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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 desirable to present a very brief, if not sketchy, account of the *perspective* that leads 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 its constituent parts of relevance to this chapter; and, explicitly, also a psychopedagogical view of learning that necessarily is also rooted in this same philosophical anthropology.

Phenomenology as method

Phenomenology, as a method designed to disclose the essences of a phenomenon, begins with a thinking strategy that tries to eliminate or minimize the essence-blinding influences of assumptions, theories, ideologies, philosophies of life, etc. that can hide and distort how a phenomenon “speaks to” or reveals itself to the investigator. This attempted control of these influences is to

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\* 2021 revision, but not update, of chapter 1 from Sonnekus, M. C. H. (ed.) (1985) *Learning: a psychopedagogic perspective*. Stellenbosch: University Publishers and Booksellers.

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 study of an experience of something.

This allows for a closer, clearer view of and access to the phenomenon 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 phenomenon. 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 reduction (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 does it serve) of each of the essences. Then, by means of the dialectic (triadic) method, the inter-relationships (coherence) among the essences and structures are disclosed (e.g., how do 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 will transcend any occurrence of the phenomenon and thus can claim universality. This is not merely armchair theorizing that awaits empirical validation.

An existential-phenomenological philosophical anthropology  
underlying pedagogics and 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 findings of an existential-

phenomenological philosophical anthropology (on which psychopedagogics rests) follow:

- (a) A human being is a psycho-physical-spiritual (existential) unity (Frankl, 1969); owing to 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 *pedagogic situation* (Langeveld, 1968). To know and assist a child educatively, one must go to that situation where the child as an educand is [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). As openness, he/she does not merely react or respond to things in the world but answers by choosing, discovering new values and especially by giving meaning to his/her world and everything in it. As directedness, he/she takes the initiative to go out to and dialogue with it via its contents.

### Pedagogics as a phenomenology of educating as upbringing

What follows reflects some of the main points made by Crous (1984/2018, ch. 1); his book should be consulted for greater detail:

Educating as a human activity occurs as a series of situations within which an adult presents and demonstrates to a child norms, values, codes of behavior, dispositions and skills, etc. as contents so 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 contents with the help of which the adult accompanies him/her and in terms of which he/she becomes adult. Thus, the entirety of the educative event, as it originates in the relationship between adult and child, is the area of study of pedagogics.

By studying educating and its essentials phenomenologically, its complex, multi-faceted nature and broad scope become very clear. Thus, to be able to study it in its totality, it is necessary that it be illuminated from different angles (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 all merge into the one science of pedagogics. Hence, within pedagogics there is not only a search for the essentials and their relationships as disclosed by each perspective, but there also 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 that studies everything regarding educating as what appears and is actualized between adults and children and that reveals and describes what is essential to it.

#### Psychopedagogics as a part-perspective of pedagogics

As with the brief consideration of pedagogics above, what follows are some of the main points made by Crous (1984/2018.ch. 1) on this topic:

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 particular question is: "*How* does a child become adult?" From a phenomenological perspective its task is to reflect on everything in an educative situation that is essential for a child's becoming adult. It is interested in the way becoming adult occurs. By answering this question, it can make 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, a child and educative contents, psychopedagogics directs itself 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 a necessary supplement of personal actualization. The question that psychopedagogics is concerned with in this regard is not so much the essentials of educating as with how educating or accompanying should be carried out so that 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 also has a share in his/her personal actualization. It is always a child in an educative situation who has to 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 in order 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. Consequently, giving meaning is at the foundation of a child's own share in his/her personal actualization and, therefore, psychopedagogics is particularly interested in how personal actualization occurs by a child giving meaning within an educative situation.

Educating and personal actualization cannot occur if there are no contents in terms of which they can take place. Here reference to contents means educative contents because not all contents are 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 contents is raised, thoughts of subject matter contents and thus teaching in school necessarily spring up. Consequently, psychopedagogics asks questions about the ways school teaching contributes to adequate personal actualization.

Thus, it is clear that adult accompaniment (educating, teaching), contents, learning and becoming are interconnected. Consequently, it is a task of psychopedagogics to indicate these interconnections and point out how they influence a child's personal actualization.

#### A psychopedagogical view regarding “what is learning?”

The following account of ways of learning and their functions reflects some of the points stressed by Crous (1984/2018) in chapter V of his book and these modes of learning are the main topic of chapter III of the current book:

Basically, learning is a phenomenon of becoming in the sense that a child's willingness to learn also is a willingness to become. Changing, an essence of becoming, is possible in that a child learns.

Learning has its origin in a child's own initiative, but he/she always is dependent on educating (upbringing) for its proper actualization. Without educating, he/she cannot learn as he/she should and thus

also 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 contents learned. Indeed, as a child learns, especially when guided by an educator (adult), the level of this dialogue 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 things appear here-and-now to what it is that 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 into the old. Without remembering no learning would be possible.

### The functions 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 that: it is a sharpened intention (being directed) to learn; it is selective of contents 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, synthesizing problem solving.

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 tslearning 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, the plan is 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 will be concentrated on. i.e., classical conditioning, operant conditioning, and information processing. Social learning, as developed by Bandura, to a large extent carries the stamp of operant conditioning *and* information processing and it will not be considered. So-called cognitive theories will not be focused on since no one claims to offer a comprehensive theory or model.

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 critically; (3) a phenomenological view of the phenomena addressed by the model are viewed phenomenologically; (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 child learns in a pedagogical (educational) as well as in other kinds of situations. 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 (that always involves an adult guiding or accompanying a child via contents with the aim of helping him/her become an adult) and the *categories* of psychopedagogics, including its categories of learning and becoming, emerge from within this situation itself and are not imported to it from the domain of psychology.

In contrast to psychopedagogics, “traditional” educational psychology does not start with a child in a pedagogical situation (indeed, a pedagogical situation and all that 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 at 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 phenomenon under consideration means. These consequences will hold for the application of future advances in psychology or other fields to education unless they are evaluated and reinterpreted from an educational perspective (i.e., with pedagogical criteria).

There is no question that a teacher or educator can profit 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). Yet 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 needs to 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 that tries to understand and describe *how* learning occurs in that type of everyday situation? If they do not arise from within a pedagogical situation, if they do not “belong” to it, but are imported from psychology, how can one decide how, when or even if one can or should use these theories for *pedagogical 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 there is an attempt to show that psychopedagogics need not and perhaps should not include them as an important focal point, two things need to be done. First, two examples from a

widely accepted pool of definitions of learning are examined critically 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 naturalistic philosophical anthropology (a natural science view of being human). Second, a very brief sketch of an aspect of the temporality of consciousness is presented and used to add a dimension to the evaluation of these models not ordinarily explicated.

In preparing for what follows, I have consulted six\* well-respected educational psychology textbooks. There is virtual unanimity across all of them regarding their response to “what is learning?” and to their presentations of the three models of learning evaluated. 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 of the textbooks helped me in my evaluation of the information processing model.

## WHAT IS LEARNING?

Two definitions of learning that are accepted widely in the United States are presented as examples. One of the better, but still limited definitions is that of Gagne (1965) who states that “*Learning is a change in human disposition or capability that persists over a period of time and is not simply ascribable to 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 that roughly is as follows: change implies time in the sense that an organism that has learned *behaves now in a way different from before; this change is limited*

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

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 own 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 applied 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 an 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 would go 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 will become apparent in my evaluations of the models of learning to follow.

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 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 etc.) 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 that clearly defines their line of thinking that 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 result in rather than what it is ads an act.

## THE TEMPORALITY OF CONSCIOUS LIFE

This is an extremely complex topic which is kept relatively simple for the purpose of this chapter. The temporality of conscious life (of any experiencing) is of interest in the present study because the theoretical attitude of most educational psychologists and psychologist, especially those who root themselves in a *natural science philosophical anthropology*, *hinders* their understanding of the nature of temporality and, in particular, the fact that any *momentary present* essentially includes inherent “horizons” of retentions and anticipations (protentions). Such misunderstanding renders unintelligible the possibility of many taken-for-granted everyday experiences (e.g., of duration, of similarity, of repetition, of change, of identity).

Anyone whose understanding of the temporal structure of any *momentary present* which *does not include retentions and anticipations* as an inseparable part of that *momentary present* is bound to a distorted notion of the temporal foundation of the classical and operant conditioning as well as the information processing models of learning considered below. Therefore, the focus is on trying to describe the temporal structure of any *moment of awareness* (e.g., looking at a physical object, reading a sentence, listening to a piece of music) with the aim of showing that there is a *nuclear perception, a “now”*, which, together with *retentions and anticipations (protentions) belonging to it*, comprise any *momentary present of consciousness*.

The attempt is to correct the notion that *only what is objectively or physically present can constitute a momentary present* and that retentions and anticipations are not present except as activated memory traces (e.g. physically or chemically present). What follows is only accessible to phenomenological reflection; Sokolowsky (1974) tells us that such “phenomenological reflection alone becomes *aware of the manifold of profiles which are experienced but never thematized in non-phenomenological awareness, which considers the identity but overlooks the manifold*”.

As the “now” of consciousness continually streams forward, the events encountered (e.g., objects) are given in different temporal perspectives as a ‘now phase’, a just elapsed phase, “a coming

phase” However, even though consciousness is in flux, there is an abiding temporal structure which consists of *a central, primal impression* (a “now” surrounded by horizons of retentions (of just having been) and anticipations (not quite yet)). In agreement with Sokolowski (1974), Kvale (1974) points out that “the retentions and protentions are usually not explicitly experienced as such. they are more given in the mode of a temporal background”.

What is retained and anticipated (as opposed to specific *acts* of recollection and expectation) are still part of the ongoing experience. The retentions, e.g., are continuous with and are a part of the *present awareness of something*. What is retained has not yet “moved from the present; consequently, it cannot be recalled or remembered because in remembering we turn to the past as past. What is retained, however, is not retained as the “now” that it was. Rather, it is retained on the fringe of the “now” as “just having been a ‘now’ but not yet past”.

For example, let us say a tone began at phase 1, endured through phases 2 and 3, and ended at phase 4. At phase 1, retained is the silence interrupted by its beginning (phase 1), but that silence, now just past but retained in the present, is a profile of the original silence from the vantage point of phase 1 (the *original silence-as interrupted* is what is *retained* at phase 1). As the temporal structure elapses and phase 2 (an anticipation of phase 1) is now, the silence *and* phase 1 are retained and still present in their profiles from the vantage point of phase 2. Also retained are the horizons of retentions and anticipations of each of the retained phases, but again as profiles from the now (phase 2). For example, when phase 1 was present, an immediate retention was silence and an immediate anticipation might have been that the tone will continue, change or, in its most general form, that something will occur (become present). At phase 2, silence is a retention of a retention (a retention of phase 1 which is now a retention of phase 2). The “open-ended” anticipation of phase 1, from the vantage point of phase 2 has become determinate (the tone continues). At phase 3 the retentions and anticipations expand accordingly so finally, at phase 4, the initial silence and phases 1, 2 and 3 are retained in the “now” when the sound stops. Also retained are the retentions and anticipations of each of the preceding phases, again

from the vantage point of phase 4. The anticipation of phase 3, say “new” because the “old” silence that the tone will continue has been disconfirmed by a “new” silence. It is a “new” silence because the “old” silence is still retained in the present, but as just having been. “Beginning and end”, the “identity” of the tone through temporal phases, “silence again”, etc. all are possible because the “now” has a thickness or duration constituted by a central impression, or “now” with its horizons of retentions and anticipations belonging to that “now” which, as a totality, is a *momentary present* and *not just a fleeting, “knife-edged instant*. The inherent unity of consciousness becomes possible because “(T)he unity of the present with the past is thus constituted by retentions and at the forward end of the perceptual are the protentions [anticipations] joining the present to the ‘future’” (Kvale, 1974).

The final point of emphasis regarding a *momentary present* is that the “now” and its horizons of anticipations and retentions form a unity such that each of the three “moments” of the *momentary present* influence each other reciprocally. For example, anticipations are not separated from retentions or from the primal impression (the “now”). In reading a sentence, the words just read at the beginning (and now retained) give direction to and set constraints on the meanings (words) *anticipated*. The word(s) *now being read* may sustain the developing meaning of what has *just been read* (and is still retained), and what meanings (words) might be what *was anticipated*, or the words now being read might change the sense of what has been read (and still present) and what is likely to follow (new anticipations). Expanding the horizons beyond the present retentions to a *recalled past*, and beyond present anticipations to an *expected future*, the same interrelations and mutual influencing prevail.

If retentions and anticipations are of the present, what of past and future? Retentions begin at an “edge” of a primal impression (“now”) and extend to the past as past. Retentions are the “way” from the “now” to the past. The past as past must be *recalled or remembered* because it is no longer retained as part of the present. Similarly, anticipations begin at another “edge” of a primal impression and extend to the future as possible future. *Expectations* give us the future as possible future.



In contrast to immediate retentions, *something remembered or recalled has become no longer an inherent part of the present. What is remembered (in present act). is something which is brought back, re-called, re-presented from the past as past.* Here “there are two tracks of temporality as opposed to just one in the above account of the present as *momentary present*. For example, in seeing a tree, we not only see the object, but we *also* experience the act (of seeing). In *remembering* the tree, however, we relive the portion of our conscious life that was the original perceiving of the tree” (Sokolowski (1974). In the *act of remembering* we are aware of this act *in the present and of the object remembered*; hence, we are dealing with temporality of the act of remembering with its retentions and anticipations. But within the object or event being remembered is nested the re-presented flow (temporality) of the original act of perceiving the tree (with its retentions and anticipations); thus, I remember the tree as having-*been-perceived*. Consequently, *in remembering, there are two tracks of temporality. whereas in an inherent retention there is only the one track of a lived present.*

These sketchy and incomplete comments will suffice because it is clearly beyond the scope of this chapter to engage in a full-blown phenomenology of temporality. For a more complete account of temporality, the interested reader is referred to Gurwitsch ((1974), Husserl (1964), Kvale (1974), Merleau-Ponty (1962), Sokolowski (1974), Straus (1970) and Zaner (1970).

## 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) that 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) that 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 the previously neutral sound of the bell. One can look at this change in behavior as a result of 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 – at least as far as salivation is concerned.

What counts as learning here, a change in behavior as a result of 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?

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\*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.

Gage and Berliner (1984) offer as clear an answer as anyone to this question. They argue 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 a number of 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 concentration 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 will become clear after 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.

#### 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), offered a devastating critique of Pavlov’s “doctrine” of “conditional” reflexes, and he also showed that, in essence, Pavlov was dealing with signal learning. He justifies calling Pavlov’s interpretations a “doctrine” because they are based on the following *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 in 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) has shown 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 led 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 nature of what a signal is, 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.

As indicated, as early as he 1930's, Straus had worked out a phenomenology of "signal-formation" which he showed 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 non-neutral 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 nature of a signal because its formation is in part 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 went before is irrelevant. More is said about this below.

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

According to Straus (1982), “If an object is to become a signal, it must fulfill two conditions. Even though it is itself neutral (indifferent). it must nevertheless 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 non-neutral 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).

However, not just any stimulus will become a signal because of merely contiguous pairings with the non-neutral situation. (This seriously qualifies the simplistic notion of contiguity learning, that the mere pairing of any events *will necessarily* result in learning a signal; their connections or relations can be learned via *association*). Although it belongs to the neutral situation, the signal must stand out in contrast to this situation. If a stimulus 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 taking into account the nature of the neutral situation. Again, from Pavlov to Gagne, this precisely is not what is done; hence, what can serve as a signal (CS) becomes extended, in theoretical examples, to events or objects that could not in reality become signals at all. (I am thinking of the examples offered by Gage and Berliner referred to earlier and to be 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 is from the beginning 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 the temporally ordered, “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, Straus’ criticism of Pavlov is so thorough that we need not dwell on the temporality of signal learning and how Pavlov distorts it. Rather, mention will only be made of the temporality of signal learning as the former is viewed phenomenologically.

If the present did not have a “thickness” or duration to it, as described earlier, then it would be virtually impossible to understand how a signal could function as the middle term of a three-term relation without introducing fictions such as memory traces (see Straus, 1966), which is precisely what Pavlov did. However, with an understanding that a momentary present is made up of a primal impression with its horizon of retentions and anticipations, the signal and its relation to the other two terms becomes transparent. Let us say that after the signal has been learned, it is presented. At that moment the *neutral situation is retained* and it is still present as *just having been interrupted by the signal*. The signal is the primal impression, and anticipated, *as part of the present*, is the *coming non-neutral situation*. (What other retentions and anticipations are involved would depend on the situation, e.g., whether a previous occurrence of the signal were retained or recalled).

In connection with anticipating the non-neutral situation, to the credit of Gagne (1965), he recognizes an essential difference between an unconditioned and conditioned response. Indeed, he refers to the latter as an “anticipatory response”, a response in anticipation of what is being “announced” by the signal; in his example of eyelid conditioning, what is anticipated is the “puff-of-air-to-come”. Even so, Gagne is unable to penetrate to the essence of a signal because he ignores the first term (the neutral situation) and sees a signal as the first of a two-term relation. Also, he does not see anticipation as a temporal but rather as a psychological (an

act) phenomenon which, of course, it can be, but not as it appears within a momentary present.

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

Even though it is an accurate description of what one must *do* to promote signal learning, the three-step model with which this section began 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 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 taken place*. There are differences between a UR and a CR such as latency. But the most decisive difference is, e.g., the organism eats the food but not the sound of the bell! Surprisingly, usually these differences 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 three-step model. For most, the learner learns to pair an old response (salivation) to a previously neutral stimulus (sound of the bell). As already seen, for Gagne what is learned is the “anticipation of a stimulus (food)” and for Straus what is learned is the changed meaning (significance) of the signal from neutrality to a pointing to. What is learned is that a signal means a *transition* from the neutral to the non-neutral and not a particular response to a new stimulus.

Viewed in the context of the nature of a signal, it is clear that 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 of 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 at least 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) pointed to a non-neutral situation (a loud noise) which upset Albert. According to Straus' analysis, if it were the signal, as such, that aroused the emotional response, then it would not point beyond itself and it couldn't serve as a signal. For someone viewing respondent learning as stimulus substitution, it is the signal itself (the CS) that 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 clear 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 that is signaled by the science class? This is very doubtful. How does one test to see if the 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. These examples, real enough in their own right, become absurd when forced into a signal learning model that is misunderstood as stimulus substitution.

Psychopedagogy 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).

Psychopedagogics is clear in focusing on the *ways*, the *modes*, the *how* of learning. Consequently, signal learning (the learning of a signal that 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 want 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 contents (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 completely 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 learning *is* or *how* it occurs. It doesn't provide that sort of understanding. As will be 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 to be explicated later. For example, if the 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 even to 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 that increases the probability that the behavior *preceding* it will occur again. There is an obvious *circularity* in the claim that, on the one hand, if the behavioral response is reinforcing, the probability of that behavior (response) occurring is increased, and, on the other hand, 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 just mentioned (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 below.

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. This occasional pressing the lever without consequent reinforcement is called the operant level. It provides a baseline for comparing the frequency of behavior 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 the purpose of 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, the focus now shifts to the application of the model to the classroom situation.

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 educational situations. This area of application sometimes is 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 (1984) state that “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 textbooks in educational psychology referred to earlier, contingency management usually means that the teacher *explicitly tells the learner beforehand* what the conditions are that must be met before reinforcement will occur and what the reinforcer will be. For example, Gage and Berliner offer the example, “you will receive a candy bar for every report card that 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 can 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 pupil’s 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 that doesn’t allow for the luxury of waiting for the response.

### A phenomenological view of operant learning

It is a curious model of learning that focuses on quantitative changes (e.g., frequency) in responses that the learner was able to “emit” before learning was said to occur. 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 of this is *visible in changed behaving*, but only symptomatically. This line of thought does not have to be 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 as a result of *reinforcement* raises the question of why? Why did the rat change its rate of responding? Of course, Skinner would 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 of the model and have no place or meaning within it. Is it not evident 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 in the course of a 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. Intentions, purposes, expectations, retentions, etc. are not part of what the response means or is. Or rather, all of these “mentalist” 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. Therefore, now my focus changes to humans in operant learning situations with special reference to the temporal structure\* of operant learning.

Learning always occurs in the present, but this present is not a point on a continuum, an instant which is isolated from the past which is no longer and a future which is not yet. Learning is possible only if the learner retains in the present (or sometimes recalls) something as just having been present (or as past) and anticipates that something (vague or specific) will occur or become present. This structure was described earlier and need not be repeated. What needs to be done here is to see operant learning in light of this temporal structure in that it is fundamental to all experiencing and thus to learning.

At a particular moment, which *contains its own retentions and protentions( anticipations)*, a child makes a “response” (time<sub>1</sub>). This “emitted” response is then reinforced *immediately* (time<sub>2</sub>). The *moment of reinforcement* contains its *retentions and anticipations*. For example, the response at time<sub>1</sub> is retained as just having been present; the anticipation is that reinforcement will cease, be continued, that something will occur, however *vague and indeterminate*; if on this occasion or several “trials” later, the reinforcer has resulted in an increase in frequency of that type of

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\* The following discussions of temporality presuppose a familiarity with an earlier section of this chapter, i.e., section 3. THE TEMPORALITY OF CONSCIOUS LIFE.



response, what has happened? What seems to have happened is that a new *synthesis* has occurred among the three moments of the momentary present. Before proceeding, it should be noted that these same three moments (i.e., “now” and its horizons of retentions and anticipations) are operative in signal learning. But in signal learning where the signal is the middle of three terms, a reinforcement is the second of a two-term relation. The reinforcer, as a *reinforcement*, does not point to anything beyond itself. It is the term of interest to the learner where in signal learning, the *signal is not the valued term*, but rather the non-neutral situation (i.e., the food) that *follows* it is what is of interest to the learner.

What is this new synthesis? Before reinforcement, the anticipations and retentions belonging to the moment of responding are different than after the reinforcement has had its effect. That is, before reinforcement, the retentions and anticipations of that momentary response may be indefinite or irrelevant to the *experimenter’s purposes*. At any rate, what is to become a reinforcer at first is not a *salient anticipation or expectation belonging to the moment of responding*. Later, however, after the reinforcement has “taken hold”, when the reinforced response is present, its horizons of retention and anticipation are changed. Now, a retention might be that *the response just made was followed by reinforcement*. In making this response, the retained relation will continue; thus, the anticipation is that reinforcement will follow. None of this involves specific intentional acts of anticipation and retention; these are matters of operative intentionality (i.e., they occur because of the structure of temporality). To engage in specific acts (act intentionality), the learner would have to specifically recall or expect something.

This temporal structure allows one to see how it is possible for a reinforcement to influence a response even though it *occurs after the physical or objective presence of the response*. That is, though no longer physically present, the response is retained in the momentary present of the *occurring reinforcement* and, thus, can be retroactively influenced by that reinforcement; at the same time, present anticipations become more delimited. In other words, the significance of the retentions and anticipations of the retained response are changed by the occurrence of the reinforcement in a

way analogous to the way in which words read at the beginning of a sentence change their meaning when words later in the sentence are read (and all of this delimits the anticipated meaning of the not yet but soon to be read part of the sentence). Everything being described here occurs within a momentary present. Because they are phases of the momentary present, the retentions and anticipations described are not intentional acts and are no more “mentalistic” than is the “now” of a momentary present.

Without going into detail, extinction is a matter of the “new” anticipations becoming unfulfilled until, yet another synthesis occurs where the connection between the response and reinforcement may be retained (remembered) as “what used to be but is no longer the case”. The upshot is that *within a momentary present*, the retentions (recollections) and anticipations (expectations) will change so the connection between the response and the reinforcement will become ambiguous or nullified (extinguished).

As already mentioned, the Premack principle is where a more preferred response is used to reinforce a less preferred one. Interestingly, most educational psychologists view this principle as an obvious application of the principles of operant learning, which we have seen, it is not. They find no difficulty in the fact that the *contingencies for* (“If you do X”) *and the indication of the occurrence of reinforcement* (“you will be permitted to do Y”) are explicitly provided to the learner *before any responses have occurred*. This provides the learner beforehand with an expected future (consequence) which will be anticipated at the moment of engaging in the activity specified as the contingency for that “reinforcement” to occur. The arrangement strips any doubt from the fact that expectations and anticipations are functioning full force. In other words, *this arrangement assumes (requires)* that the learner “will do X to obtain Y, or, at least, *“will do it with the expectation that Y will follow”*”.

As indicated earlier, the Premack principle is not true to the basic principle of operant learning, i.e., *waiting* for the desired response to occur before reinforcement is used. That is, even though the reinforcement follows the response in the Premack principle, there

is a qualitative difference in that in operant learning the connection between response and reinforcement *develops within a momentary present*, while in the Premack principle, the connection has already been stated explicitly before there is the momentary present when doing X is executed. In this case, what was learned in operant learning is explicitly provided beforehand.

The above analyses lead to the conclusion that, stripped to its core, for human learners, operant learning is a matter of using reinforcement to establish a relationship between a desired (by the experimenter) response and a valued (by the learner) occurrence such that the valued occurrence becomes a salient part of the horizon of anticipations/expectation of that response. *It is precisely these anticipations/expectations which are changed (learned) in operant learning.* The changed frequency of responding is symptomatic of this change but it is not what has been learned. In other words, *what has been learned is the connection between response and reinforcement.* And with this, the horizons of retention and anticipation of a momentary present [when the reinforced response occurs] also have changed because the reinforced behavior now has a different significance or meaning.

#### 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 merely is 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 seems to be unnoticed by most 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 that “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 needs to do, in a practical sense, is to find consequences that strengthen the designated responses. 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 the presumed reinforcing situation (more preferred behavior) and in a way this makes the presumed reinforcer a chosen reason (motive) for agreeing first to engage in a less preferred behavior to be allowed to engage in the more preferred one. This is a *very noticeable difference* from operant learning where the learner has no notion of what will be a reinforcer until it has been applied. If someone using such a technique is caught up 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 because the very same preferred activity IS a reinforcer. 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, in general.* Among other things, this circularity interferes with one obtaining a clear grasp of what is being learned and of whether it even is an *account* of learning of any kind, operant or otherwise. The issue of what is being learned in operant conditioning has already been addressed briefly. With respect to the issue of learning, as such, we refer to a psychopedagogical 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 necessarily is involved when he/she learns? Apparently, these questions are of little or no interest to Skinner and his followers. As already noted, the model leaves such questions unanswered.

Those using this model and interpreting resulting changes in behavior quite likely are unaware that psychopedagogically identified learner initiated modes of learning (sensing, attending, perceiving, thinking, imagining and fantasizing as well as remembering) necessarily are occurring (as a coherent functioning unity). Necessary in the sense that before the response-reinforcement relation can even be experienced, a person must perceive, attend to, remember, etc. the "arrangement". These 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 or not 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*. Clearly, 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, in general, and psychopedagogics, in particular, 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; that is, it is a method for *teaching* 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 that will influence learning. It does not provide an insight into what learning fundamentally is.

In applying this model to educational situations for educative purposes, one must be extremely cautious. This model (any model) must be evaluated in terms of pedagogical criteria. Although this cannot be undertaken here, it should be noted that the application of the Premack principle described earlier is completely devoid of any pedagogical considerations. The overriding, if not exclusive, question in that example 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 its preferred behavior (running and screaming, etc.) contributes 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 psychopedagogical modes of learning must be an integral part of planning and presenting a lesson, but 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 the 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 that 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 more or less 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 the 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* to be relevant (by one's *executive control*), a *second type of attending* will be *initiated* in that the information will be *attended to* in the sense of *examined*. This attending *enters* the information into short-term memory. The *process of learning begins at this point*.

In continuing, it should be mentioned that *one's executive control* is "the *decision-making* center that *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 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 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 that “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 *repository for information* that has been filtered through the *attention mechanism, the sensory register and short-term memory*”.

Lindgren and Suter (198)( claim that “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) day “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 *transforms* input from working memory into *impulses that 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 has been 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 that 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 that "*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 are 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 across all of them with respect to 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 that 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, pegwords).

Regarding the flow of information through various processes preparatory to storage and retrieval, Gagne (1985) suggests a broad array of external effects that can be extended by a teacher, or even the learners in some cases, 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 general 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 refer to describable experiential phenomena, the information processing model to a large extent is metaphorical. This makes it very difficult to study it phenomenologically. Still, there is much that 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 warned 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 needs to 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 that must take place? This is a big and very limiting if, as Dreyfus (1972) says, “there are good reasons to doubt that there is any ‘*information processing*’ going on 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, namely, 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 or 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 throw-back to a view of perception which cannot be verified phenomenologically, namely 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 Merleau-Ponty (1962) and McConville (1978). However, the primacy of (hypothesized) stimuli over perception is evident in the language of several authors discussing 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 will be evident in chapter III, perceiving always begins on a *global, general level* and proceeds to differentiations 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, 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 *learned* response).

The *executive control*, conceived as “the decision-making center that *supervises* the entire information-processing operation is a vague and muddled 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 chapter to a realistic length, these troublesome points will not be 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 a memory trace) 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 only access to the past 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* because one can remember it only *from the future of that*

*very event* (i.e., one's present) which was possibly *anticipatd* but unknown at the time 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 similar to what is described earlier in this chapter as a *momentary present with its inherent horizons of retentions and anticipations*. A significant difference is that information processing accounts of the nature of short-term memory do not acknowledge the horizons of retentions and anticipations 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 dial 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 enter short-term memory, 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 have to agree with the reasons Skinner has for making it.

#### An evaluation of the information processing model

Owing to 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 lies 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 tied 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 that 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 have 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 pegwords. 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 the fact 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* metaphorical structures that 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. For example, regarding *feature detectors*, Farnham-Diggory (1978) 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 will become clear 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 that 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 accomplishing this. 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.

In arriving at this conclusion, one might ask, “But *what of the many research studies supporting this model?*” The data and results of these studies cannot be ignored. However, many of the *interpretations* of these studies can be questioned. There are many reasons for this. The main one is that several of these studies use contents and conditions (e.g., brief periods of exposing the content) often designed to fill in the details of this problematic model. The data emerging from these studies may be useful and relevant *when reinterpreted* in terms of an *accountable philosophical anthropology* (view of being human) and when a child, as educand, is the focus. However, this remains to be seen because *such reinterpretedations have yet to be made*.

### General comments and conclusions

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 its 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 anthropology*. Sonnekus (no date) indicates that, in contrast to the theories that 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, that 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 found 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: (1) to base an understanding of a learning and becoming child on an *accountable philosophical anthropology*; (2) to begin with the *lifeworld of a child*, or more specifically, *a child in an educative situation who is learning and becoming*; (3) to disclose and describe the categories (essences) of learning and becoming as they *emerge from* this every day, lived reality.

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