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# [Without temporality]
# CHAPTER I*
# PSYCHOPEDAGOGICS AND LEARNING: THE QUESTIONABLE RELEVANCE OF THREE PSYCHOLOGICAL THEORIES OF LEARNING FOR TEACHER PREPARATION

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## PRELIMINARY COMMENTS

Since the following evaluations of the value for teachers and educators of the classical and operant conditioning, as well as information processing models of learning are somewhat negative, it is fair to present a brief overview of my *perspective* leading to such claims.

This perspective embraces phenomenology, as its primary method, pedagogics, as a phenomenological study of educating, as upbringing, psychopedagogics, as a part-perspective of pedagogics, and their underlying philosophical child anthropology (view of being human), as aspects constituting it, which are relevant to this chapter, and explicitly, a psychopedagogical view of learning, which is rooted in this philosophical anthropology.

### Phenomenology as method

Phenomenology, as a method designed to disclose the essences of a phenomenon, begins with a thinking strategy which tries to eliminate or minimize the essence-blinding influences of assumptions, theories, ideologies, philosophies of life, etc. which can hide and distort how a phenomenon "speaks to", or reveals

* 2023 revision, but not update, of chapter 1 from Sonnekus, M. C. H. (ed.) (1985) *Learning: a psychopedagogic perspective.* Stellenbosch: University Publishers and Booksellers.

itself to someone. This attempted control of these influences is to bracket or temporarily hold in abeyance as many of them as is feasible. This is called the phenomenological reduction, and it is sustained throughout a phenomenological investigation of an experience of something.

This allows for a closer, clearer view of and access to the matter itself; that is, it allows it to describe and explain itself to us as it would if it could, without our presumptions and life commitments, etc. intruding, skewing, and even interrupting our dialoging with the matter. This strategy gets us closer to it by trying to neutralize biases of whatever kind for the entire duration of the investigation. (Even though a complete phenomenological reduction is not possible, this does not invalidate its value).

Within this bracketing, the eidetic reduction is performed. Also called the method of free variation, it is a way of disclosing and highlighting what seem to be essences. To further test and elucidate the seeming essences, the hermeneutic method then is used to disclose and clarify the meaning (what function it serves) of each of the essences. Then, by means of the dialectic (triadic) method, the interrelationships among the essences, and coherent structures are disclosed (e.g., how they serve as mutual conditions for each other to occur). Each of these strategies is used while a phenomenological reduction is operative and, thus, the resulting essences/categories transcend any concrete occurrence of the phenomenon and, thus, can claim universality. This is not merely armchair theorizing which then must be empirically validated.

## An existential-phenomenological philosophical anthropology underlying pedagogics, psychopedagogics and, thus, my perspective.

Philosophical anthropology focuses on disclosing and describing the essential nature of being human. As a human science, psychopedagogics and the other part-perspectives of pedagogics (e.g., didactic-, and fundamental-pedagogics) also aim at disclosing and describing essentials of being human as found in and nuanced by being in a practical educative (pedagogic)

situation. Within the scope of this chapter, only a few of the disclosures of an existential-phenomenological philosophical anthropology (on which psychopedagogics rests) follow:

(a) A human being is a psycho-physical-spiritual (existential) unity (Frankl, 1969); because of spirituality, a human being is a person, and this spiritual aspect makes educating both necessary and possible (De Vries, 1986; Gunter, 1974; Nel, 1974). Rejected is the *incomplete* view that a human being is only a psycho-physical organism. One reason is that the spiritual dimension allows a human being to be self-conscious (Royce, 1969). Because he/she is self-conscious, he/she can distance him/herself from him/herself and, thus, view and judge him/herself and have a conscience.

(b) A human being is always in a situation. (The "in" here is not merely a spatial relationship; it means in-volved, being-there. See, for example, Luijpen, 1969). A child on the way to adulthood is in a *pedagogical situation* (Langeveld, 1968). To know and assist him/her educatively, one must go to that situation in which a child is, as an educand [i.e., a being who can be, *and* must be educated/brought up].

(c) Of direct relevance to the other chapters is a person as intentionality. Intentionality is a directedness to and an openness for something (objects, contents, world). Directedness to is an active, meaning-attributing pole and, simultaneously, openness is a more passive, receptive pole of receiving meaning. Thus, a child does not merely react or respond to things in the world, but answers situational demands and appeals by choosing, discovering new values and, especially by giving meaning to his/her world and everything in it. As openness, he/she is receptive to the meanings inherent in the matter of his/her consciousness. In an act of being conscious of something, there is a "lived" dialogue between giving meaning *to* and receiving meaning *from* what is experienced (e.g., content).

Pedagogics as a phenomenology of educating (upbringing)

What follows reflects some of the points noted by Crous (1984/2023, ch. 1); his book can be consulted for greater detail:

Educating, as a human activity, occurs as a series of situations within which an adult presents and demonstrates norms, values, codes of behavior, dispositions, skills, etc. to a child as content such that he/she will learn them and eventually live in terms of them. In essence, all educative situations consist of an adult, a child (or children) and educative content, with the help of which an adult accompanies him/her and by which he/she becomes adult. Thus, the entirety of the educative event, as it originates in a parent-child educative relationship at home, and as institutionally formalized, e.g., in a teacher-pupil educative relationship at school, is the area of study of pedagogics.

By studying educating and its essentials phenomenologically, its complex, multifaceted nature and broad scope become clear. Thus, to be able to study it in its totality, it is necessary that it be illuminated from different angles (part-perspectives). This has led to contemporary pedagogics developing into several part-perspectives, such as fundamental pedagogics, didactic pedagogics, psychopedagogics, sociopedagogics, orthopedagogics, and others. Each of these part-perspectives, in fact, studies the *total* phenomenon of educating -- but each asks its own questions and, in doing so, creates its own perspective on it. Thus, although different pedagogical part-perspectives exist, eventually they are synthesized into the one science of pedagogics. Hence, within pedagogics there is not only a search for the essentials and their structures, as disclosed by each perspective, but there is a search for the connections among the findings of each of the different part-perspectives. In this way, the complex phenomenon of educating is studied and described in its totality through these different part-perspectives.

Thus, pedagogics is the human science which studies everything regarding educating as what appears and is actualized between adults and children, and which reveals and describes what is essential to it.

## Psychopedagogics, as a part-perspective of pedagogics

As with the consideration of pedagogics, some of the points noted by Crous (1984/2023, ch. 1) on this topic follow:

As a part-perspective of pedagogics, everything regarding educating falls within the domain of psychopedagogics--as is true with the other part-perspectives. Also, psychopedagogics is rooted in the reality of educating, and its question is: "*How* does a child become adult?" From a phenomenological perspective, its task is to reflect on everything in an educative situation which is essential for a child's becoming adult. It is interested in the way(s) this becoming occurs. In answering this question, it makes statements about the dynamics or movement of a child in his/her becoming adult, as well as about what occurs between adult and child.

Since an educative situation consists of an adult, ta child, and educative content, psychopedagogics is directed to each of these constituents to determine what is essential to each, and how they influence a child's becoming adult.

The adult (parent), as educator, plays a significant role in educating and, thus, also in a child's personal actualization. Without educating, he/she cannot become a proper adult and, therefore, it is necessary for personal actualization. The question psychopedagogics is concerned with, in this regard, is not so much the essentials of educating as how educating or accompanying should be carried out so a child is allowed to prosper into a full-fledged person. Thus, its domain includes ascertaining how an educator's [affective, cognitive, and normative] accompaniment should be carried out so that the essentials of educating [i.e., the relationship, sequence, activity, and aim structures] are allowed to function.

As one of the constituents of the educative situation, a child him/herself necessarily has a share in his/her personal actualization. It is always a child in an educative situation who must become adult, and from an anthropological view, he/she has

the potentialities to gradually change from being a child to being an adult. However, psychopedagogics wants to know how he/she actualizes his/her potentialities, how he/she learns, how he/she changes, how he/she acts, how he/she responds to the accompaniment of the adults, etc. Thus, there is a search for the essentials of personal actualization to obtain an image of how becoming adult occurs.

Psychopedagogics finds that a child's share largely resides in the fact that, under adult accompaniment, he/she gives sense and meaning to his/her being educated and, in this way, actualizes his/her potentialities. Hence, he/she changes or becomes. Thus, giving meaning is at the foundation of a child's own share in his/her personal actualization and, therefore, psychopedagogics is especially interested in how personal actualization occurs by a child giving meaning within an educative situation.

Educating and personal actualization cannot occur without content in terms of which they can take place. Here, reference to content means educative content, because not all content is suitable for bringing a child nearer to adulthood. For example, when a child learns to be dishonest, it merely thwarts the educative aim. How the contents appear, i.e., their normative nature, also is of utmost importance for his/her becoming adult. When the topic of content is raised, thoughts of subject matter content and, thus, teaching in school necessarily arise. Consequently, psychopedagogics asks questions about the ways school teaching contributes to adequate personal actualization.

Thus, adult accompaniment (educating, teaching), content, learning, and becoming are interconnected. Hence, it is a task of psychopedagogics to indicate these interconnections and show how they influence a child's personal actualization.

## A psychopedagogical view regarding the question, "what is learning?"

The following account of ways of learning and their functions reflects some of the points stressed by Crous (1984/2033) in

chapter V of his book, and these modes of learning are the main topic of chapter III of this study:

Learning is a phenomenon of becoming, in the sense that a child becomes only if he/she learns.

Learning has its origin in a child's own initiative, but he/she is always dependent on educating (upbringing) for its proper actualization. Without educating, he/she cannot learn as he/she should and, thus, not become as he/she should. The educative significance of an act of learning is his/her becoming a proper adult.

Learning is given with being human, and it is one way in which one displays his/her psychic life (See chapter II). In other words, the modes of learning are ways of going out to the world (as contents) and of carrying on a dialogue by which one learns to know that world. As an act of intentionality, *learning is a search for meaning,* and this implies that, as something is learned, the learner is changed, as is the meaning of the content learned. Indeed, as a child learns, especially when guided by an educator (adult), the level of this dialogue with content (reality)is elevated, and he/she gradually behaves as an adult. When a child becomes an autonomous, morally responsible person (i.e., an adult), the aim of educating/upbringing has been attained, and the pedagogic relationship between adult and child now becomes an andragogic relationship between adults (e.g., Yonge, 1985).

## The modes or ways of learning

From a psychopedagogical view, the different modes of learning--sensing, attending, perceiving, thinking, and imagining and fantasizing -- [let's "forget" remembering for the moment] --are different ways of relating to reality. Sensing, as the beginning of learning, is our first "seeing" something. Attending allows us to break out of our sensory horizon of how something appears here-and-now to what it is which appears. That is, attending allows us to distance ourselves from our pathic/gnostic sensing to an affective/cognitive level of knowing; here, for example, hearing, via attending, becomes listening, seeing becomes looking,

touching becomes feeling; thus, Straus (1963, p 317) calls perceiving the "second seeing", in that it is a more distanced, cognitive relationship to the world than is sensing, the first seeing. Thinking is an even more distanced relationship than perceiving, because one can only perceive what is present, but one can think about what is absent, as well as what is present. Imagining and fantasizing are even more distanced modes of learning because they allow one to push and exceed the limits of reality in creative ways. Finally, remembering is the crowning of learning, in that it makes our past learning present so newly learned contents can be integrated with the old. Without remembering no learning is possible.

## The functions (modalities) of each mode of learning

The functions (modalities) of sensing are: it initiates all learning, and it is the foundation of the other modes of learning (and, thus, always sustains or accompanies cognitive learning); qualitatively, sensing is affective, pre-cognitive, and subjective.

The main functions of attending are: it is a sharpened intention (being directed) to learn; it is selective of contents and, along with sensing, it supports and sustains the cognitive modes of learning (perceiving, thinking, imagining, and fantasizing as well as remembering).

Some functions of perceiving are: global identification, perceptual analysis, synthesis and ordering.

Some of the most important functions of thinking are: conceptual abstracting, conceptualizing, ordering, analyzing, synthesizing, problem solving.

Some functions of imagining and fantasizing: they make it possible to go beyond or exceed reality; imagining is an activity by which reality can be represented; and imagining and fantasizing both contain a creative aspect.

The following functions of remembering are: making past learning present (recalling); integrating new learning contents with the old.

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## INTRODUCTION

By way of setting the stage for the following three chapters, the first on the psychic life of the child-in-education, the second on the learning child-in-education and the third on a child becoming adult, also within an educative relationship, I aim to show why the psychological theories of learning found in almost every educational psychology textbook in the United States at this time (1985) are not a focus for psychopedagogics. These theories are: classical conditioning, operant conditioning, social or imitative learning, cognitive theories (e.g., Ausubel, Bruner), and information processing. Only three are considered, i.e., classical conditioning, operant conditioning, and information processing. Social learning, as developed by Bandura, largely caries the stamp of operant conditioning *and* information processing and is not considered. So-called cognitive theories are not focused on since no one claims to offer a comprehensive theory or model [in 1985].

In considering these three theories or models of learning: (1) a model is presented briefly; (2) an educational psychological (i.e., an applied psychology) view of its value for a teacher/educator is considered; (3) a phenomenological description of the phenomena addressed by the model is presented ; (4) the phenomena the theory claims to account for are viewed phenomenologically; (5) a model is evaluated psychopedagogically and, finally, (6) conclusions are made regarding the model's potential usefulness for teachers/educators. Before doing this, a few other comments are in order.

To fully appreciate psychopedagogics, as a part-perspective of pedagogics, it is helpful to understand why these psychological theories of learning do not appear in chapter III dealing with the

*ways or modes* by which a person learns and, specifically how a child learns in a pedagogic (educative) situation. The main reason is that psychopedagogics is not psychology applied to schooling or to educating, as upbringing. Its point of departure is a pedagogical situation (which always involves an adult guiding or accompanying a child via content with the aim of helping him/her become an adult). The *categories* of psychopedagogics, including its categories of learning and becoming, emerge from within this relationship/situation itself and are not imported from psychology.

In contrast to psychopedagogics, "traditional" educational psychology does not start with a child in a pedagogical situation, (indeed, a pedagogical situation and all it entails [see Landman, 1975/2013 and Yonge (1989) appendices I and II] is absent). Other than a reference to "learning at school", seldom is any *explicit context* or situation mentioned. Their point of departure is the psychology of learning and, more specifically, the psychology of learning applied to learning in school. This is precisely why the above-mentioned theories of learning play such a prominent role in the thinking of educational psychologists—they tend to start with and apply these theories or models to a school situation. In doing so, an implicit underlying philosophical anthropology also is imported, in that it strongly influences the interpretation of what the phenomena under consideration mean. These consequences will hold for the application of future advances in psychology or other fields to education, unless they are evaluated and reinterpreted from a pedagogical perspective (i.e., with pedagigical criteria).

There is no question that a teacher or educator will benefit from knowledge of and insights into how children learn and yet, it is questionable that a study of the psychology of learning is very helpful in this regard (See Sonnekus, no date). Even so, writers of most educational psychology textbooks present these and other theories while *assuming,* for the most part *without question,* that they are what a teacher or educator must know about *how* a child learns. But are these theories relevant? Or, if they are, why is it that they do not spontaneously suggest themselves when one begins with a pedagogical situation and tries to understand and

describe *how* learning occurs in that everyday situation? If they do not arise from within such a situation, if they do not "belong" to it, but are imported from psychology, how can one decide how, when, or even if one should use these theories for *pedagogical, i.e., educative, purposes?* Psychology cannot provide any direct answers because this is a psychopedagogical, and not a psychological issue.

Before proceeding to a presentation and evaluation of the three theories, I attempt to show that psychopedagogics need not and, perhaps, should not include them as an important focal point, two examples from a widely accepted pool of definitions of learning are examined because the models to be considered are claimed to be consistent with them and, partly because these definitions, and the models of learning are founded on the same unacceptable natural science philosophical anthropology (a natural science view of being human).
In preparing for what follows, I have consulted six* well-respected educational psychology textbooks. There is virtual unanimity among them regarding their response to "what is learning?", and to their presentations of the three models of learning evaluated below. Even so, I favor the presentations by Gage and Berliner (1984) with respect to what learning is, and their presentations of classical and operant conditioning. This is not because I consider their book to be inferior to the others. Rather, their examples and explanations reveal most clearly the line of thinking encouraged by following a natural science anthropology (view of being human). All six textbooks helped me in my evaluation of the information processing model.

## WHAT IS LEARNING?

Two definitions of learning which are widely accepted in the United States are presented as examples. One of the better, but still limited definitions is that of Gagne (1965) who states, "*Learning is a change in human disposition or capability that persists over a period of time and is not simply ascribable to*

*Gage and erliner (1984), Gagne (1984), Lefancois (1985), Lindgren and Suter (1985), Rosser and Nicholson (1984) and Thornburg (1984).

*processes of growth. The kind of change called leaning exhibits itself as a change in behavior ..."* Even more prominent is the definition offered by Gage and Berliner (1964) who say, "learning is the process whereby an organism changes its behavior as a result of experience." They then offer an elaboration of this definition which roughly is as follows: change implies time, in the sense that an organism which has learned *behaves now in a way different from before; t*his change is limited to *behavior* and does not include, e.g., change in height and other natural changes. As Gage and Berliner state, "*the overt behavior of the organism – pigeon or school age child, worm or teacher – is always our starting point;as a result of experience means change resulting from things other than fatigue, sensory deprivation, drugs and mechanical forces ..."* More specifically, "*learning results from experience with the environment whereby relationships between stimuli and responses are established"* (Gage and Berliner, 1964): *italics* added.

In connection with my comments on these variations of a definition of learning, the reader is referred to the criticism of such definitions made by Sonnekus in the 1960's (Nel, Sonnekus and Garbers, 1965). Among other criticisms, Sonnekus mentions that such definitions are concerned mainly with a change in behavior, with the aim of a better adaptation of the individual to his/her environment: the terminology has a natural science, biological flavor, and is not applicable to a person; a change in behavior and adaptation concern peripheral spheres of life, and is applicable to a vital-psychic level of a person's behaving but, in no sense refers to a spiritual-personal level of behavior. He also says that, instead of just a change in behavior, a person him/herself changes as a human being, not as a reaction to stimuli, but because of his/her dynamic, intentional directedness to act on, to modify, to create, and discover his/her world. A person doesn't undergo a change in behavior but, as a person, the "I" changes. Thus, Sonnekus says that learning concerns much more than merely a change in behavior.

Possibly, the emphasis on a change in behavior is a carryover from behaviorism, but its persistence and general acceptance are rooted in an error of logic. That is, there is no question that a

change in behavior is evidence of learning. However, it does not follow from this that leaning *IS* a change in behavior.

These remarks revolve around the fact that such definitions of learning as those by Gagne and by Gage and Berliner, as well as the other four authors, are founded on a pedagogically unacceptable philosophical anthropology. For example, these definitions do not reflect human intentionality, as openness for and directedness to the world. Unfortunately, to pursue this important point is beyond the scope of this chapter. In this connection, the reader is referred to Sonnekus (no date). However, some of the consequences of overlooking intentionality, as being directed to and open for something are apparent in my evaluations of the models of learning.

At this point, additional inadequacies of these definitions are indicated. Regarding the definition offered by Gagne, a persistent change in human *disposition* or *competency* is *not* a statement regarding what learning *is* but rather it refers to an *effect of having learned.* Even so, a positive aspect of Gagne's position is that, unlike most others, he does not limit the effect of learning to the very general category of *a change in behavior*. In addition, in his definition, he refers explicitly to *human learning.* The definition presented by Gage and Berliner comes closer to considering the act of learning itself when they refer to it as a "*process by means of which the organism changes its behavior".* Although not stated explicitly, "process" is exemplified differently by each of the models of learning. They do say that learning is a "process" of having "experience with the environment whereby relationships between stimuli and responses are established."

Aside from the natural science language (process, organism, stimulus) used by Gage and Berliner (1984), in their elaboration of their "definition", it is revealing in that the five main terms in their definition (process, organism, change, behavior, experience) have a strong natural science flavor which clearly color their line of thinking which is expressive of a natural science philosophical anthropology.

Without further consideration of the above "definitions" of learning, it is concluded that they are inadequate, not only because they are expressive of a psychopedagogically unacceptable philosophical anthropology underlying them, but because they focus on what learning accomplishes or results in rather than what it is as an act.

## SIGNAL OR RESPONDENT LEARNING

### The model of how learning occurs

This model almost always is reduced to Pavlov's paradigm for establishing a conditioned reflex. Restricting this phenomenon to Pavlovian respondent conditioning is a direct consequence of misunderstanding the essential nature of signal learning. To fully appreciate this misunderstanding, I begin with a traditional account of learning from this perspective. First, I present this model in its own terms before pointing out the nature of the misunderstanding involved.

Three steps, or phases are required for learning to occur and to be demonstrated, according to this paradigm:

Step 1 involves presenting a stimulus (food), which leads to a reflexive response (salivation). In this example, the food is called an unconditioned stimulus (US), and salivation an unconditioned response (UR). Unconditioned means unlearned, in the sense that the stimulus "naturally" leads to the response; the response is a reflex caused by the stimulus.
Step 2 requires the repeated presentation of a neutral, or conditioned stimulus (CS), say the sound of a bell, *slightly before*[*] presenting the food (US), which then causes salivation, the reflexive UR.
Step 3 entails presenting the sound of the bell (CS) alone. If learning has occurred, the organism will respond by salivating to

[*]Of the six recently published educational psychology textbooks consulted, none emphasized that the CS *must precede* the US. Four stated this is so but don't stress it, two give a misleading diagram or a misleading example, and two state outright that the simultaneity of CS and US which will lead to conditioned learning, which it will not; simultaneity might well lead to associative learning but not to conditioned learning.

the previously neutral sound of the bell. One can look at this change in behavior resulting from the experiences provided in step 2. This change sometimes is referred to as *stimulus substitution,* in the sense that the CS has become a surrogate, a substitute, for the US in step 3 – at least as far as salivation is concerned.

What counts as learning here, a change in behavior resulting from experience, is not a change in the response (salivation) but rather a responding now to a previously neutral stimulus. Why the above interpretation is erroneous is clarified below.

## Why should teachers, educators know about this model of learning?

Gage and Berliner (1984) offer as clear an answer as anyone to this question. They state that, "any time an unconditioned stimulus (UC) elicits a visceral or emotional response (UR), such as fear, anger, vomiting, revulsion, joy, pleasure, happiness, and ecstasy, then a previously neutral stimulus (CS) can be paired with the US-UR connection by presenting the CS slightly before the US. This results in the development of a conditioned response (such as fear or joy) to that conditioned stimulus." For example, Gage and Berliner say, "the stimulus hugs and compliments of the teacher may be interpreted as the unconditioned stimulus. These acts elicit in the child feelings of pleasure, which we can interpret as the unconditioned response. The previously neutral teacher and school, the unconditioned stimulus, are associated with the unconditioned stimulus and soon come to elicit the same feelings of pleasure."

These authors also present the following scenario regarding students from homes of low income who come to school without having had any breakfast. "They come to school reluctantly ... as the morning goes on each day, however, they experience increased discomfort particularly in science class that just precedes the lunch hour. The students' hunger brings increasing anxiety and tension that makes it difficult for them to concentrate and attend to their work."

Gage and Berliner then analyze this situation in terms of the Pavlovian model of respondent learning. The US is hunger; the UR is the combination of anxiety and tensions, with little concentrating, or attending behaviors; the CS is the science class; the science class and hunger are paired (step 2); finally, the CR is the feeling of discomfort, anxiety, and tension when it occurs as a response to the science class alone.

And how can an understanding of this model provide a basis for practical action? Gage and Berliner tell us that "the CS-CR link is well established, although in time it certainly could be extinguished. Providing food during science class would, however, break the relationship and establish positive emotional responses to science by association with relief from hunger."

Of course, Gage and Berliner, as is the case with most other authors of educational psychology textbooks, recognize that the model of respondent learning has severe limitations when applied to human beings to change their behavior, to provide insight into what learning is, or both. Still, they say, "The teacher who can analyze the learning environment in terms of this basic kind of learning is in a better position to understand and improve student behavior."

It is evident from a phenomenological analysis of signal or respondent learning that the above examples are *not* instances of signal learning. To say this is not to deny the phenomenon of respondent or signal learning, and it is not to deny that a child's attitudes, interests, and feelings about school often are influenced by a teacher's actions, by being hungry, etc. via learning these associations and not via respondent conditioning or signal learning.

## A phenomenological view of respondent learning

Long before Gagne (1965) typified respondent learning as signal learning, Erwin Straus, first in 1930 (see Straus, 1982) and then, in a more elaborate fashion, in 1935 (see Straus, 1963), offers a devastating critique of Pavlov's "doctrine" of "conditional"

reflexes, and he also shows that, in essence, Pavlov is dealing with signal learning. He justifies calling Pavlov's interpretations a "doctrine" because they are based on the following seemingly *conclusive* assumptions: "(1) There is the possibility of *purely objective* observations and descriptions; (2) Pavlov's experimental design is *simple and perfectly lucid;* (3) the theory directly follows, as an evident generalization from the results obtained by the experiments; (4) these results, carried through in all possible variations and verified ln each case, provide ever-renewed proof of the theory" (Straus, 1963).

Generations of psychologists and educational psychologists have promoted Pavlov's interpretations as self-evident, though perhaps limited in application to human beings, even though Straus (1963) shows that Pavlov's theory is shot through with *contradictory and ad hoc invented hypotheses* (e.g., inhibition, disinhibition, cortical irradiation, trace reflexes, orienting reflexes).

However, the point is not to repeat Straus' criticisms of Pavlov. Rather, the issue is this: if the *interpretations of the results of the experiments by Pavlov and hundreds of others are untrustworthy (and generally they are), what do they mean?* As Straus (1963) puts it, "The phenomena observed by Pavlov exist, and they remain unshaken even if his own explanations of them collapses. But on collapse of his theory, it becomes a matter of utmost urgency to ask: How must sensory* experience be constituted so that the so-called 'conditioned reflexes' are possible?"

This guiding question leads Straus (1963), in 1932, to show that respondent learning or Pavlovian conditioning is a form of signal learning. When viewed as such, Pavlov's data are accounted for in terms of the essential nature of a signal, and none of his "*ad hoc invented hypotheses"* are needed. Not only that, when respondent learning is seen as signal learning, it is released from being bound to reflexive (Pavlov) and to emotional (Watson) responses.

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*Sensory in the special "sense" of Straus (G.Y.)

As indicated, as early as the 1930's, Straus had carried out a phenomenological analysis of "signal-formation", which he then shows to be the *essential theme* of Pavlov's experiments. Now, the question is, what is a signal in its essence?

*A signal is the middle term of a three-term relation, in that it signifies a transition from a neutral to a nonneutral situation.* From Pavlov to Gagne, signal learning is viewed *only* in terms of the relationship between the signal (CS) [e.g., the sound of the bell] and that which it signifies (US) [e.g., food]. In taking for granted the neutral situation, the focus becomes one-sided, and this distorts or hides the essential meaning of a signal, because its formation, in part, is dependent on the neutral situation.

The reason for this neglect of the neutral situation is clear. Not seeing the signal as the *middle* term, it is seen as the stimulus, the cause, the beginning of the event. What occurred before is irrelevant. More is said about this below.

According to Straus (1982), "If an object is to become a signal, it must fulfill two conditions. Even though it is itself neutral (indifferent), nevertheless, it must stand out in relief against the neutral situation. It must be a sudden or conspicuous *modification* of the neutral situation to which it belongs, and, at the same time, it must be different in nature from the nonneutral situation to *follow,* and to which it merely points." Within the limits of these conditions, "in principle the stimulus applied as a signal must be replaceable by other stimuli." This pointing to is precisely why a signal (CS) *must precede* what it points to (US).

Although it belongs to the neutral situation, the signal must stand out or be noticeable in it. If it is too weak, it will go unnoticed (it will not belong to the neutral situation), if it is too strong, it will be experienced as such, and *not point to* anything else. In other words, there are essential limits to what can serve as a signal, and these limits cannot be defined without considering the nature of the neutral situation. Again, from Pavlov to Gagne, these essential limits are not recognized; hence, what can serve as a signal (CS) becomes extended, in hypothetical examples, to an event or "stimulus" which does not meet the essential conditions for

functioning as a signal. (I am thinking of the examples offered by Gage and Berliner referred to earlier and discussed later).

Returning to Straus (1982), "If a stimulus is to become a signal, the external circumstances must be ordered so that the *transition* takes place only at the point indicated by the stimulus." And further, "To form a good signal ... it is necessary that the specific situation enters only when the stimulus selected to be a signal has appeared in the neutral milieu; inversely, as soon as this stimulus shows itself, the non-neutral situation *also* follows it every time." Straus also says the so-called conditioned reflexes "are formed only by narrowing-down the possible stimuli of the neutral milieu to one definite stimulus." And later, "The development of the conditioned reflex, from the beginning, is nothing more than a process of concentration, that is, of narrowing down and limiting the stimuli."

Finally, according to Straus (1982), Pavlov's theory distorts its temporal order in that, instead of the signal being the first of four terms, there is a "three term relation in which the signal stands as middle term .... The animated organism's anticipation of what is coming and its reaction to it has no place in his theory." Indeed, his criticism of Pavlov is so thorough that we need not dwell on the temporality of signal learning and how Pavlov distorts it [i.e., as a response and not an anticipation].

## An evaluation of respondent learning in terms of the phenomenology of a signal

Even though it is an accurate description of what one can *do* to promote signal learning, the three-step model with which this section begins, is misleading with respect to providing insight into the nature of what is going on in this type of situation. Analyzing the model of respondent learning into its *assumed* constituent parts of US, UR, CS and CR invites the misunderstanding that the essence of respondent learning is *stimulus substitution,* in that the US is dropped out and the CS takes its place as the cause of the response (now CR). However, *a true substitution has not occurred*. There are differences between responding to a UR and a CR, such as latency in snd amount of salivation. But the most

decisive difference is, e.g., the organism eats the food, but not the sound of the bell! Surprisingly, these differences usually are not acknowledged. For example, Gage and Berliner (1984) talk about "a response very similar to the one given when the meat powder is presented." And Klausmeier (1985) says, "The learning process consisted of associating the already available response with a new stimulus." Both statements reflect a fundamental misunderstanding of the nature of signal learning.

Also, the answer to the question of what is learned is obscured by this model. For most, the learner learns to pair an old response (salivation) to a previously neutral stimulus (sound of the bell). As noted, for Gagne, what is learned is the "anticipation of a stimulus (food)", and from Straus' analysis, what is learned is the changed meaning (significance) of the signal from neutrality to a pointing to [anticipation]. What is learned is that a signal means a *transition* from the neutral to the nonneutral and not an "old" response to a "new" stimulus.

Viewed in the context of the nature of a signal, the school related examples of respondent learning offered by Gage and Berliner (1984), and those offered by countless other authors, do not meet the criteria for signal learning. What is more, their assumption that signal learning is limited to visceral or emotional reactions is unfounded. This idea has been widely accepted, especially since Watson's (1913) classic study with little Albert. But a signal does not cause an emotional response; it belongs to the neutral situation and is not a cause of what follows. Rather, in Watson's study, the signal (a white rat) points to a nonneutral situation (a loud noise), which upset Albert. According to Straus' analysis, if it were the signal as such, which aroused the emotional response, then it would not point beyond itself and function as a signal. For someone viewing respondent learning as stimulus substitution, it is the signal [bell] itself (the CS) which produces the emotion (CR); after all, the emotion occurs even if the anticipated emotional situation (US) is not presented. This line of thought is rooted in a misunderstanding of the nature of respondent learning.

Now, first consider the example given by Gage and Berliner regarding the hugs, smiles and compliments of a teacher (US), the

pleasant feelings (UR), the teacher, school, etc.(CS). What is the neutral situation which is "conspicuously modified" by the appearance of the teacher/school? Are teacher/school neutral to pupils? How does the school become a signal for a smile? By a teacher always and only smiling? Without raising any more such questions, it is evident that this is not an example of signal learning. Of course, this is not to say that a friendly teacher cannot contribute to a child feeling pleasant about going to school.

A final example from Gage and Berliner, referred to earlier, focuses on children who go to school hungry. This also is not an example of signal learning. For example, in what sense can the science class be a signal for hunger which persisted from long before entering that class? Is it an increase in hunger which is signaled by the science class? This is very doubtful. How does one test to see if the science class has become the CS? By feeding the children to see if they still respond as they did when hungry? But this is the proposed solution to the problem. It is possible that school attendance is experienced as stressful or pleasant and this association is learned. But associative learning is neither signal nor respondent learning. These examples, real enough in their own right, become absurd when forced into a signal learning model, which is misunderstood as stimulus substitution.

## Psychopedagogics and signal learning

Perhaps there is universal agreement with the statement that *to learn is to learn something.* An implication of this "simple" declaration is that *how* learning occurs, and *what* is learned are not equivalent. Though they may be correlated, the modes or ways of learning are not synonymous with the contents learned.

Since psychopedagogics is interested in *how* learning occurs, an issue of importance is whether *signal learning* refers to *how* learning (however limited) occurs in relation to *what* is learned. Straus' phenomenology of the signal is helpful in addressing this issue. There is no mention of fundamental *ways* (modes) of learning in Straus' account of signal learning. His focus, and that of *Pavlov*, is on *arranging experiences so that a relationship can*

*be learned,* the learning of a signal and not *how* learning itself occurs. (Usually the "arranger" is not the learner, but someone whose acts of arranging are somewhat analogous to what a teacher does).

Psyhopedagogics is clear in focusing on the *ways,* the *modes,* the *how* of learning. Consequently, signal learning (the learning of a signal which points to) has very little or no place in psychopedagogical thought. Indeed, the model of respondent or signal learning presented at the beginning of this section appears to be a very sketchy and impoverished lesson plan. That is, it does not account for how learning occurs, but rather it specifies *what someone should do if he/she wants to teach someone that "x signals (points to) y".* Even so, if the "arrangement" succeeds, learning has occurred; we just don't know what the learner had to *do* to come to know that "x signals y".

A psychopedagogician is not ordinarily interested in *how* signal learning occurs but rather *how learning of any kind occurs.* For this reason, psychopedagogics penetrates to modes of learning as such, irrespective of content (see chapter III).

## Conclusions regarding prospective teachers

Since textbooks in educational psychology are written for prospective teachers, the question here is should respondent learning be included as a type of learning with the misleading promise that an understanding of it can shed light on how children learn, and is relevant to solving some classroom problems, especially those related to emotions? Whether included or not, respondent learning should not be held out as an account or description of what the "process" of learning *is* or *how* it occurs. It doesn't provide that sort of understanding. As seen in chapter III, psychopedagogics penetrates to the essentials of learning as such, and not to paradigms for learning specific contents (e.g., x signals y). Indeed, the Pavlovian paradigm for promoting signal learning *presupposes* the seven modes of learning fully explicated in Chapter III. For example, if a learner did not sense, attend, perceive, think, imagine, and fantasize as well as remember, as a functionally coherent unity, he/she would

not be able to even experience the signal learning "arrangement" and learn that x signals y.

## OPERANT LEARNING

### The model of how learning occurs

The basic premise is that learning results from reinforcement. The idea is that a behavior (response) operates on the environment to generate consequences (reinforcement, punishment). This behavior need not be seen as linked to any specific stimulus, as is the case with the typical (mis)interpretation of signal or respondent learning. What is critical in operant conditioning or learning is the *consequence* of the behavior. If that consequence is *reinforcing*, the probability of engaging in that behavior in the future is increased.

But what is a reinforcer? It is *any* event or stimulus which increases the probability that the behavior *preceding* it will occur again. There is a *circularity* in the claim that, if the behavioral response is reinforced, the probability of that behavior (response) occurring is increased, *and* that a *reinforcer is whatever increases that probability of occurrence.*

Although this circularity renders Skinner's theory that learning results from reinforcement untestable (*Skinner really offers a circular definition of learning, not a theory*), many educational psychologists are not bothered by this. For example, with respect to this circularity, Gage and Berliner (1984) say "it need not deter us from using the concept of operant conditioning to change behavior. What is not circular is that it is empirically possible to change behavior by manipulating –presenting or withholding – reinforcers." Notice, this claim does not escape the circularity (i.e., all Gage and Berliner are saying is that, empirically, one can change behavior by using reinforcers because, by definition, reinforcers are what change behavior). This problem of circularity is returned to.

A concrete example often given of operant learning is a hungry rat in a box with a lever and a food tray. At first, the lever is

disengaged and does not deliver food pellets when pressed. In its exploratory movements, the rat occasionally presses the lever, but this behavior remains "indifferent", in the sense that it does not lead to reinforcing consequences (food). This occasional lever pressing without consequent reinforcement is called the operant level. It provides a baseline for comparing the frequency of lever pressing after operant learning has occurred.

Now the lever is engaged so that pressing it delivers a food pellet (only if the lever pressing response is increased in frequency is the food a reinforcer – remember the circularity). Obtaining the food is contingent on pressing the lever. What usually happens is that the rate (frequency) of lever pressing increases. What has happened? The lever pressing response has been reinforced by the food. This rate of lever pressing is the change in behavior which provides the evidence that learning has occurred; such behavior is the learning effect, the result of having learned.

For this chapter, it is not necessary to consider the intricacies of reinforcement and punishment, of shaping, of primary and secondary reinforcers, of stimulus discrimination and generalization, etc. Rather, having presented the basic model of operant learning, my focus shifts to the application of the model to the classroom.

## Why should teachers/ educators know about this model of learning?

Operant learning is viewed by many educational psychologists as a practical theory, at least a technique, which can be applied usefully to a variety of classroom and educative situations. This area of application is sometimes referred to as behavior modification, or contingency management (the conditions for the occurrence of reinforcement are under the management – the control, manipulation – of the teacher, the educator).

Regarding the application of the model, Gage and Berliner (11984) state, "Giving food *following* lever-pressing, saying "good" *after* a student's response, giving candy for obeying (i.e., *for having obeyed*) rules, smiling *after* a joke, all may be regarded

as presenting ... a positively valued stimulus. In turn, *positive reinforcement of this kind may cause an increase in lever pressing, student responding, obedience, joke telling ...*" (*To be reinforcement, these increases must occur, by definition).* Italics and parenthetical comments are mine. In these examples, the learners are not informed of what the contingencies are for the occurrence of reinforcement, except by the very reinforcement of the behavior *after* it has occurred. These examples, then, are true to the basic idea of operant conditioning: *wait* for a desired response to occur, and *then* reinforce it. Contingency management, or behavior modification is an apt label for what is occurring here. However, contingency management or behavior modification has come to include a host of techniques which differ essentially from this basic idea of operant conditioning.

Of the six educational psychology textbooks referred to earlier, contingency management usually means a teacher *explicitly tells a learner beforehand* what conditions must be met *before* reinforcement will occur, and what the reinforcer will be. For example, Gage and Berliner offer the following: "you will receive a candy bar for every report card which has at least four marks of 90 or above." In general, you will receive X every time you do Y in the manner specified.

Another variation of contingency management is the Premack principle. According to this principle, one activity (behavior, response) is used to reinforce another. More specifically, Premack states that a more preferred activity can be used to reinforce a less preferred one. For example, if you wash the dishes (less preferred activity) then you may play (more preferred activity). These examples do not parallel the model of operant learning: *wait* for the desired response to occur and *then* reinforce it.

As an example of the practical value of the Premack principle, Gage and Berliner (1984) relate how a classroom teacher first became aware of the power of this principle while working with an out-of-control class. Children were running, screaming, pushing chairs noisily and doing puzzles. The teacher's requests for order seemed to have no effect. "Faced with this problem ...(he) took the approach of making the disruptive behavior on doing a small

amount of whatever the teacher wanted them to do. For example, the pupils were asked to sit quietly in chairs and look at the blackboard. Then, almost immediately they were told 'Everyone run and scream now.' This kind of contingency management enabled the teacher to take control of the situation."

Other techniques claimed to be the application of the principles of operant learning to the classroom are "token economies" and "contingency contracting", neither of which is true to the operant learning model. Now two things are emphasized. Although these various techniques, strictly speaking, are not true to the basic principle of operant learning, they are inspired by Skinner, and they are *effective behavior changers.* Most importantly, the deviation of these techniques from the model of operant learning is a *practical necessity.* In a dynamic classroom, the desired response may never occur, or usually there is an urgency which doesn't allow for the luxury of waiting for the response.

## A phenomenological view of operant learning

It is a curious model of learning which focuses on quantitative changes (e.g., frequency) in responses which a learner can already "emit", rather than on learning a new response. From a phenomenological perspective, this change is not what learning *is*, it is one *effect of having learned something* and, when taken alone, it is merely a *symptom*. To have learned *something*, in the true sense of the word, is to have come to know something in a *new* or *different* way. The *learner* is changed, the *meaning* of the *something* or content (situation, world) is changed, as is the level of dialogue between the learner and the content (world), and all this is *visible in changed beh*aving, but only symptomatically. This line of thought is not pursued further here because it leads directly into the content of the following two chapters.

If the *changed frequency of behavior* is not acceptable as the *learning content, what is being learned?* To say the rat in the box learned to emit the *already known lever-pressing response* more often, because of *reinforcement* raises the question of why? Why did the rat change its rate of responding? Skinner might say it was *because of the reinforcement,* which we know is circular

reasoning. As to how or why reinforcement works, Skinner (1974) has no answer except a vague reference to the possible preservation of the species on unknown biological grounds.

Most of the following questions fall outside the model and have no place or meaning within it. Is it not possible that the rat's change in behavior could indicate that it has learned that "lever-pressing is followed by food"? What is the meaning of this change in frequency to the learner? Or rather, is the response the same before and after learning, except for frequency? Is pressing the lever during random exploration of the box (emitted response) the same *as the rat* pressing the lever (more frequently or not) in anticipation of the food? To deny a difference is to say that the response does not refer to anything beyond itself. Lever-pressing is lever-pressing. *Lever-pressing in anticipation of food* or anything is misleading language, according to Skinner (1974); if there is "anticipation", it is contained within the present lever-pressing because of the *present* effect of previous reinforcement. On Skinner's account, time collapses into a "now" without horizons; earlier and later, past and future are nothing but the present. For example, regarding remembering, Skinner (1974) says, "after hearing a piece of music several times, a person might hear it when it is not being played, though probably not as richly or clearly. So far as we know, he is simply doing in the absence of the music some of the things he did in its presence." Skinner does not live the time of his theory. The above quotation presupposes lived time. Otherwise, how can hearing "several times" be acknowledged? And who makes the comparison between what one does in the presence and in the absence of the music, or between its comparative richness, and how?

From the perspective of operant learning, a reinforcer has an effect now and that is all one needs to be concerned with. Intention's, purposes, expectations, retentions, etc. are not part of what the response means or is. Or rather, all these "mentalistic" notions can be reinterpreted in terms of the effects of reinforcements.
This line of thought is unacceptable phenomenologically and psychopedagogically. If intentions, anticipations, etc. are not recognized as fundamental and unavoidable moments of the

structure of human experience, one's view of a child's (any human's) psychic life and learning will be seriously distorted.

## An evaluation of the "theory" of operant learning

The "pure" form of operant conditioning (*wait* for a desired response to occur, then reinforce it) assumes that the learner is merely a responding being, whereas contingency management techniques (e.g., token economies, the Premack principle), often recommended as applications of operant learning, assume, at least tacitly, that the learner is an anticipating, choosing being. This fundamental difference tends to be glossed over by many educational psychologists.

If one accepts the first assumption, one must remain strictly in the circular definition of learning and reinforcement provided by Skinner, otherwise one is confronted with a multiplicity of questions which are unanswerable from a Skinnerian perspective (e.g., how does a reinforcer work, how can a response no longer physically present be reinforced so that the probability is increased that it will occur in the future?), indeed, it is for good reason that questions such as these are not asked and seem in no need of being asked, from the perspective of operant learning. That is, in accepting the circular definition as unproblematic, one does not have to worry about such questions, or about "intentions", "anticipations", "meanings", etc. because, *by definition*, it is the *consequence* of the reinforcement which "strengthens" the response or makes it more likely to occur. How or why the response occurred is said to be of no practical concern (and it isn't). Therefore, all one must do, in a practical sense, is to find consequences which increase the likelihood the designated responses will occur. These consequences (reinforcers) are said to be the cause of the resulting change in behavior, and that is all one needs to know.

With respect to contingency management techniques, such as the Premack principle, a learner chooses beforehand a proposed reinforcing situation (more preferred behavior) and, in a way, this makes the proposed reinforcer a chosen reason (motive) for agreeing (deciding) to first engage in a less preferred behavior to

be allowed to engage in the more preferred one. This is a a *very noticeable difference* from operant learning, where the learner has no notion of a reinforcer until it has been given. If someone using such a technique is caught in the circularity problem, he/she will conclude that, if the less preferred behavior is NOT chosen, it is because the more preferred behavior, in this case, is not a reinforcer; however, if the less preferred IS chosen, it is a reinforcer, because the very same preferred activity IS a reinforcer (by definition). What does this line of thinking contribute to one's understanding of what is going on?

Unfortunately, this circularity *is problematic as far as the model of operant learning being able to offer an account or understanding of why operant learning (reinforcement) works, and how learning occurs here, and in general.* This circularity interferes with one obtaining a clear grasp of what is being learned, and of whether it is even an *account* of learning of any kind. The issue of what is being learned in operant conditioning has already been addressed briefly. With respect to the issue of learning as such, I refer to a pschopedagogical view of operant learning.

## Psychopedagogics and operant learning

What does Skinner's model of operant learning say about what learning is? What are the *activities* in which a person is necessarily involved when he/she learns? Apparently, these questions are of little or no interest to Skinner and his followers. As noted, the model leaves such questions unasked and unanswered.

Those using this model and interpreting resulting changes in behavior, accordingly, quite likely are unaware that psychopedagogically identified learner-initiated modes of learning (sensing, attending, perceiving, thinking, imagining and fantasizing, as well as remembering) are necessarily occurring as a coherent, functioning unity. Before a response-reinforcement relation can even be experienced, a person must perceive, attend to, remember, etc. the "arrangement". These entwined, coherent acts, or modes of leaning are discussed in detail in chapter III.

The issue of great importance is the *consequence of a response, and* whether *perceiving, remembering, etc. are implicated.* Indeed, these *categories of learning* are precisely what psychopedagogics focuses on because it is only by actualizing them that *any kind of learning (e.g., signal, operant learning) can occur.* Hence, for psychopedagogics, operant learning is not an acceptable model of learning as such. *It is an effective way of influencing learning under limited circumstances.*

What does operant learning have to offer pedagogics and psychopedagogics, especially if it is not considered to be an insightful view of learning? It provides a paradigm or model for arranging circumstances to facilitate leaning a relationship between a response and a consequence, i.e., it is a method for *teachin*g a very limited, but sometimes important content. This approach does offer a wealth of information regarding contingencies influencing learning, but virtually no insight into what learning is. For example, a popular area of research is how various schedules of reinforcement (e.g., ratio, random, etc.) lead to a change in the rate of responding; this refers to conditions for influencing some (not all) learning.

The important point is that the model seemingly provides a didactic or teaching model of very limited scope. It is not an account of *how* someone learns, per se; it is an account of how learning sometimes can be influenced in certain ways.

## Conclusions with respect to teachers and educators

Why should a teacher be familiar with operant learning? It provides a model by which certain behavioral contingencies can be used, and of variables which influence some learning. It does not provide an insight into what learning fundamentally is.

In applying this model to situations for educative purposes, one must be extremely cautious. This model (any model) must be evaluated in terms of pedagogical criteria. Although this is not done here, it is noted that the application of the Premack

principle, described earlier, is completely devoid of any pedagogical considerations. The overriding, if not exclusive, question in the Gage and Berliner example discussed earlier, is "what can be done to restore order in the class?" Of course, there is nothing wrong with this question itself. In this specific example, the problem is that no consideration is given to how using the Premack principle with the preferred behavior (running and screaming, etc,) does not contribute to a child's becoming adult, to the clear and consistent exemplification of norms and values.

The model of operant learning should be familiar to teachers for what it essentially is. It should not be presented with the promise that it provides a fundamental insight into the nature of learning. For example, in planning a lesson, the modes of learning disclosed and described by psychopedagogics should be an integral part of planning and presenting a lesson. In a lesson context, the model of operant conditioning will seldom, if ever be relevant.

## INFORMATION PROCESSING

### The model of information processing

This model begins with the assumption that "the human mind and the computer function similarly" (Rosser and Nicholson, 1984). The aim of this model is to account for how content to be learned (information) enters the information processing system, and how that input is transformed (processed) into a form storable in and retrievable from short-term memory. The model makes use of the following terms regarding information storage, viewed as structures analogous to the hardware of a computer: *a sensory register, short-term and long-term memory.* These types of storage differ in terms of the nature and extent of processing the information which has been taken in. Processing refers to activities such as attending, rehearsing, elaborating, organizing, integrating, analyzing, etc. The "programs are used to manage the information" (Rosser and Nicholson (1984). Essentially, this is a model of human memory. But it is claimed to be a model of learning, in the sense that learning occurs by means of processing

information such that it becomes stored in and is retrievable from long-term memory.

The idea is that stimuli from the environment activate our sensory apparatus or receptors. According to Gagne (1985), this activation transforms the stimuli into neural information. This neural information enters the sensory register where it persists in almost complete form, usually for less than a second. Not only is decay of the information rapid, but the capacity of the sensory store is extremely limited. Only what is attended to in the sensory store persists longer, and the remainder dies away and has no further effect on the nervous system.

Again, according to Gagne (1985), by means of *selective perception,* the information *recorded* in the *sensory register* is transformed into *patterns of stimulation. Selective perception* depends on a learner's ability to *attend to* certain features of the contents of the sensory register while ignoring others. "The selective perception of features (e.g., invariances such as edges, textures, slants and three-dimensional objects) forms a new kind of input to the short-term memory."

*Attending* is the first process to occur, and it moves the information to *short-term memory.* Some authors (e.g., Lindgen and Suter, 1985) recognize *two types of attending.* The first type is called an *orienting response and* is said to occur when some *information in the sensory register catches one's attention.* A sudden, loud noise, an unexpected or novel *stimulus* can initiate this response. If this information (stimulus) is considered relevant (by one's *executive control*), a *second type of attending* will be *initiated,* in that the information will be *attended to* by being *examine*d. This attending *enters* the information into short-term memory. The *process of learning begins at this point.*

In continuing, it is noted that *one's executive control* is "the *decision-making* center which *supervises* the entire information-processing operation" (Lindgren and Suter (1985). The survival of information stored in the *sensory register* depends on whether *executive control* can *give it meaning* and *consider* if it is worthy of further attention. "The meaning of a bit of information is

determined by its relationship to our past experiences with it or with similar stimuli with which it occurs" (Lindgren and Suter, 1985). And, with respect to *executive control*, Klausmeier (1985) describes two aspects which parallel the function of a computer program and its external source of electrical energy. As he says, "The executive control of the human being necessarily includes the *activating process* as well as the control process. Accordingly, there are two aspects of the *internal or external control* of our own learning. One is the control of motivation, and the other is the control of the information flow and the related mental operations".

Continuing with the flow of information into short-term memory, it is stored in two forms: "(1) an acoustic form in which the information is *internally heard* by the learners, and (2) an articulatory form in which the learners hear themselves saying the information" (Gagne (1985). Visual images may also be a way in which information is stored in short-term memory. Although information which enters short-term memory may be stored there for a longer time than in the *sensory register* without any processing; it can be held there even longer if it is *rehearsed.*

Two forms of *rehearsal* have been identified. Maintenance rehearsal is *rote repetition* of the content with the aim of maintaining the information intact. The second is *elaboration rehearsal* or *encoding,* such as relating the series of numbers 1-6-5-2 to the year 1652 when Van Riebeeck landed at Table Bay in South Africa. Elaboration not only helps maintain the information in short-term memory, it facilitates entering that information into long-term memory (and later retrieving it from there). This is because elaboration requires that the present information be related to information already in long-term storage.

"Elaboration also can increase the limited capacity (5 to 9 items) of short-term memory. In the above example of the series of numbers, if one simply tries to retain the four units as given (e.g., by maintenance rehearsal), one quickly approaches the limits of his/her store; however, if these four numbers are 'chunked', or

coded into one year, there is 'room' in the store for four to eight additional units ('chunks') as well" (Gagne, 1985).

After attention has played its role of selectively attending to some of the information in the *sensory register,* all connected processing occurs when *short-term memory* functions as *working memory.* Working memory is where one rehearses, elaborates, organizes, and integrates what is received in *short-term memory* from the *sensory register* and what is retrieved from *long-term memory.*

Klausmeier (1985) states, "We *rehearse* the last items we have read. We *organize* by connecting two or more items of the new material before relating them to what is already known." And further on he says, "We *integrate* by combining items into a more complete knowledge structure." Klausmeier goes on to say "From a strictly information-processing point of view, these are the only processes necessary for *explaining initial learning*. This process in *working memory* is referred to as *encoding* and the encoded material initially learned is stored in long-term memory". In basic agreement with Klausmeier, Lefransois (1985) says, "Processing refers to *activities* such as *organizing, analyzing, synthesizing, rehearsing* and so on". Lindgren and Suter (1985) add that long-term memory is the r*epository for information* that has been filtered through the *attention mechanism, the sensory register and short-term memory".*

Lindgren and Suter (198) claim, "Long-term memory differs from *short-term memory* both in the duration and capacity of storage. Whether the storage of information in long-term memory is permanent or not, in a practical sense, duration of storage is not a problem. What is more, its capacity appears to be unlimited. As far as the learner is concerned, the *basic problem* with long-term memory is the *search for* and *retrieval of* (called processing) of the information stored there." A metaphor commonly used for long-term memory is a large library where the storage of books is not a problem. The problem is retrieving a book when needed. The book may be there (as may the information) in long-term memory but not *accessible, retrievable* for use. *Strategies of*

*learning (teaching)* that facilitate *retrieving and accessing* stored information are considered below.

When information is retrieved from long-term memory, it is available for use. As Rosser and Nicholson ((1984) say, "Retrieval is often equated with making an overt response, indeed, to make overt responses, people must retrieve something from their long-term memory. Cognitive processes_such as *performing addition problems* also entails *retrieval".* Along these lines, Klausmeier (1984) includes in his information processing chart a *response generator* which *transform*s input from working memory into *impulses which guide* the effectors in producing overt responses. Thus, when information is *retrieved* and moved into short-term memory, vocal and motor actions are generated which are observable as responses in the environment. Gagne (1985) adds that the *response generator sometimes* can be brought into play to generate suitable response directly from *long-term memory* without the mediating phase of *short-term or working memory* (e.g., when well-practiced responses such as writing are made). This is consistent with the claim by Lafrancios (1985) that "Long-term memory describes a more passive, unconscious process".

This presentation of the *information processing model* is incomplete in many respects of detail. What is presented is a synthesis of the interpretations currently presented in six recent widely used educational psychology textbooks.

## Why should teachers, educators know about this model of learning?

Few, if any, would disagree with the claim that *memory* (i.e., remembering) plays a critically important role in a child's learning and becoming. Consequently, to study a model which claims to provide insight into memory should be of relevance to an adult (parent, teacher, etc.) involved in assisting a child to learn and become in the direction of adulthood.

Gage and Berliner (1984) say, "We are concerned with *how attention and memory work* because we want a certain part of what we teach to be attended to and remembered", and

Klausmeier (1985) states, "cognitive information processing theory provides many useful ideas for arranging instruction and for diagnosing a child's learning difficulties". In comparison to signal and operant learning, the information processing model provides a more analytic scheme for trying to identify and remedy specific causes of learning difficulties. For example, does the difficulty stem from how his/her information is encoded, or to attention, etc.?

What re some of the practical implications said to be derived from this model? The authors of all six textbooks consulted provide many explicit suggestions. Also, there is essential agreement among them about the implications of an information processing model for researchers and educators to help learners attend to, encode, store, and retrieve information.

Without being exhaustive, some of the recommendations made by these various authors are: foster the *intention* to remember, use techniques which will allow the learned contents to be integrated with what already is stored in long-term memory (e.g., by rehearsal, mass and distributed practice, over learning, stressing meaningfulness), teach strategies for remembering and retrieving, such as mnemonic devices (e.g., rhyming, peg words).

Regarding the flow of information through various processes preparatory to storage and retrieval, Gagne (1985) suggests a broad array of external effects which can be extended by a teacher, or sometimes even the learners, on the external processes of learning. Regarding the *reception of stimuli*, he says "stimulus change produces arousal (attention)". As far as *selective perception*, he says, "enhancement and differentiation of object features facilitates selective perception." Concerning *semantic encoding storage*, required to move the information from short-term to long-term memory, he notes, "suggestions or display of cues such as diagrams, tabular arrays, rhymes and retrieval". Regarding the *organization of responses in the response generator,* Gagne says, "verbal instructions about the objective of learning informs the learners about the class [type] of performance expected". Finally. with respect to the *two aspects of executive control*, he says, "instruction establishes sets that

activate and select appropriate strategies" (regarding information flow) and "informing the learner of the objectives establishes a specific connection with performance". The upshot of all of this is that there is consensus among educational psychologists that the information processing model of leaning is a *significant* advance over previous models, and it has direct implications for facilitating learning under *normal* circumstances, and to "diagnose and remediate" where learning is not proceeding as it should.

## A phenomenological view of the information processing model

Unlike signal and operant learning, which largely refer to describable experiential phenomena, the information processing model is metaphorical. This makes it very difficult to study it phenomenologically. Still, there is much which can be said about it phenomenologically, and otherwise.

For example, the possibility that *human learning* is not a matter of stimulus and response is not raised. But this is not surprising because human beings are not a source of data for this model—except, especially, as they perform in *highly artificial* experimental situations designed to find evidence confirming the model.

Although we are reminded by many authors that this model is metaphorical, and should not be taken literally, still it is taken literally when experiments are designed, and data are interpreted. What must be shown is whether this model, *as metaphor,* has heuristic value or whether it is inadequate and misleading.

The point of departure for the construction of this model is not a human being learning or remembering something. Rather, it has its roots in *computer science.* This model is premised on the thesis that "the computer is an appropriate analogy for human thought and cognition and for learning" (Rosser and Nicholson, 1984). Some questions underlying this model are: if, in transforming stimulus input so that behavior output occurs, does a human being "act" like a computer, and what are the structures

and functions which must take place? This is a big and very limiting question if, as Dreyfus (1972) says, "there are good reasons to doubt that there is any '*information processing'* going o*n* and therefore reason to doubt the validity of the claim that the mind functions as a digital computer".

Human information processing is said to parallel the three phases of computer information processing, i.e., input, processes, output. This model is a variation of the basic stimulus-response paradigm, even though its emphasis is on the *processing* assumed to occur between a stimulus (Pavlov) and the response (Skinner). Correctly, it is described as a more complex model than that offered by Pavlov and by Skinner. Still, it carries the inherent weaknesses of any stimulus-response model. For example, as with all stimulus-response models, it is based on a faulty philosophical anthropology [i.e., view of being human], which ignores *human intentionality,* as a *directedness to* and *an openness for something*, in the existential-phenomenological sense of *being-in-the-world (Dasein),* and *in direct relation to and involvement with things, people, events, etc.*

If "empirical" means to be *related to or based on experience,* then this model is not empirical. The claim that stimuli from the environment stimulate the receptors, which transform them into neural information, which then enters the sensory register is in direct contradiction with everyday experience. No one, however, has ever seen a stimulus as such, let alone in the sensory register. This is a regression to a view of perception which cannot be verified phenomenologically, i.e., that sensations, stimuli are prior to objects and things; to perceive objects, etc., we must give meaning to the stimuli registered in the nervous system. For a critique of this line of thought, two examples are Meerleau-Ponty (1962) and McConville (1978). However, the primacy of (hypothesized) stimuli over perception is evident in the language used by several authors in discussing (and thinking about) this model. They all erroneously equate stimuli and objects, e.g., "A student in a classroom faces many stimuli -- a teacher, a textbook, bulletin boards, students and many others", according to Gage and Berliner (1984). As Straus (1965) notes, stimuli and objects belong to different levels of reality. He goes on to say, "Stimulus

is a central concept of behaviorism, but whenever it is used, there is a good chance that it will be badly misused, signifying things rather than stimuli". In addition, he emphasizes "the hyphenated term stimulus-response is a sham".

But the misuse of "stimulus" shares the company of admixtures of terms from the biological-physiological, computer, and human domains, as though such mixing of terminology raises no conceptual problems, or ambiguities. This line of criticism is not pursued here.

How anyone can attend to the neural information held in the sensory register is a complete mystery, which is compounded further by the claim that selective perception *identifies features* of this information such as "sides", "slopes", etc. The idea is that a perceived object is built up from the detection of the features of the information held in the *sensory register.* Drefus (1972) characterizes this line of thinking as a "new form of gibberish". Phenomenological studies disclose that perceiving is not built up in this way. As is evident in chapter III, perceiving always begins on a *global, general level*, and becomes differentiated, and then is reconstituted via a perceptual [i.e., not-yet conceptual] *analysis and synthesis of the initially global, diffuse whole.*

The ideas of a *sensory register* and an *executive control* also are problematic and are *unverifiable structures.* They seem to be necessary, *ad hoc* band-aids, given the initial unverified assumption *that* neural information must go through a series of transformations (processes) to attain psychological status (e.g., to become a *learne*d response). The *executive control*, conceived as "the decision-making center that *supervises* the entire information-processing operation is a vague and middled idea" (Lindgren and Suter (1985), the main purpose of which is to take the place of an experiencing, sensing person. *This "super" program apparently does all kinds of things we normally attribute to persons (e.g., supervise, decide, etc.).*

To keep this argument to a realistic length, these troublesome points are not pursued. Rather, since this model is claimed to

contribute to an understanding of human memory, my final focus is on short-term and long-term memory.

For an excellent account of how the information processing model provides a distorted and inaccurate account of human memory, the reader is referred to Sardello (1978). Although not addressed directly to the information processing model, the articles by Kvele (1974) and by diSibio (1982) underline the extent to which this model misses the mark regarding human memory.

Therefore, it is not surprising that long-term memory is conceived as a limitless store of the items of memory. These items sometimes merge to form schemata, or nodes not unlike a large library. As are the books in a library, the memories are *present.* They are said to be in long-term storage, even if they can't be *retrieved.* Thus, the problem in remembering is gaining access ("retrieval") to the stored memories. But how something *present* (e.g., as am existing memory trace or engram) can refer to the past is not even asked.

In *retrieving* information from long-term memory, often it is claimed that this long-term store is *recorded for the needed item.* This spatial metaphor is extremely misleading. In remembering. or trying to remember something, one does not search a storehouse containing the memory as present, like an object merely to be found. One reopens the temporal horizons of retentions and horizon and recollections belonging to the lived present. This is our access to the pat as past. Thus, one "reaches" one's past but always from the present. One does not travel to and arrive at the past moment being remembered. That moment is *recalled* from the present (but as past). Thus, *one cannot remember an event exactly as it was experience,* because one can remember it only *from the future of that very event* (i.e., one's present) which was possibly *anticipated* but unknown at the moment of the original event.

As noted here, and spelled out in chapter III, *remembering means to make present something from the past as past.* Generally, this relation to the past, as past, is absent in the information processing model where remembering is a matter of retrieving

existing information from long-term storage so it can be entered into short-term memory. It is present all the time, but moved from one storage to another, rather like retrieving (moving) food from a freezer to a refrigerator for use. This gives rise to another confusion pointed out by Straus (1970) and elaborated on by Sardello (1978). Sardello says, "Effects carried forward from the past do not have anything to do with memory". One learns to write but does not remember the past as past in writing. Such automatisms as walking, reading and taking are not examples of remembering. One might say, 'After all of these years on a desert island, he remembers how to read'. But this is a misleading statement. A more accurate statement is "... he can actualize his potential (skill) to read". Thus, contrary to the information processing model, skills, aptitudes, etc. are not *memories* stored in long-term memory. *Without* an explicit acknowledgement that remembering has to do with recalling something from the past as past, the model cannot provide anything but a distorted understanding of memory and remembering.

What of short-term memory? On a superficial level, short-term memory is like a *momentary present with its inherent horizons of retentions and protentions [i.e., perceptual, preconceptual anticipations].* A significant difference is that information processing accounts of the nature of short-term memory do not acknowledge the horizons of retentions and protentions which are an inherent part of the temporal structure of conscious life. Short-term and working memory do deal with retentions, but they are viewed as explicit *acts of remembering.* Rehearsing a phone number in the present while one prepares to enter it is *not* an *act* of remembering it, but a way of keeping it present (retaining it). It is not being remembered because *it is still an inherent part of the momentary present (it has not yet become past).* We are told that an item retrieved from long-term memory enters short-term memory. If it does, it does so only by becoming present, e.g., by having been recalled. This makes the remembered content present, and it now must be "retained" as part of a momentary present while one "works" with it. Retaining a memory in a momentary present is to retain it as *having been remembered,* and this is not the same as the *act of remembering it, making it present in the first place.*

A thorough phenomenological analysis and evaluation of this model easily could become a book length project. Therefore, the above brief comments suffice. At this point, one can easily agree with Skinner (1974) when he says, "The metaphor of storage in memory, which seems to have been so dramatically confirmed by the computer, has caused a great deal of trouble. The computer is a bad model – as bad as the clay tablets on which the metaphor was probably first based". Of course, in agreeing with this statement, one does not necessarily agree with the reasons Skinner has for making it.

## An evaluation of the information processing model

Because of the metaphorical nature of this model, many evaluative comments have already been made and are not repeated. The theoretical side of this model is bankrupt when viewed against the background of the psychic life (chapter II) and the modes of learning (chapter III) of a child in an educative situation. If so, why is it hailed as one of the latest advances in the psychology of learning? Perhaps the answer is in its practical applications. But even this line of thought is not too promising in that most (if not all) of the suggested applications are *not directly tied to this model*. Even so, an evaluation of some of these suggested applications is in order.

Since the primary thrust of this model is the *storage and retrieval of information*, it is not a surprise that the recommended practical applications are concerned with procedures and techniques designed just for this purpose. Some of the proposed applications which have existed long before the information processing model was developed are, e.g., emphasizing meaningfulness of the content, over-learning, rehearsing, reviewing, and practicing (massed or distributed), active recitation, note taking, using advance organizers, reminding students of prior knowledge, provision of goals and objectives, etc. These techniques and others are acceptable because they can promote meaningful learning. What is more, in promoting and implementing these techniques, one does not need to know about

this model. That is, these techniques *stand on their own independent of* and *prior to* the information processing model.

Another set of techniques emphasized in the textbooks consulted are mnemonic devices such as verbal rhyming, visual loci, and peg words. These techniques do not emphasize meaningfulness and, in fact, probably are most useful when the content to be remembered is meaningless. Although such mnemonic devices promote the recall of series of unrelated material, they do not promote the kind of meaningful learning one would hope to accomplish in educating children. This is not to deny the value of some mnemonic devices in some circumstances; however, where feasible, meaningfulness should be emphasized.

None of the above practical suggestions are derived from the information processing model and, perhaps, it is just as well, since this model presents a gross distortion of the nature of human remembering and learning.

### Psychopedagogics and information processing

Aside from noting that, to become functional, new content must be integrated with one's possessed knowledge, the information processing model offers virtually nothing of relevance to psychopedagogics. The main reason is that the model consists of *ad hoc,* metaphoric structures which do not do justice to *the learning child-in-education, and in everyday life.*

Except for attending and remembering, other modes of learning are taken for granted or distorted (e.g., the assumption that in perceiving we only experience small aspects on an object from which it is built-up into a totality. An example of *feature detectors is* Farnham-Diggory (1978) who says, "They do not detect a whole object or event at once, instead they detect very small aspects of it, called *features*)". Phenomenologically, this view is *untenable.* Why is clarified when perceiving (as a mode of learning) is considered in chapter III.

The information processing model is a strictly cognitive one, which ignores the *emotional foundation* of all learning, and it

leaves the child, his/her psychic life, and the pedagogical (educative) situation out of consideration. These are additional reasons why the model is of little relevance or value from a psychopedagogical perspective. In viewing a child as (analogous to) a computer, this model seriously misrepresents the *learning child-in-education.*

## Conclusions with respect to teachers and educators

As indicate, assisting children to learn so they can remember the content in ways which further their learning and becoming (adult) is important. To this end, it might be useful for a teacher to be familiar with the techniques recommended for helping a child remember. The use of these techniques is not dependent on a familiarity with this model. Since it represents an *inadequate and misleading* view of human learning and remembering, it cannot be recommended as a topic of study for teachers or educators.

## General comments and concclusions

The three models of learning are not of central relevance to one interested in gaining insight into and understanding how children (anyone) learn, in general, and how they learn in an educative relationship, specifically. None of the models have the learning child as its point of departure. The Pavlovian model asks us to view a learner as a *reflexive nervous system.* However, most psychologists see it as a matter of stimulus substitution – CS for US -- instead of as signal learning. The Skinnerian model sees the learner as a *responding organism* and the information processing model sees the learner in terms of *metaphors borrowed from computer science. Each one turns tits back on the everyday reality of a learning child in an educative situation.*

In one way or another, these models are variations of a *stimulus-response paradigm,* and they represent an untenable *natural science grounded philosophical anthroplogy.* Sonnekus (no date) indicates that, in contrast to the theories which have been considered, "phenomenological penetration of the learning phenomenon in the human being unquestionably points to the

fact that, in the first place, learning is an anthropological phenomenon, which is innate in the human being; that the naturalistic oriented psychology of learning, as such, with its different point of departure and field of study, does not make any practical contribution toward the elucidation of this phenomenon". He adds, "the lifeworld of the child must be our point of departure if we are to ground our thoughts on an acceptable anthropology, and if we hope to penetrate to the essentials of learning as a form of actualization of the child's psychic life".

The following three chapters are attempts to: (1) base an understanding of a learning and becoming child on an *accountable philosophical anthropology*; (2) begin with the *lifeworld of a child*, or more specifically, *a child in an educative situation who is learning and becoming;* (3) disclose and describe the categories (essences) of learning and becoming as they *emerge from* this every day, lived reality.

## REFERENCES


CROUS, S. F. M. (1984/2023) *Persoonsvoltrekking: psigopedagogiek vir onderwysstudente/ Personal actualization: psychopedagogics for student teachers.* Pretoria: Unpublished manuscript. Translation: geogeyonge.net/node/56

DE VRIES, C. (1986) *Orientation in fundamental educational theory.* Stellenbosch: University Publishers and Booksellers.

DiSIBIO, M. (1982) Memory for connected discourse: a constructivist view. *Review of educational research* 52(2), 149-174.

DREYFUS, H. (1972) *What computers can't do: a critique of artificial reason.* New York: Basic Books.

FARNHAM-DIGGORY, S. (1978) *Learning disabilities.* Cambridge: Harvard University Press.

FRANKL V. E. (1969) *The will to meaning.* New York: Plume.

GAGE, N. L. and BERLINER, D. C. (1984) *Educational psychology* (3rd ed). Boston: Houghton Mifflin.

GAGNE, R. M. (1985) *The conditions of learning* (2nd ed). New York:

Holt, Rinehart and Winston.
GAGNE, R. M. (1985) *The conditions of learning and theory of instruction* (4th ed.). New York: Holt, Rinehart and Winston.
GUNTER, C. F. G. (1974) *Aspects of educational theory.* Stellenbosch:
University Publishers and Booksellers.
KLAUSMEIER, H. J. (1985) *Educational psychology* (5th ed). New York: Harper and Row.
KVALE, S. (1974) The temporality of memory. *Journal of phenomenological psychology* 5(1), 1-31.
LEFRANCOIS, G. R. (1985) *Psychology for teaching* (5th ed). Belmont,
CA: Wadsworth.
LANDMAN, W. A. *1975/2012) Fundamentele-pedagogiese essensies:
hulle verskyning, verwerkliking en inhoudgewing/ Fundamental pedagogical essences: their appearance, actualization and giving them content. Introduction and chapters one through four of Landman, W. A., van Zyl, M. E. J. and Roos, S. G. *Fundamentele-pedagogiese essensies: hulle verskyning, verwerkliking en inhoudgewing.* Durban: Butterworths. Translation: geogeyonge.net/node/14
LANDMAN, W. A., KILIAN, C. J. G., SWANEPOEL, E. M. and BODENSTEIN, H. A. (1982) *Fundamental pedagogics.* Johannesburg: Juta.
LANGEVELD, M. J. (1968) *Beknopte theoretische pedagogiek.* Groningen: J. B. Wolters-Noordhoff.
LUIJPEN, W. A. (1969) *Existential phenomenology.* Pittsburgh: Duquesne University Press.
LINDGREN, H. C. and SUTER, W. N. (1985) *Educational psychology in the classroom* (7th ed). Monterey: Brooks/Cole.
MCCONVILLE, M. (1978) The phenomenological approach to perception, in: R. S.Valle and M.King (eds.) *Existential-Phenomenological alternatives for psychology* (pp.94-118). New York: Oxford University Press.
MERLEAU-PONTY, M. (1962) *Phenomenology of perception.* London: Routledge and Kegan Paul.
NEL, B. F. (1974) *Fundamental orientation in psychological pedagogics.* Stellenbosch: University Publishers and Booksellers.

ROSSER, R. A. ands NICHOLSON, G. I. (1984) *Educational psychology*
*principles in practice.* Boston: Little brown.
ROYCE, J. E. (1969) *Man and meaning.* New York: McGraw-Hill.
SARDELLO, R. J. (1978) A phenomenological approach to memory, in: R. S. Valle and M. King (eds) *Existential-phenomenolocal alternatives for psychology* (pp. 136-151). New York: Oxford University Press
SKINNER, B.F. (1974) *About behaviorism.* New York: Vintage.
SONNEKUS, M. C. H. (1965) Die mens in leerverhouding tot sy Wereld [A=The person in a learning relationship to his world], in
B. F. Nel, M. C. H. Sonnekus and J. G. Garbers, *Grondslae van die psigologie* (pp. 205-244). Stellenosch: University Publishers and Booksellers.
SONNEKUS, M. C. H. (no date) *Learning: a new approach for humanistic psychology.* Address presented at a conference for human psychology in Wurzburg, Germany.
SONNEKUS, M. C. H. (1974) *The learning child.* Johannesburg: McGraw-Hill.
SONNEKUS, M. C. H. and Ferreira, G. V. (1979) *Die psigiese lewe van*
*die kind-in-opvoeding.* Stellenbosch: University Publishers and Booksellers.
STRAUS, E. W. (1963) *The primary world of senses: a vindication of*
*sensory experience.* New York: The Free Press of Glencoe.
STRAUS, E. W. (1966) *Phenomenological psychology.* New York: Basic Books.
STRAUS, E. W. (1970) Phenomenology of memory, in: E. W. Straus and R. M. Griffith (eds.) *Phenomenology of memory.* The third Lexington conference on puree and applied phenomenology (pp 45-63). Pittsburgh: Duquesne University Press.
STRAUS, E. W. (1982) *Man, time and world.* Pittsburgh: Duquesne University Press.
THORNBERG, H. D. (1984) *Introduction to educational psychology.* St. Paul: West Publishing.
WATSON, J. B. (1913) Psychology as the behaviorist sees it. *Psychological Review, ,* 20, 158-177.

YONGE, G. D. (1985) Andragogy and pedagogy: two ways of accompaniment. *Adult Education Quarterly,* Vol. 35(3), 160-167.
YONGE, G. D. (1989/edited 2024) *The paret-child/adult-child educative relationship: cThe overlooked ground/foundation of educational theory and practice?* Unpublished manuscript.