

(loud noise) which upset Albert. Remember, 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 some one viewing respondent learning as stimulus substitution, it is the signal itself (the CS) that produces the emotion (the CR), after all, the emotion occurs even if the anticipated emotional situation (US) is not presented. This line of thought betrays a misunderstanding of respondent learning.

Now, let us first consider the example offered by Gage and Berliner (1984) concerning the smiles, hugs, and compliments of the teacher (US), the pleasant feelings (UR), the teacher/school (CS), etc. What is the neutral situation which is "conspicuously modified" by the appearance of the teacher/school? Are teacher/school neutral to children? How does the teacher become the signal for a smile, etc.? By always and only smiling? Without raising any more such questions, it ought to be 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 second example offered by Gage and Berliner (1984) 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 has persisted from long before entering that class? Is it an increase in hunger that is signalled 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 mould.

#### 4.5 Psychopedagogics and signal learning

Perhaps there is universal agreement with the statement that to learn is to learn *something*. An implication of this 'simpler' 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 content learned.

Since Psychopedagogics is interested in the *how* of learning, an issue of importance is whether signal learning refers to *how*

learning (however limited) occurs to *what* is learned. Straus' nomenclature 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 as well, is on *arranging* experiences so that a relationship can be learned. In other words, signal learning refers to *what* is learned, the learning of a signal, and not to *how* learning occurs.

Within this context, the claim that respondent learning is one type of learning is ambiguous. A "type" of learning can mean a way of learning or the content learned. Psychopedagogics is very clear in focusing on the ways, the modes, the *how* of learning. Consequently, signal learning (the learning of a signal) does not hold a central place in psychopedagogic thought. Indeed, the model of respondent or signal learning presented at the beginning of this section is a very sketchy and incomplete lesson plan. It does not account for how learning occurs, it specifies what someone should do if they want to teach that "X signals Y". In fact, this is a didactic pedagogic rather than a psychopedagogic topic.

A psychopedagogician ordinarily is not interested in how signal learning occurs, but rather in *how* learning of any kind occurs. For this reason, psychopedagogics penetrates to modes of learning, as such, irrespective of content. This is not to deny, as didactic pedagogics continually emphasizes, that the *what* and the *how* often are related, sometimes essentially so.

#### 4.6 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 promise that an understanding of it will shed light on how children learn? 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 a later chapter, psychopedagogics penetrates to the essentials of learning as such and not to paradigms for learning specific content (e.g., that X signals Y). Indeed, the Pavlovian paradigm for promoting signal learning presupposes the various modes of learning to be explicated later. That is, if the learner did not actualise his sensing, attending, perceiving, thinking, imagining/

fantasying and remembering, he would not be able to experience and come to learn (lived-experience) that x signals y.

## 5. OPERANT LEARNING

### 5.1 The model of how learning occurs

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

But what is a reinforcer? It is any event or stimulus that increases the probability that the behaviour preceding it will occur again. There is an obvious circularity in the claim that, on the one hand, if a behavioural consequence is reinforcing, the probability of that behaviour (response) occurring is increased (is learned) 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 behaviour by using reinforcers because, by definition, reinforcers are what change behaviour). This problem of circularity will be 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 behaviour remains "indifferent" in the sense that it does not lead to reinforcing consequences. This occasional pressing of the lever, without consequent reinforcement is called the operant level. It provides a base-line for comparing the frequency of lever pressing after operant learning has occurred.

Now the lever is engaged so that pressing it delivers a food pellet (only if the lever-pressing response is increased, in frequency is the food a reinforcer — remember the circularity). Obtaining the food is contingent upon 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. The rate of lever-pressing is the change in behaviour, which provides the evidence that learning has occurred: such behaviour is the learning effect, the result of having learned.

For the purpose of this chapter, it is not necessary to treat the intricacies of reinforcement and punishment, of shaping, of primary and secondary reinforcers, of stimulus discrimination and generalisation, etc. Rather, having presented the basic model of operant learning, the focus now will shift to the application of this model to the classroom situation.

However, before doing this, an additional point needs to be made. In the example of the lever-pressing rat, no doubt it is conspicuous that the rat could press the lever before operant learning occurred. The rat's rate of responding but not the nature of the response is what was changed. But what of "new" patterns of responding? The technique of shaping is used to account for as well as to "develop" new or original patterns of behaviours by the reinforcement of responses (and patterns of responses) which are successive approximations leading to the target pattern of responding (e.g., a pigeon being "taught to play ping-pong"). This line of thought is based on a fundamental idea of operant conditioning. An organism has the potential to emit a large variety of responses. By means of selective reinforcement, the hierarchy of the probabilities of occurrence of these behaviours (and patterns) can be changed.

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

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

Regarding the application of the model of operant learning, 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 learner is not informed of what the contingencies are for the occurrence of reinforcement, except by the very reinforcement of his behaviour 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 behaviour modification is an apt label for what is occurring here. However, contingency management or behaviour modification has come to include a host of techniques which differ essentially from the basic idea of operant conditioning.

In the six recent textbooks in educational psychology referred to earlier in this chapter, 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, "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 said to be the so-called Premack principle. According to this principle, one actively (behaviour, 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) then you can play (more preferred)." These examples, do not parallel the model of operant learning: wait for the response to occur, then reinforce it.

As an example of the practical value of the Premack principle, Gage and Berliner (1984) relate how a researcher named Homme first became aware of the power of the Premack 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 on the class.

"Faced with such a problem, Homme took the approach of making the running and other disruptive behaviors contingent on doing a small amount of whatever the teacher wanted them to do. For example, the pupils were asked to sit quietly in chairs and look at the blackboard. Then, almost immediately, they were told, 'Everyone, run and scream now.' This kind of contingency management enabled the teacher to take control of the situation."

Other techniques claimed to be the application of the principles of operant learning to the classroom are "token economies" and "contingency contracting", neither of which are true to the operant learning model. However, these will not be discussed here because the purpose only is to present each model of learning in its essence, provide an example or two of a recommended practical application and then to view the model and recommended applications phenomenologically and pedagogically.

### 5.3 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. This change is a change in behaviour but from a phenomenological perspective this change is not what learning is. It is one effect of having learned 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 a different way. The person is changed, the meaning of the content (situation, world) is changed, the level of dialogue between the person and his world has changed, and all of this is shown in changed behaviour, but

only symptomatically. This line of thought cannot be pursued further here because it will lead us directly into the content of the next two chapters.

If the changed frequency in behaviour 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 frequently as a result of reinforcement raises the question of why? Why did the rat change its response rate? Of course, Skinner would say because of the reinforcement, which is circular. As to how or why reinforcement works, Skinner (1974) has no reply except a vague reference to the possible preservation of the species on a biological basis.

It is not evident that the rat's change in behaviour 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 response to the rat as pressing the lever (more frequently or not) with the anticipation of getting food? To deny a difference is to say that a response has no reference 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. Time collapses to 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 may hear it when it is not being played though probably not as richly or as 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 music or between its comparative richness, and how?

From the perspective of operant learning, a reinforcer does or doesn't have an effect now and that is all one needs to be concerned with: intentions, purposes, anticipations, expectations,

retentions, etc. are not part of what the response means or is. Or rather, all of these "mentalistic" notions can be reinterpreted in terms of the effects of reinforcements. This line of thought is unacceptable phenomenologically and pedagogically. If intentions, anticipations, etc. are not recognized as a fundamental and unavoidable part of the structure of human experience, one's view of the child's psychic life and learning will be seriously distorted. Therefore, my focus changes now to humans in operant learning situations with special reference to the temporal structure of operant learning.

To learn always is to learn in the present. But this present is not a point on a continuum, an instant 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 explicit) will occur or become present. This structure was described earlier and need not be repeated here. 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 anticipations, a child makes a "response" (r). This "emitted" response is reinforced immediately (r<sub>1</sub>). The moment of reinforcement has its retentions and anticipations. For example, the response at t<sub>1</sub> is retained as having just been present; the anticipation might be that the 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 the frequency of that type of 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., a "now" and its horizons of retentions and anticipations) are operative in signal learning. But 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 where in signal learning the signal is not the valued term but rather the non-neutral situation that follows it, is what is of interest.

What is this new synthesis? Before reinforcement, the antic-