

Behavioral Models of Depression: A Critique of the Emphasis on Positive Reinforcement

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Abstract

This paper provides a review of behavioral models of depression highlighting the problems associated with its historical emphasis on lowered frequencies of positive reinforcement. We analyzed the models of Ferster and Lewinsohn in their theoretical approach, methodology and application. We conducted a review of the suppressive characteristics exercised by punishment, by the presentation of non-contingent aversive stimulation and by operant extinction. A number of recommendations are made concerning how these processes can inform interventions. We conclude that interventions geared towards identifying aversive control play a promising role in clinical change in the treatment of depression.

Keywords: Aversive Control, Response-Contingent Positive Reinforcement, Depression, Clinical Behavior Analysis, Functional Assessment, Behavioral Activation.

The present article aims to revisit the principles of behavioral models of depression by emphasizing advancements in the field, as well as providing a critique of the dominant models. With this goal in mind, we aim to re-direct the conceptual analysis towards an understanding of the environmental variables frequently observed in the behaviors of depressed individuals. Drawing from the existing literature, we propose possible variables associated with behavioral suppression and its mechanisms during the development and course of depressive behavior repertoires. Three particular behavioral processes are considered: (1) suppressive characteristics exercised by punishment, (2) the presentation of non-contingent aversive stimulation, and (3) operant extinction. We begin with a discussion of the dominant models of depression, followed by a critique, and we conclude with a discussion of how each of these processes can inform clinical interventions.

Models of depression

Behavioral analysis, in addition to advocating for a pragmatic approach to control and prediction of behavior (Skinner 1974/1976), is concerned with promoting an understanding of clinical phenomenon in order to create effective interventions. With this goal in mind, behavioral analysis has studied depression for decades, describing this type of behavioral phenomena along contextual and behavioral lines. In order to understand behavioral variations observed in depressed clients, it is necessary to understand the variables responsible as cause and maintenance of the feelings of dysphoria present throughout the history of the individual. This process can be reached by identifying the “depressive” contingencies, which involves identifying the antecedent events and consequences of the depressive behaviors of interest. Taken together, the problem behaviors, the antecedent and consequential events form the unit of analysis referred to as “triple contingency” (Skinner, 1953/1965). Behavioral analysis focuses on the application of this analytical tool in order to understand the context in which depressive repertoires are taking place. This perspective offers possibilities of clinical interventions. Examples of interventions afforded by this perspective can be found today in various private and public practice settings.

Given this emphasis on a contextualized understanding of the problems associated with depressive behaviors (Jacobson, 1997; Hayes, Hayes, & Reese, 1998), the study of depression gained momentum with the publication of a 1973 article written by Charles Ferster and published in the

American Psychologist. Ferster (1973) proposed a functional analysis of depressive behaviors building on the cumulative knowledge reached by previous base studies (Ferster, 1967; Ferster, Culbertson, & Boren, 1968; Ferster & Skinner, 1957/1997). Functional analysis, in this context, refers to how certain contextual factors in the environment of the individual influences behaviors. The functional analysis model proposed by Ferster has influenced the work of many practitioners and researchers today; however, research on the efficacy of this model lacked rigorous evaluation and interventions to validate Ferster's theoretical contribution (Kanter, Callaghan, Landes, Busch, & Brown, 2004). This lack of empirical work was later addressed by the work of Peter Lewinsohn. Lewinsohn adopted most of Ferster's model while also adding significant findings through his own research (Blaney, 1980, Lewinsohn, Biglan, & Zeiss, 1976). Ferster's conceptual analysis, coupled by the empirical work done by Lewinsohn, provided the initial basis of applied studies in depression, laying the foundation for the development of modern behavioral analytic treatment.

Ferster (1973) stated that certain characteristics of the depressed person such as excessive crying, irritability and self-criticism is associated with the loss of other types of activities. The variables that are influencing this type of repertory are lowered frequency of positive reinforcement and the increase of negative reinforcement (Ferster, 1973). Positive reinforcement occurs through events that heighten the frequency of behaviors observed in non-depressed individuals, such as behaviors associated with the experience of having a positive and fulfilling relationship with a significant other, feeling productive at work or relating to friends, among others. Negative reinforcement, on the other hand, refers to a heightening of the frequency of avoidance or escaping behaviors associated with an aversive stimulation. Avoidance behaviors are evidenced, for instance, in a situation where a depressed worker avoids tenuously being face to face with his or her boss. The avoidance of a potential conflict can maintain the non-resolution of the problem and with it perpetuate the suffering. Escape behaviors occur when a depressed individual escapes undesirable situations, such as by abandoning responsibilities at work and at home, or even in everyday situations when an individual finds excuses to isolate him or herself from being in the presence of friends.

Hypotheses have been proposed concerning the determinants of lowered frequency of positive reinforcement. These include sudden changes in the environment of the depressed individual. Sudden changes offer life circumstances similar to contingencies of schedules of reinforcement in high-fixed ratios. When the effort necessary for the production of reinforcement is too high, there are pauses among reinforcements. This effect is known in the literature as abulia. Sudden changes in the environment are noticeable in situations where the individual moves out of his or her residency to a setting where they no longer possess a social network that can operate as a source of positive reinforcement. A high response cost can be observed in professional situations in which the employee is required to work beyond normal expectations. When a task is complete, there is a slowed response to the next task. If the work constitutes an inevitable high effort, then it becomes likely to identify abulia. Overtime pay or additional benefits provided by corporations are good examples of companies attempting to exert influence over this type of intense effort.

Lewinsohn's model was similar to Ferster's in that it recognized that feelings of dysphoria of a depressive person would be the result of a reduction of the positively reinforced behaviors. The author coined the term response-contingent positive reinforcement to refer with greater emphasis to this singular characteristic of the repertory of the depressed (Lewinsohn et al., 1976). According to Lewinsohn and colleagues (1976), there are three ways to explain the low rates of response-contingent positive responses. One would be a loss of reinforcement effectiveness of events which formerly used to serve as positive reinforcers. Another might be that a change in the individual's environment could cause the former reinforcer to no longer be available. Third, the reinforcer might still be available in the environment however, the individual may no longer have the ability to access it.

Lewinsohn elaborated on these explanations further when proposing a structured treatment for depression. The treatment's main goal would be to re-establish the rate of response-contingent positive reinforcement to an adequate level. In order to make this happen, it would be necessary to change the

frequency, quality and quantity of pleasure activities and social interactions of the individual. The primary technique used in the evaluation and intervention towards this end are scales that attempt to characterize and measure the symptoms, focusing on the interpersonal behavioral patterns of the individual, social skills training and the use of the Pleasant Events Schedule, which is focused on proposing pleasurable activities. Perhaps its greatest contribution was the creation of the Pleasant Events Schedule (MacPhillamy & Lewinsohn, 1982). The Schedule involves asking the individual to choose 160 options of pleasurable events among a list of 320 pleasurable events that are previously listed. Depressed individuals generally present very brief lists of pleasurable activities; hence the use of an extensive list with predetermined pleasurable activities. Once made, the choices are organized on a 3-point scale. The individual is also asked to record daily the activities that were attempted (by checking them off) and to note an adjective describing the corresponding mood when the event took place (Lubin, 1965). Following 30 days of doing this, 10 activities that are significantly associated with changes in mood are chosen for further exploration.

Therefore, the Lewinsohn therapy became synonymous of behavior treatment for depression (Shaw, 1977). Consequently, a number of researches have been conducted on components of the proposed intervention. Some studies suggest that simply raising the number of positive reinforced activities would not be enough for the treatment of depression. Two studies conducted showed no significant change of depressive behavior among the group of subjects instructed to use the Pleasant Events Schedules in comparison to control groups (Dobson & Joffe, 1986; Hammen & Glass, 1975).

What are potential variables that could affect the lack of significant findings in the Pleasant Events Schedule studies discussed above? The phenomenon in question is often observed in the clinic setting among clients who reproduce depressive behaviors despite having a schedule full of “pleasure” events (Martell, Addis, & Jacobson, 2001). A careful investigation may reveal that their behavior repertoires may be controlled by aversive stimulation rather than by positive reinforcement, as one might assume. From a behavior-analytic perspective, some authors have argued that it is important to evaluate the consequences of behaviors using as reference the ideographical character of each subject rather than determining arbitrarily the environmental consequences at the expense of a more accurate contingential analysis (Martell et al., 2001).

The common factor present in Ferster and Lewinsohn’s model in determining depression would be a reduction in the frequency of positively reinforced behaviors. It is important to note that stimulus that reinforces positively a class of responses also present an eliciting function of determined responses that can lead a layperson to conclude that a certain stimulus is a reinforcer because it reinforces certain behaviors – meaning that it is a reinforcer because it has properties that elicit body responses considered “pleasant”. The stimuli reinforced is considered “good”; however, “good” is a verbal reinforcer utilized in the transmission of cultural practices (Skinner, 1981/1984).

With regards to reinforcement circularity in the assertions set forth by Skinner (1953/1968), positive reinforcement can not only heighten the frequency of behaviors reinforced as such in the past, but can also elicit responses considered “pleasant” and therefore act as antidepressants. Skinner (1989) states that:

“One feels good who feels a body which has been positively reinforced. What is felt in that way is an apparently strong probability of action and a freedom from aversive stimuli. We are ‘eager’ to do things which have had reinforcing consequences and feel ‘better’ in a world in which we do not have to do unpleasant things. We say that we are enjoying life or that life is good. We have no complaints because complaining is a kind of negatively reinforced behavior and there are no negative reinforcers” (p. 83).

In the quote above, Skinner frames this discussion of positive reinforcements; however, the antidepressive effects of positive reinforcement are difficult to isolate and analyze in randomized studies involving clinical populations. Some studies on depression conducted with animals have shown some findings supporting Skinner’s assertions. The uncontrollable learned helplessness model (discussed later

in this chapter) shows that previous exposure to positive reinforcement prevents helplessness in rats after being exposed to uncontrollable aversive events (Hunziker & Lima, 2006; Hunziker, Manfré, & Yamada, 2006). Added to this, there is evidence that treatment with positive reinforcement after experience of uncontrollable shocks can revert helplessness (Hunziker, 2005).

Thus, it is important to consider the latter given the history of behavioral therapy. In prioritizing the increase of pleasant activities through contingencies of positive reinforcement, Lewinsohn's intervention model (Lewinsohn & Libet, 1972; Lewinsohn et al., 1976) seems to have achieved partial success: but not all depressed individuals have the same susceptibility to positive reinforcers as they used to have before becoming depressed. Other responses occurring through aversive stimulation may be competing with the emission of positively reinforced behaviors. Lewinsohn's therapy did not adequately consider the coping mechanisms necessary to modify a person's mood. The problem did not begin with the application, but rather in the theoretical conception laid out by Lewinsohn and his colleagues.

Moreover, aversive stimuli are utilized in the control of behavior due to its rapid ability of suppressing undesirable behaviors. Cultures normally possess aversive forms of social control that impede the emission of positively reinforced behaviors (Sidman, 1989). As a result, the use of aversive control leads to the emergence of any behavior that may have freed the individual of a similar aversive stimulus in the past. For instance, avoidance behaviors are frequently associated with the maintenance of problem behaviors in psychiatric pathologies, as in modeling of compulsive behaviors under contingency of negative reinforcement observed in patients who are obsessive-compulsive (Abreu & Prada, 2004/2005).

Ferster (1973), in fact, expresses doubt concerning the generalized effect of behavior practices among the depressed: is depression occurring due to the absence of positive reinforced behaviors, or is aversive behavior impeding its emission? This leads to the question of whether depressive behaviors are influenced by aversive events.

In 2001, Jacobson and colleagues (Martell et al., 2001) released a handbook on behavior analysis with a new proposal for the treatment of depression called Behavioral Activation (BA). The handbook criticized the protocol of Lewinsohn's treatment pointing out that only increasing the number of "pleasant" activities would not be enough because it would be necessary to understand the context in which the behavior is being enacted. According to the authors, "the assumption that any activity will enable a client to contact positive reinforcement in the environment is never made until a change in mood or behavior is seen" (Martell et al. 2001, p. 37). Like other behavioral analysts, they point out that "depression results from problems in the individual's interaction with the environment that result in the individual not engaging in behaviors that will be positively reinforced and that would allow that individual to exert control over [his or] her environment" (Martell et al. 2001, p. 26). The central philosophy of Behavioral Activation would be to promote coping of aversive situations, what would arguably lead to solving the problems and with it the promotion of positive reinforcement. The therapist would have to try to map which contingencies would be maintaining the depressive behaviors of the client and attempt to change them.

The Jacobson and colleagues therapy (Coffman, Martell, Gallop, Dimidjian, & Hollon, 2007; Dimidjian et al., 2006; Martell et al., 2001) brought back the functional character of the contingential analysis forgotten in the cognitive approach (Beck, Rush, Shaw, & Emory, 1979). Their approach brought back Ferster's model (1973), highlighting the importance of the contingencies of avoidance and escape behaviors, as well as complaining, among others, observed in the depressive client. The BA therapy highlights that these behaviors would be negatively reinforced and would inhibit positively reinforced behaviors from being emitted. Therefore, facing the aversive situations would be primordial in solving depressive behaviors.

Existing evidence suggests the need to change the focus of the investigation from the deficit of positive reinforcement to a focus on the contingencies which impede the emission of positively reinforced

responses (Abreu, 2006). Ferster (1973) pointed out that the identification of all processes responsible for the decrease in positively reinforced responses would have to consider the influence of the physical and social environment of the individual. A contextualized understanding of the relationship between aversive control and depressive behaviors would allow for the creation of more effective therapies in clinical behavior analysis.

Punishment

Punishment consists of an aversive stimulus applied after the emission of a given behavior (Ferster et al., 1968). Punishment is a technique of control in which the punisher or punishing institution tries to eliminate behaviors that are judged inadequate. Excessive punishment can be observed in the environment of depressed individuals in family and conjugal relationships, in institutional settings such as work, prisons, military, etc... and thus it can be observed in various types of social interactions. For example, a punishment may consist of a mother trying to eliminate a son's complaining by use of physical aggression. Positive reinforcement establishes one's tendency to behave in a certain way while punishment is concerned with ending it (Skinner 1953/1968).

The practical value that individuals observe in the use of punishment by leading another individual to behave in a certain way reinforces this type of behavior because of the suppressive characteristics of this operation. The three punishment effects, according to Skinner (1953/1968), would be (1) the eliciting of incompatible respondents (or suppressive effect), (2) the establishment of behaviors consistently punished as a new source of conditioned aversive stimulation, and (3) the selection of any avoidance and escape operant which suspends such aversive stimulation. With regards to punishment, whether presenting an aversive stimulus contingent to a certain operant (punishment type I) or withdrawing a positive reinforcer (punishment type II), what is commonly noted is the eliciting of emotional responses normally incompatible with the punished operant, and that is why it interferes with its emission (Ferster et al., 1968). The same happens with correlates of these operations such as the presence of or removal of conditioned aversive stimulus.

Parents who raise their children using physical punishment may be eliminating the punished behaviors from the children's behavioral repertory; however, they may also restrict positively reinforced responses. Many studies have shown a positive relationship between physical punishment and depression, over and above the effects of other behavioral problems (Backar, Canetti, Bonne, Denour, & Shalev, 1997; Frias & Armenta, 2002; Good, 1999; Matta, 2002; Spencer, 1999; Straus & Kantor, 1994; Turner & Finkelhor, 1996). But according to Ferster and colleagues (1968) the efficient punishment in this kind of practice may be the suspension of attention given to the child by the parent who punishes him or her constantly – a finding which highlights the importance of understanding punishment type II. Other examples can be seen in punishments type I and II observed in coercive job characteristic of modern societies. The demand for productivity at any price, the disqualification or lack of recognition of reached goals, the lack of salaries and benefits, longer work days, among other things, may also present contingencies which contribute to the development of depressive repertoires.

Frequently, the unpredictability of punishment occurs only in the first presentation of aversive stimulus because its recurrence allows other stimulus existent in the environment to be associated with it. In this context, another operation of emotional suppression of response is observed in the association of a neutral stimulus temporally preceding the presentation of an unconditioned aversive stimulus (Estes & Skinner, 1941). If this association S-S occurs, not having the possibility of escape from the immediate presentation of the unconditioned stimulus (US), the neutral stimulus will start to present the same eliciting characteristics of the original stimulus (CS). The group of reflexes elicited during the time-interval between the presentation of the CS and US was called anxiety (Skinner, 1953/1965).

Normally, a high comorbidity between anxiety and depression can be observed, a fact which seems to be the rule rather than the exception in the elaboration of psychiatric diagnoses (Barlow, 2002).

Facing this clinical phenomenon, Barlow, Allen and Choate (2004) proposed a combination of anxiety and depression diagnosis in a wide nosologic category.

It is important to point out that the emotional responses related to anxiety have suppressive effects more pronounced than the suppressive effects present in punishment that is not signaled: its effect is more generalized because it does not restrict itself to the punished operant and the circumstances in which the punishment happened. They extend differently by generalizing any other operant which is being emitted, as well as other environments which present physical similarities with the original environment (Appel, 1969). Added to this, the creation of classes of equivalent stimulus could be promoting the transfer of the CS function to other controlling stimulus (Dougher, Augustson, Markham, & Greenway, 1994). The operants positively reinforced in course could be disorganized in their emission and could be completely eliminated from the individual's repertory depending on the intensity, the frequency in the aversive stimulus' presentation (CS and US), and the contiguity with the target operant (Ferster et al., 1968). Estes and Skinner (1941) called the emotional effect incompatible with the operant behavior "conditioned suppression."

In the signaled punishment, while the operant repertory frequency decreases given the effects of conditioned suppression, there is a raise in the frequency of other operants which avoid the appearance of CS as well as US. Avoidance behaviors raise in frequency because they are negatively reinforced with the suspension of CS or US. Avoidance behaviors in depression can be observed in two distinct periods. First, during the installation of the depressive repertory (condition I), the individual receives punishment in his or her environment contingent to many response classes. In this context, an increase in avoidance behavior that is negatively reinforced is likely to occur if punishment is not present. For example, an individual who works long daily hours in a punishing environment, facing the CS related to going to work, may miss a couple of days or arrive late finding excuses to justify his or her absence. This way the individual is avoiding the CS punishment (when paired CS-US or CS-CS) and/or US normally present in his or her work environment. Another way avoidance can happen would be after the installation of a depressive repertory (condition II). An increase in avoidance frequency is frequently observed in clients, contributing to the maintenance of behavioral problems (Ferster, 1973). The avoidance could be evidenced, for instance, in situations when the individual reports sleeping in excess. Excessive sleeping may prevent the individual from contacting the CS related to solving problems, or from thoughts or aversive subject, or even, from doing a tedious or extremely challenging job (Martell et al., 2001).

Soon, some observations related to signaled punishments and non-signalized can be formulated. First, since *non-signalized punishments* are contingent procedures to an operant that was previously positively reinforced, they allow the formation of relations R-S by the organism – a fact which causes emotional effects to have suppressive effects (Appel, 1969). The suppressive effects are temporary, that is, the behaviors are only eliminated when there is immediate contingent presentation of the aversive stimulus or the suspension of positive reinforcement (Skinner, 1953/1968). When punishment is ceased, suppressed behaviors tend to return to baseline levels (Catania, 1998). Moreover, since punishment depends largely on the behavior of the person who controls it, it is probable that it will occur intermittently as punished behavior becomes rare (Skinner, 1953/1968). With regards to the *signalized punishments*, avoidance in the context of problem behavior can be effective since it may become present for an extended period of time and may turn the *disorganizing* or *suppressive* effect of operants that are positively reinforced to be less accentuated (Ferster et al., 1968). In this case, the CS would gradually lose the propensity of eliciting conditioned responses since it is no longer being paired with the US. The consequence of an avoidance-type response is that the aversive response is avoided effectively (Catania, 1998). Normally, under these conditions, the individual lowers the frequency of emission of avoidance behaviors, making it possible for the US to present itself again. As such, the association S-S becomes re-established, and with it the effectiveness of the negatively reinforced avoidance behaviors (Skinner 1953/1968).

Given this, it is hypothesized that the probability of developing depression if punishment occurs is relatively smaller compared to other procedures of aversive control because the positively reinforced

behaviors continue to be emitted – even if in lower frequencies. It is possible that certain operations allow for the development of other problems present in the medical nosology (e.g., anxiety disorders) before the development of depression.

Loss of effectiveness of operant behavior

There is another procedure of aversive stimulation which requires particular attention. According to Hunziker (2003) behavior analysis has studied operants and its direct correlation with modification consequences caused in the environment. This line of research has highlighted the effects of the presentation and suspension of aversive stimulus as a consequence of the operant performance. And leads to the following questions: what is the role of the aversive stimulus presentation not contingent to any operant? And would they also influence the learning and emission of positively reinforced behaviors?

Provided that learning is a cumulative process – previous learning interferes with the acquisition of new ones, it would be expected that the uncontrollability of aversive stimulus would interfere with the learning of new responses (Hunziker & Santos, 2007). Seligman & Maier (1967) created an experimental procedure with three distinct groups of dogs to investigate the effects of the presentation of uncontrolled shocks in the animal's learning. Two dogs were submitted to electric shocks while a third was placed in a control group and was not administered shocks. The ability to control the shocks was granted to one of the groups in which the dogs were able to suspend the shocks by pressing the board with its nose. The responses of the second group did not have any programmed consequence. When the first dog pressed the board, besides suspending its own shock, it also suspended the shock of the second dog. Twenty-four hours after the treatment with shocks, the dogs were submitted to an escape response test. The results showed that the animals previously treated with controllable shocks were able to emit an escape response, and so were the animals exposed to the experimental control group. Both groups emitted the escape response that was negatively reinforced with lowered latency and greater probability. The animals submitted to shock uncontrollability did not emit the escape behavior, or when they did, they presented high latencies, not changing the probability of the response happening. As a result, these dogs did not learn the escape response. This challenge in their learning was characterized as learned helplessness (Maier & Seligman, 1976).

It is important to point out that the learned helplessness procedure should not be confused with the punishment operations. In punishment operations, there is a contingent character necessary to define the procedure as being “punishment” of a previously installed response that is reinforced (Ferster et al. 1968). This characteristic allows the operant selection of the avoidance and escape behaviors which gives control to the individual to escape or avoid the aversive event.

Hunziker (2003) presented a behavior-analytic interpretation of this procedure, stating that:

“(…) under uncontrollability there is no differential reinforcement of responses, in other words, selections of relations R-S are never established. With that said, high body excitement elicited by the first shocks is only being controlled by the habituation process, which is promoted by the repeated presentation of shocks. Consequently, the frequency and intensity of body movement drops throughout the session, leaving the individual with a ‘passive’ appearance. Once the generalization process becomes ‘learned’, and the test has a lot of stimulus common to the treatment phase, it is likely that the individual will behave as in the beginning of the test, the same way he or she behaved in the previous phase. This way, the individual will move a little, which decreases the chances of selected responses to be emitted through positive reinforcement. However, even if the subject emits this response and experiences the reinforcement, learning will not be easily established because it involves a relationship of dependency among responses and the termination of shocks incompatible with the relationship of independency previously learned. Being opposite learning processes, it is expected that the first will make it difficult for the next, producing helplessness”. (p. 18-19)

Learned helplessness was soon presented as the animal model for depression given its phenomenological similarities to the psychiatric disorder (Seligman, 1975). The similarities were apparent, above all, with regards to the difficulty of starting operant responses (referred to as motivational deficit), the difficulty of associating the fact that the emitted responses produced consequences (referred to as associative deficit), and in various noted physiological changes (Maier & Seligman, 1976).

It is possible that many contextual determinants in depression are incorrectly associated with punishment. The examples previously hypothesized about corporal punishment during childhood or the coercive labor conditions aforementioned can be considered, in this context, because they fit the model of helplessness uncontrollability. The *relative* effects already discussed in punishment (signalized or not) regarding positively reinforced behavior, would make it difficult for the development of a depressive repertory.

A fact which seems central to the argument presented here is that, in the psychological explanation and in common sense, it is said that one punishes another not consistently but according to one's mood. Therefore, it does not matter what a child does, for instance, since this child will ultimately be punished by parents who by nature possess unstable moods. The behavior of physically hurting normally emitted is assumed to be negatively reinforced. Parents who hit their children could be acting in this fashion because certain behaviors of the child could be the source of aversive stimulation. By definition, a reinforced behavior would tend to increase in frequency in future emissions. The act of hitting a child could then be considered as being an avoidance and escape operant. The emerging problem is that the operant control of hitting behaviors could extend itself by generalization and formation of equivalence classes to other stimulus. As Skinner (1953/1968) points out, in the anxiety paradigm it is possible for an individual to avoid not only the CS and US but also the elicited emotional components. In other words, hitting behaviors could serve as not only the inadequate behaviors of the aggressed person, but also as operant control of other variables – a fact which would characterize the uncontrollability in the aversive stimulus to the person who experiences this type of aggression. For this reason, the context in which the terminology “punishment” is normally used in the current literature seems inadequate given the actual conceptual definition of punishment in behavioral analysis.

Despite its contribution to understanding the phenomena of depression, the learned helplessness model leaves some important questions unanswered. Different from other models which bring the deficit in the positive reinforcement as the critical variable in the functional evaluation of depression (Ferster, 1973, Lewinsohn et al. 1976, Martell et al., 2001), in the learned helplessness model, the criteria to consider whether subjects are depressed or not would be the emission of escape behaviors during the test phase. But according to Skinner (1953/1968), escape behaviors do not produce pleasant feelings rather, it produces feelings of relief. Even when there might be efficient repertories which allow for the avoidance or escape behaviors from the aversive stimulus, there could be a deficiency in positively reinforced behaviors (Ferster, 1973). This seems congruent with cases previously noted of clients with “full schedules” who remain chronically depressed despite having large quantities of events in their schedules (Martell et al., 2001).

Operant extinction

The extinction procedure is characterized by the suspension of reinforcement contingent to responses which were positively reinforced in the past. When a present performance is no longer reinforced, it re-occurs in higher frequency at first, and then starts to decrease in emission (Ferster et al., 1968). Extinction is defined here as a procedure of aversive control which could be impeding the emission of positively reinforced behaviors due to (1) intense emotional responses elicited in the organism in which it is desired to terminate certain behaviors and (2) through the capacity that such operation has to condition stimulus that would function as aversive stimulus if presented contingent to

any response. Due to this, extinction is here assumed to be an aversive control procedure which could eliminate the emission of positively reinforced behaviors.

As Dougher and Hackbert (1994) point out, clients usually search for treatment after an expressive aversive event takes place such as the loss of a family member, a relationship break-up, a loss of job, retirement or children leaving the home. Other forms of extinction can be observed in institutions where there is excessive privacy (e.g., correctional facilities) which impedes the prisoner from being able to emit positively reinforced behaviors.

Operant extinction should not be confused with the procedure of uncontrollable aversive stimulus noted in learned helplessness. Although the suspension of stimulus independent of the response of the individual characterizes this stimulus as being uncontrollable in the learned helplessness model, in extinction (similar to punishment), it is necessary that the individual is exposed to the operant control earlier (Hunziker, 2003).

Of special interest regarding extinction, however, is the development of an avoidance repertory controlled by aversive stimulus and conditioned by environmental circumstances in which there is a suspension of positive reinforcement. In this context, the individual may start avoiding people, environments or activities related to the loss of reinforcement – which would prevent the individual from getting in contact with potential positive reinforcement contingences and its *antidepressive* effects. There are cases with children in clinical settings where a conflictive familiar environment can not be observed which might have favored the development of depression. Upon investigation, it can be noticed that one parent may be absent or does not provide the positive reinforcement characteristic of an adequate parent-child relationship (or that the frequency of interactions may produce insufficient reinforcing effects to the child). In this case, one could argue that the possibility of developing depression is low given that the behaviors of the child are being reinforced intermittently. This phenomenon is not contradictory to the core of behavior-analysis if it is considered from a molar functional analysis of the insufficient frequency of attention provided by the parent (Baum, 1994). The function of the stimulus of the parent's presence may have changed the S^D into $S^?$ throughout the child's history due to the operant extinction of behaviors associated with the child's desire for an adequate relationship with the parent.

Implications for clinical and applied settings

We will now turn to the implications for clinical and applied settings of the suppressive characteristics exercised by punishment, the presentation of non-contingent aversive stimulation, and operant extinction.

Punishment

There are unique characteristics in the observed avoidance and signalized punishment in conditions I & II as previously discussed, which require further attention. As Ferster (1973) points out, avoidance behaviors in depression are characterized as passive because they have indirect action on the environment. They may appear as complaints of the individual who recognizes the aversive situation. The author calls them indirect actions, superstitious performance or extended avoidances, due to their passive role in affecting the environment. Throughout the installation period of depressive behaviors, it is noticeable that the behaviors which avoid facing the punishing agency do not modify the aversive environment (condition I). Likewise, ruminative behaviors – despite causing temporary relief on feelings of dysphoria, do not suspend the aversive stimulus critical to depression (condition II). In contrast to passive avoidance, active avoidance would be negative operant behaviors that reduce or end aversive stimulus. It is considered for this reason as coping behavior.

A possible intervention in this context would be to alter the consequences of avoidance behaviors (Ferster et al., 1968). In place of temporary suspension of aversive everyday events and feelings of dysphoria, another stimulus is presented. This situation normally occurs in clinical settings with the use of

verbal analysis through the promotion of functional analysis, which can be done by pointing out the ineffectiveness of temporary suspension. BA, at its core, is concerned with the promotion of this particular goal (Martell et al., 2001).

However, only promoting the recognition of functional relations would not be enough if there is a strong control exerted by the establishing operations (EO) – which also controls passive avoidance during depression. Daily aversive events (condition I) and feelings of dysphoria (condition II) are considered operations which promote an increase in the effectiveness of reinforcement of its suspension, evoking behaviors which in the past may have suspended aversive stimulation (Michael, 1982, 1993, 2000). Therefore, due to these characteristics, in a conflict situation, the EO would momentarily turn the emission of passive avoidance to the emission of active avoidance (Skinner 1953/1968).

According to Michael (2000), in order to modify the problem behavior, it would not be enough to modify the EO because it would soon re-establish itself to desired levels, and again such behaviors would reappear. This is likely to occur with techniques that are essentially composed of contingencies of passive avoidance which promote the temporary relief of feelings of dysphoria, including the Distraction From An Unpleasant Event, Behavioral-Stopping and the Limiting Contact With Unpleasant People (Martell et al., 2001). An alternative for this impasse would be the reinforcement of incompatible behaviors through the mapping of behaviors which have similar or *better* consequences than the consequences obtained through avoidance behaviors (Ferster et al., 1968). In depression, incompatible behaviors would have to effectively suspend everyday aversive events (condition I) or feelings of dysphoria (condition II), which would affect the emission of coping behaviors or active avoidances. For this reason, it is important to gradually raise the levels of difficulty faced with each proposed situation, so that the consequences that occur in the natural contingencies are evaluated constantly. Beyond the diminishing of levels of exposure to the aversive stimulus (Wolpe, 1961), another advantage of the gradual increase in difficulty is the differential reinforcement of the behaviors necessary for the execution of each gradual step.

In the event of an insufficiency or even a non-existence of the necessary repertory needed for the reinforcement to be achieved, the training of specific abilities related to this deficit is recommended (Libet & Lewinsohn, 1973). It is important to highlight again the need to constantly evaluate the adaptation of these behaviors to the natural contingencies. At last, strengthening the positively reinforced behavior repertory should always be considered since programming and promoting the emission of newer behaviors can be more effective than a client's own initiative.

Presentation of non-contingent aversive stimulation

In order to consider the clinical implications of the animal model, it is necessary to divide it into two distinct temporal situations. Thus, we consider the treatment phase with an uncontrollable aversive stimulus, as well as the test phase of escape responses in the experimental model.

Normally, when a client is seen with depression in which the learned helplessness model is adequate, it is normally ascertained that the exposure to the un-controlling aversive stimulus is still in course. This is equivalent to the phase of uncontrolled shocks in the animal model. This might happen in situations noted earlier of physical punishment. For heuristic purposes, and given the definition of learned helplessness, it is believed that any intervention which would lead the client to countercontrol the aggressor would not fit the model. The possibility of control is not characteristic of this approach. In addition, it is possible that an attempt to exert control in this environment will have little effectiveness given that the individual has already tried with little success to countercontrol the aggressor. The aggressive behavior of the person who controls can be a form of escape-avoidance behavior strongly maintained in the repertory of the aggressor, and may be one of few operants that are emitted. The aggressor will not be inclined to lose the reinforcement obtained by controlling the aggressed, in other words, it is as if the aggressor countercontrols the attempts of countercontrol made by the aggressed. For this reason, it is observed that the countercontrol in human environments present a complexity of difficulties inherent in reproducing the behavior of animals in laboratory.

An experimental correlate more likely of this situation would be if the experimenter would also present shocks contingent to the escape response in the operant control group – which would lead the contingencies of control to be more complex, leaving fewer, if any, possibilities for the animal. By doing this, the experimenter would be deliberately countercontrolling the attempt of countercontrol of the experimental group.

Similarly, pharmacological interventions may not be successful for the same reasons: even if the medication raises susceptibility of the reinforcement (Dougher & Hackbert, 1994) it will not be successful if it does not allow for the selection of an effective operant that suspends the uncontrollable aversive stimulus. These types of cases can be observed in patients who do not respond to medication, for whom active components of medication do not exercise its effect (Phillips & Nierenberg, 1994). This problem is not related to a biological given, and rather appears related to a contextual problem.

Given this, it may very well be that the only possible intervention is the removal of the individual from the uncontrollable aversive environment: a suggestion which raises important debates about its social and ethical implications (e.g., in a prison context or substitute families in the case of parental use of violence). This debate extends beyond the scope of this article.

However, another possibility in the clinical setting can be found in situations that appear similar to the testing phase in the helplessness model. If no new compatible learning has taken place between the individual's experience of uncontrollability and the present moment (Mestre & Hunziker, 1996), it is probable that the helplessness effects are still present. These individuals may present very strict self-rules related to the improbability of control (Rehm, 1977). In this case, interventions which promote self monitoring of activities along with an understanding of antecedents and consequences could allow for more accurate discriminations to be made (Martell et al., 2001; Rehm, 1977). The gradual exposure to contingences associated with tasks would promote the extinction of conditioned responses in situations of helplessness. With the installation of an adequate discriminative repertory, it is possible that the individual would emit positively reinforced behaviors again.

Similar to the interventions proposed in the punishment situations noted earlier, the specific abilities training and the amplification of a positively reinforced repertory would benefit the client.

Operant extinction

A depression that is caused by extinction has characteristics different from depressions that are caused by other kinds of aversive control. In this form, there is no need to establish countercontrol of any controlling agency. Perhaps a sufficient and effective intervention, in this context, may be the gradual exposure to the CSs associated with the circumstances of loss and the promotion of a positively reinforced repertory.

The exposure to CS should be encouraged not only in the natural contingences but also in the verbal contexts of clinical sessions. Talking about this loss, might have as consequence the extinction response of many verbal conditioned Ss associated with the suspension of positive reinforcement by the formation of equivalence classes (Hayes, Strosahl, & Wilson, 1999). The increase in the repertory of positively reinforced behaviors should be motivated so that it can regain sources of previous reinforcement and help foster new ones. If necessary, modeling the specific abilities needed to accomplish this must be a core element of training.

It is possible that this kind of depression is more easily treated and pose lower rates of remission. The DSM-IV-TR (American Psychiatric Association, 2003) states that major depressive disorders are often episodic, with a course of duration lasting from approximately nine to twelve months – even in the absence of treatment. Unlike the medical model which regards spontaneous remission as a biological determinant of the species, behavioral analysis is concerned with understanding the contingencies of reinforcement responsible for the remission or maintenance of behavioral problems (Goertner, Gollan,

Dobson, & Jacobson, 1998; Jacobson & Gortner, 2000). Within this perspective, and as determined by operant extinction, there might occur spontaneous reemission for two reasons. First, social contingencies would prevent the individual from stopping to behave in a certain way (e.g., having to go to work despite the loss of a close relative). Second, the individual could gradually occupy him or herself with positively reinforcing activities, if throughout his or her history this person behaved in a distinct fashion compared to someone who is clinically depressed. The absence of a controlling agency facilitates the regaining of activities. In this case, it can be observed that the instant abulia would be an exception, rather than the rule, in the life of an individual who has never developed a depressive repertory.

Conclusion

Even though three aversive control operations were independently examined in order to strengthen our understanding of each, it is a fact that these three aversive control operations may combine and present themselves together in the determination and control of a depressive repertory. As Kanter, Cautilli, Bush and Barush (2005) point out:

“The diversity of the above factors clarifies that depression is not a unitary phenomena, a specific disease state, or a simple reaction. It has a complex, multiply controlled, and co-occurring set of operant and respondent behaviors, and any similarity between two cases of depression is assumed, not determined” (p. 74).

However, this complexity should not impede its experimental and applied study, nor lend the behavioral analyst to disregard adopting or mixing multiple theoretical approaches as it has historically happened in the ascension of the cognitive-behavioral model (Kanter et al., 2004).

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