretical position that conceives of theories as »instruments« or »tools« for making explanaions and predictions. This view has also been called »conventionalism,« which was the name given to it by the famous mathematician and physicist, Henri Poincaré. In psychology the instrumentalist view is represented by well known psychologists such as Freud, Lewin, and Tolman. Tolman made it popular among American psychologists under the label »constructive« (in opposition to »reductive« theories). In the past years the instrumentalist view has gained many adherents, because mathematical and cybernetic models have demonstrated their utility in psychology. The instrumentalist view is shared by all those psychologists who use hypothetical terms with neutral surplus meaning (S-H_N-R theories).

We can summarize this section by making a classification scheme encompassing the modern and earlier theories of motivation which we have studied (Table 3).

Table 3

Classification scheme of modern and earlier theories of motivation according to their view of the metatheoretical status of the theories.

Metatheoretical positions	Descriptive view	Realist view: Reductionism	Realist view: Mentalism	Instrumentalist view
Modern theories	Duffy?	Bindra Kontorski Pribram Miller (II)[a]	Maslow	Miller (I)[a] Brown Woodworth Festinger Catell Atkinson Berlyne
Earlier theories	Skinner	Tinbergen Hebb Young	Allport Moore	McCleland McDougall Murray Hull Lewin Tolman

[a] Miller is presented in two places, because his first theory is instrumentalistic, and his second reductionistic.

Hypothetical Terms

Practically all psychological theories employ terms referring to unobservable »intervening variables« or »hypothetical constructs.« We also refer to these terms as »hypothetical« or »H« terms. They differ from theory to theory according to the kind of surplus meaning they carry with them.

Some psychological theories use explanatory H terms referring to »intervening variables« in the narrow sense. Therefore, these H terms have *no* surplus meaning.

Other theories employ H terms referring to »hypothetical constructs,« which are components in a Conceptual Nervous System. These terms do not refer to physiological data, but to hypothetical variables which are conceived of as part of a brain model. Therefore, they are called H terms with physiological surplus meaning or »H_O terms« (»O« referring to the organism).

A third group of theories uses H terms referring to hypothetical constructs, which are components of a mental structure. These terms do not directly refer to phenomenological *data,* but to inferred processes, states, and structures in other peoples »minds,« which are akin to the phenomenological data we experience in ourselves. Therefore, these H terms are called H terms with mentalistic surplus meaning or H_M terms.

A last group of theories uses H terms referring to hypothetical constructs, which are components of a »neutral« model, which can be borrowed from various fields, e.g, mathematics, cybernetics, and information theory. As these models are »neutral« regarding the mind-body problem, we have called them H terms with neutral surplus meaning or H_N terms.

As it is very difficult to draw a sharp line between these H_N terms and those referring to intervening variables and having no surplus meaning, we have – in accordance with Tolman – combined them under the label H_N terms.

Thus it is possible to classify all psychological theories according to the H terms they employ. They can be divided into three main categories:

1. *S-O-R theories* using H_O terms.
2. *S-M-R theories* using H_M theories.
3. *S-H-R theories* using H_N terms.

In addition to these three main categories there is an additional one i.e., the S-R theories, which is purely descriptive and do not use any H terms. But as Skinner's theory is the only one we have found belonging to this

Table 4

Classification of the earlier and modern theories according to their preferred hypothetical terms.

Preferred	H_O terms[a]	H_N terms[b]	H_M terms[c]
Earlier theories	Young Tinbergen Hebb (Skinner)	McDougall Tolman, Lewin Murray, Hull McCleland	Allport Moore
Modern theories	Duffy Bindra Berlyne Konorski	Miller, Woodworth Brown, Festinger Cattell, Atkinson Pribram	Maslow

[a] *H_O terms,* i.e., H terms with psychological surplus meaning.
[b] *H_N terms,* i.e., H terms with neutral – or without any – surplus meaning.
[c] *H_M terms,* i.e., H terms with mentalistic surplus meaning.

category, we have included it with the S-O-R theories because we believe that Skinner's theory is actually more similar to this group of theories than to the others. We can now summarize our classification of the earlier and the modern theories of motivation in this classification scheme (Table 4).

The Data Language

There are two main data languages: the behavioral and the phenomenological. Most modern psychologists have used the behavioral data language, but a few have used the phenomenological. Many psychologists have used a mixed data language, but often with the behavioral as the basic one. There has not, however, been much discussion of the problem in the last decade. Most psychologists seem to have found the behavioral data language to be the most convenient, without committing themselves to a classic behavioristic metatheory and methodology. The reason for this is that the phenomenological data is presupposed to be translatable into the behavioral data language. Even the humanistic psychologists seem to have accepted a behavioral data language, although they criticize the biological philosophy of man as well as the naturalistic philosophy of science, which is a common trait among American psychologists.

The most serious attack upon the dominance of behaviora] data language has come from a number of modern philosophers The *hermenutic* school of metascience has claimed that there is a basic, qualitative difference between behavior and acts. Behavior – even verbal behavior – can be described, explained and predicted in accordance with the naturalistic concept of science. Human acts – to which language belongs – can neither be explained nor predicted, but the intention (or »meaning«) of the act and the linguistic message may be interpreted and understood in accordance with the *hermeneutic* conception of science.

This philosophically important distinction between behavior and human acts and language has not only been set forth by the *hermenuetic* philosophers (cf. Radnitzky, 1970), but also by analytic philosophers belonging to the so-called »Oxford school of philosophy.« Thus the Danish philosopher, Justus Hartnack, has presented a very thorough analysis of this problem (cf. Hartnack, 1971).

But, unfortunately, these European philosophers' analyses of the problems of behavior and language have late come to the attention of any American psychologists. On the other hand most European philosophers seem to be unfamiliar with Tolman's original distinction between molecular behavior and molar behavior acts (cf. Tolman, 1932). This distinction is similar to the philosophers' distinction between behavior and acts (including language). But Tolman thought it was possible to deal with molar behavior acts in the S-R paradigm, if supplemented with the intervening hypothetical variables and thus expanded into an S-H-R paradigm.

We must leave this philosophical discussion and return to our systematological classifications. In our next classification scheme (Table 5). we bring the classification of the modern and earlier theories according to their preferred data language.

Table 5

Classification of the modern and earlier theories according to their preferred data language.

Preferred data language	Behavioural data language	Mixed or combined data language	Phenomenlogical data language
	Duffy	Konorski	
	Berlyne	Pribram	
Modern	Bindra	Miller	
theories	Brown	Woodworth	
		Festinger	Maslow?[a]
		Cattell Maslow?[a]	
		Atkinson	
	Hebb	Allport	
	Tinbergen	McDougall	
Earlier	Hull	Murray McClelland	
theories	Skinner	Lewin	
		Young	
		Tolman Moore?[a]	Moore?[a]

[a] Two theories – Maslow's and Moore's – were a little difficult to place.

Concluding Remarks

The reader may have noticed that in this chapter we have mentioned the possibility of relationships between the different positions concerning the philosophy of science. These remarks are expressions of our general metascientific hypotheses. If the personality of the scientist determines his preference for some of the major philosophical propositions such as the epistemological and psychosomatic – then it is logical to assume that these first preferences or choices 3 may well imply some of the later preferences of metapropositions. In turn this should imply some consequences for theory construction and the collection of data. In other words, we expect some relationships between the preferences or some patterns in the metatheoretical positions adopted by a particular psychologist. For example, we expect a radical empiricist to be a materialist rather than a dualist, a

descriptivist rather than a realist or instrumentalist, a behaviorist rather than a phenomenalist and so on.

Such a metatheoretical pattern should influence the H level and the D level of the same theory.

We shall illustrate our theory by means of a table (Table 6) and later we can see how »correct« the evidence for the theory is in terms of our material.

As can be seen from Table 6 we have arranged the different metascientific classifications in such a way that there are three possible patterns of preference or paradigms.

The first paradigm is for convenience called the Empiricist Paradigm. This includes the following pattern of preferences: Radical empiricism + materialism + descriptivism or reductive realism + preference for Ho terms and a behavioral data language.

Table 6

A classification scheme presenting the different metascientific views which psychologists may have on different problems.[a]

Epistemological theories	Radical empiricism	Empiristic Pure ---------- Rationalism	Metaphorism
Psychosomatic theories	Materialism	Neutral Monism	Dualism
Methatheories	Descriptionism / Reductive realism	Instrumentalism	Mentalistic realism
Preferred H terms	H_O terms	H_N terms	H_M terms
Preferred data languages	Behavioral	Mixed or combined data languages	Phenomenlogical

[a] The scheme is made so that it is easy to conceive of three metascientific patterns of preference or »paradigms«:

(1) The Empiricist paradigm: The empiristic-materialist-descriptionist (or reducetionist)-H_O terms-behaviorist pattern.

(2) The Rationalist paradigm: The rationalist-neutral monist-instrumentist-H_N terms-integrationist pattern.

(3) The Intuitionist paradigm: The metaphorist-dualist-mentalist H_M terms-phenomenologist pattern.

The second paradigm is called the Rationalist Paradigm. It includes this pattern of preferences Rationalism (pure or empiristic) + neutral monism

Table 7
Classification of 24 theories according to metascientific paradigm.

Metascientific paradigms	Empiricist paradigm	Rationalist paradigm	Intuitionist paradigm
Epistemological theories	Duffy Bindra Skinner McClelland Young	Miller, Woodworth Brown, Festinger Cattell, Atkinson McDougall, Tolman Tinbergen, Lewin Murray, Pribram Hull, Berlyne, Hebb	Maslow Moore Allport
Psychosomatic theories	Duffy, Tinbergen Bindra Skinner Hebb Konorski	Miller, Woodworth Brown, Festinger Cattell, Atkinson McDougall, Tolman Lewin, Murray, Young Hull, McClelland Pribram, Berlyne	Maslow Moore Allport
Metatheories	Duffy, Konorski Bindra, Young Skinner, Tinbergen Hebb Pribram	Miller, Woodworth Brown, Festinger Cattell, Atkinson McDougall, Tolman Lewin, Murray Hull, McClelland Berlyne	Maslow Moore Allport
Preferred H terms	Duffy, Young Bindra, Tinbergen Skinner Berlyne Hebb Konorski	Miller, Woodwroth Brown, Festinger Cattell, Atkinson McDougall, Tolman Lewin, Murray Hull, McClelland Pribram	Maslow Moore Allport
Preferred Data Languages	Duffy, Hebb Bindra, Tinbergen Skinner Brown Hull Berlyne	Miller, Woodworth Allport Festinger, Cattell Atkinson, McDougall Tolman, Lewin, Murray Young, McClelland Pribram, Konorski	Maslow? Moore

+ instrumentalism + preference for H_N terms and a combined data language.

The third paradigm is called the Intuitionist Paradigm. It includes this pattern of preferences: Metaphorism + dualism + mentalistic realism + preference of H_M, terms and phenomenological data language.

These three paradigms are the possible patterns of preferences. We shall now try to ascertain to what degree these paradigms are real patterns of preferences. In other words: How the theories we have studied are distributed over the five classifications. We have placed the earlier and modern theories of motivation in a classification scheme in which the columns indicate the three possible patterns of preferences and the rows indicate the five possible metascientific classifications (see Table 7).[2]

If we inspect this classification scheme it can readily be seen that some theories consistently follow a certain pattern of preferences. Thus Duffy, Bindra, and Skinner consistently follow the empiricist paradigm. And it is also easy to see that there are three theories which just as consistently follow the intuitionist paradigm, namely those of Maslow, Moore, and Allport (although Allport is not completely consistent). In the rationalist paradigm we find nine consistent theories, those of Miller, Woodworth, Festinger, Cattell, Atkinson, McDougall, Tolman, Lewin, and Murray.

These 15 theories are those which most consistently follow one pattern of preferences. And among, these Allport was not completely consistent, only in four of the five possible cases. Thus we can call Allport's »80% consistent.« There are some theories beeside Allport's which are 80% consistent, namely those of Pribram, Brown, Hull, Hebb, McClelland, and Tinbergen. Together with Allport this makes eight theories which are »80% consistent.«

Thus we can conclude that among these 24 theories there are 14 – or 58% – which are »100% consistent.« And, in addition, there are seven theories whieh are »80% consistent.« We can combine the »100% consistent« theories with the »80% consistent« in one category, the »80-100% consistent theories.« This category encompasses 21 of the 24 theories. In other words 88% of the theories are 80-100% consistent. We regard this as fairly good confirmation of our metascientific theory of the patterns of preferences.

Supplementary Comments

The above results about »patterns of preferences« were presented by the author at a symposium. In one of the sessions H.J. Eysenck proposed a

2. We think that the term »preference« is more adequate than the term »choice« because it is rarely a matter of consciously choosing a particular metascientific »strategy« but rather a matter of unconscious personal preferences.

very interesting hypothesis: The three paradigms constitute a »dimension« if they are arranged in this way:

Rationalism	Empiricism	Intutionism

And this dimension is according, to Eysenck, correlated with the Introversion-Extraversion personality dimension. He has found the same correlation between this personality dimension and the selection of courses as Royce found between his »psycho-epistemological profile« and the selection of studies. Thus mathematicians and physicists are introverts and rationalists, whereas chemists and biologists are ambiverts and empiricists and humanists and artists are extraverts and intuitionists.

If this hypothesis proposed by Eysenck is confirmed, we have made a step toward the integration of systematology and the psychology of scientists.