

A Functional Analysis of Depression

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Depression, like infantile autism (Ferster, 1961), appears to be an especially appropriate field for the behavioral psychologist because of the missing items of behavior that are so prominent. The behavioral style of analysis emphasizes the frequency of behavior as the primary datum, while the particular categories of behavior whose frequency is to be accounted for are sought from the clinical literature or from common experience. A behavioral approach is useful for communicating, clarifying, and making objective knowledge of human behavior that has been discovered clinically or experientially. Thus, the behavior analysis may be used to complement rather than substitute for clinical knowledge (Ferster, 1972). This approach is derived from Skinner's functional analysis of behavior, particularly in his book *Science and Human Behavior* (Skinner, 1957). Especially in the chapters analyzing self-control, education, religion, government and law, and social behavior, Skinner defines the major kinds of activities that characterize various performances and seeks the variables that account for and influence their frequency. Ferster has provided more details of a functional analysis of self-control (Ferster, 1962) and childhood psychosis (Ferster, 1961).

The first task in a behavioral analysis is to define behavior objectively, emphasizing functional (generic) classes of performances consistent with prevailing clinical facts, the component behaviors of which can be observed, classified, and counted. Then, the basic behavioral processes can be applied to discover the kinds of circumstances that can increase and decrease the frequency of particular

ways of acting. Finally, an objective account of the depression phenomenon can provide a framework for experiments that measure complex, valid clinical phenomena. An objective account of the functional relation between the patient's behavior and its consequences in the physical and social environment can identify the effective parts of a therapeutic procedure so that they can be applied more frequently and selectively.

DEPRESSION AS REDUCED FREQUENCY OF ADJUSTIVE BEHAVIOR

The clinical definition of *depression* (American Psychiatric Association, 1968) as an "emotional state with retardation of psychomotor and thought processes, a depressive emotional reaction, feelings of guilt or criticism and delusions of unworthiness [p. 36]" is a good starting point to uncover the actual forms of conduct that describe the way a depressed person interacts with his environment.

To observe the actual behaviors alluded to in the clinical definition of depression, we need look to the frequency of various classes of the depressed person's activity as compared with those of a person who is not depressed. The most obvious characteristic of a depressed person is a loss of certain kinds of activity coupled with an increase in avoidance and escape activity such as complaints, crying, and irritability. A depressed person may sit silently for long periods, or perhaps even stay in bed all day. The latency of a reply to a question may be longer than usual, and speaking, walking, or carrying out routine tasks will also occur at a slower pace. While he may at a particular time answer questions, ask for something, or even speak freely, the overall frequency is low. Certain kinds of verbal behavior such as telling an amusing story, writing a report or a letter, or speaking freely without solicitation may seldom occur.

Beck's (1967) clinical allusion to depression as representing a reduction in gratification suggests

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the close connection between the frequency of a person's acts and the reinforcers supporting them. A reduced frequency of some activities in a depressed person's repertoire may even lessen the effectiveness of reinforcers closely connected to physiological processes, such as eating or sex. Because these activities in their complete function also involve a complex collateral social repertoire, their reduced frequency does not necessarily mean that sex or eating is no longer reinforcing. Thus, if there is a depression of social activity, the by-product could be a reduced frequency of eating and sex. The depressed person's commonly reported lack of interest in hobbies and sports and a lack of concern for emotional attachments could be an example of a lack of collateral social behavior, analogous to the connection between the physiological and social components of sex and eating. Playing bridge, for example, not only requires bidding, playing a hand, and scoring, but also arranging that four people meet, dealing with the interpersonal effects of winning and losing, and conversing before and after play and between hands. Emotional attachments, whatever their quality of affect, are expressed by substantial amounts of activity either reinforced or influenced in some way by the other person. Even fantasy surrounding an emotional attachment requires a substantial amount of "silent" if not overt talking. Thus, almost any significant activity occurs for multiple sources, and a depression may represent a weakening of one or more of these sources of behavior.

AVOIDANCE AND ESCAPE

The depressed person engages in a high frequency of avoidance and escape from aversive stimuli, usually in the form of complaints or requests for help, along with the reduced frequency of positively reinforced behavior. He repeatedly tells how badly he feels, cries, talks about suicide, and complains of fatigue and illness. Suicide, except of course when it is manipulative, is the ultimate expression of the aversiveness of life's experiences, even though, as a dependent variable, it does not lend itself to measurement as an operant whose major dimension is its frequency. A complaint (e.g., I can't sleep, or I feel miserable) is a class of activity that has removed or ameliorated aversive conditions in the past, even though there is nothing the

listener could do or is likely to do in the present instance. "Please turn down the volume on the radio," for example, is a minor complaint which is commonly reinforced when the other person reduces the radio's volume. The frequent reinforcements of complaints in ordinary life account for the extensions of similar but ineffective performances in the face of other aversive situations. Skinner (1957, pp. 41-48) made a functional analysis of this kind of behavior, which he designated superstitious or extended mands, akin to the person on a rainy day who says, "I wish it would stop raining," or the proverbial "My kingdom for a horse."

These performances are called "extended" because they are accounted for by past instances where similar behaviors have been effective. Thus, the person who says "I wish it would stop raining" has in the past effectively terminated aversive situations by statements like, "Would you stop splashing the water, you are getting me wet." Three primary conditions combine to produce an extended mand: (a) Similar performances have terminated aversive stimuli in the past, (b) an aversive stimulus is currently present and of sufficient influence to produce a performance that would eliminate or escape it, and (c) an effective performance is unavailable in the current repertoire. It is the aversiveness of the rain or the absence of a horse coupled with the impossibility of stopping the rain or continuing the battle without a horse that induces a person to extend performances from their past experience.

Complaints and other negatively reinforced components of the depressed person's repertoire are sometimes accompanied by high frequencies of agitated activities such as hand wringing, pacing, or compulsive talking. These activities serve a function similar to complaints because they mask (by prepotency and hence escape and avoidance) other aversive conditions such as silence, inactivity, or anxiety-producing activities. Were more effective methods of avoiding aversive situations available to the depressed person, they would be prepotent over the less effective, simpler, and more primitive ones.

AVOIDANCE AND OTHER AVERSIVELY CAUSED ACTIVITIES PREEMPT POSITIVELY REINFORCED BEHAVIOR

It may not be possible to say whether the reason a depressed person is agitated, disturbed, and com-

plaining is because of the absence of positively reinforced behavior or because the aversively motivated behavior is prepotent over and hence prevents positively reinforced behavior. Nevertheless, it is important to note the close relation between aversive and positive aspects of the depressed person's life. A repertoire that efficiently avoids aversive stimuli may still lack sufficient amounts of positive reinforcement. Conversely, the aversively motivated behavior of some depressed persons may come from the absence of positively reinforced behavior or a sudden reduction in it. It is problematical whether a person whose repertoire consisted solely of performances reinforced because they terminate or reduce aversive stimuli (negative reinforcement) could survive. Therefore, although the extreme distress felt by the depressed person needs to be the first point of contact in therapy, the long-range objective needs to emphasize those positively reinforced behaviors that are missing.

BIZARRE AND IRRATIONAL BEHAVIOR

Despite their diagnostic usefulness, bizarre or irrational behaviors confuse the objective description of the depressed person's repertoire because they divert the observer from other aspects. A depressed person may talk excessively without regard for a listener (despite an otherwise overall low rate of speech), become incoherent, repeat hand gestures, adopt complex rituals, or spend a large part of the day in simple acts like hand wringing; pacing; doodling; playing with hair, genitals, or other parts of the body; or compulsively carrying around some object. These are the behaviors described in the American Psychiatric Association's (1968) classification system as the manic aspect of manic depressive psychosis. The high frequency of these performances does not imply that they are strongly maintained parts of the person's repertoire or even a causal factor of the depression. Despite their high frequency, we cannot assume that the simple repetitive acts have the same functional relationship to the environment or even the persistence and durability as those in a normal repertoire, except when they serve to annoy or disrupt. It is possible that many of these repetitive acts occur by default of the rest of the repertoire and because their reinforcement, if any, is simpler than other complex social activities. Apparently, not being able to

behave at all, particularly where it is appropriate to do so, seems to be a highly aversive event.

Bizarre, irrational, or nonfunctional behaviors frequently occur with the same relation to the normal repertoire with undepressed as with depressed persons when they are in situations where normal activity is restricted. The person at a conference, for example, in the presence of a speaker who does not hold his interest, yet generates enough anxiety to command at least a nominal show of attention, may repetitively rub a spot on the table, doodle, repeatedly touch his body in a ritualistic way, or have bizarre, unconnected, or irrational thoughts. These performances, not so significant in themselves, may occur because no other activity is appropriate at the moment, and the irrational behavior is prepotent, as a result, over an essentially zero repertoire. Sensory deprivation experiments (Heron, 1957) provide conditions functionally comparable to the conference. Similar symptomatic prominence is common with schizophrenic or autistic children (Ferster, 1961). We assume that the autistic child carries out simple repetitive acts until there are significant activities that are successful enough to preempt the erratic nonfunctional activities.

Skinner (1959) compared bizarre or irrational symptomatology to the erratic patterns on the television set when it is not working. The TV repairman deals with the *missing* components of the television set's workings rather than with the details of the aberrant picture. It seems likely, therefore, that any factor which causes a temporary or long-term reduction in positively reinforced ways of acting because of emotional or temporary factors will also produce bizarre or irrational behavior as a by-product.

THE REPERTOIRE OF THE DEPRESSED PERSON IS A PASSIVE ONE

The bulk of the depressed person's activity is likely to be passive, derived from prompts, commands, or other aversive initiatives from other persons rather than freely emitted activities. The reinforcer in the interaction is more likely to be appropriate to the other person's repertoire than to the depressed person. In the face of silence, for example, the depressed person will prompt someone else to speak rather than initiate some activity that is important

to himself. He is more likely to be the listener than the speaker on social occasions. Thus, much of the passive character of the depressed person's repertoire appears to be connected with the preponderance of aversive control applied by others and the absence of positive control derived from the person's own repertoire.

Two kinds of actions may occur when a person faces an aversive situation: direct action, which can alter it, or indirect activity, such as complaints, which simply acknowledges it. For example, if an employer requires more work than can be realistically accomplished, a person might take direct action by making plans for finding another job, collect data about how long it took to do different parts of his job, or confront the employer in a discussion about what realistically could be expected; or the reaction could be indirect if he complained to others about how difficult it was to endure the job conditions and how he wished he had a better job. The two kinds of reactions can also be distinguished by the kinds of reinforcers maintaining the person's activity. In the case of direct action, the performances are negatively reinforced operants, which reduce or terminate aversive stimuli. Such a repertoire is active rather than passive because it alters the environment which is controlling the person's actions. The indirect actions—magical, superstitious, or extended avoidance performances—are passive because there is little chance that they can influence the aversive environment very much even though they are controlled by it. The active person acts on the environment reciprocally; the passive person reacts to the environment as in a reflex.

Another aspect of the depressed person's passivity is the reaction to the other person's initiative in interactive social situations. Person 1, in a normal interaction, for example, says, "I just read an interesting book" and proceeds to tell about it in reply to Person 2 saying, "Tell me about it." Person 2 interrupts or continues later saying, "I found that useful because . . ." or "It sounds so very different from the author's other books, I wonder" In such an interaction there is likely to be positive reinforcement for the behavior of both participants. Two-person interactions may occur, however, in which one person has an active role, the other person has a passive role, and the reinforcer is negative because the passive person emits little behavior or is reinforced by avoiding

some aversive stimulus. Although the behavior of both persons may be reinforced when a depressed person converses with someone else, it is profitable to note the different kinds of reinforcement that govern each person. The speaker is controlling the listener because he is emitting performances reinforced by the listener's reaction; and the listener is controlling the speaker by prompting, reinforcing, and complying. One person is acting flexibly and with initiative, while the other is avoiding the aversiveness of silence or isolation. An allusion appears to be made to the passivity of the depressed person when it is said, clinically, that a depressed person is unwilling to take responsibility for his actions. A person who sulks in the face of difficult interpersonal problems is passive in the same sense as the previous examples. While the sulking sometimes serves as a punishment for someone with whom the depressed person is angry, it has the same magical or extended quality typified by a complaint rather than direct (reinforced) action.

The failure to deal with, avoid, or escape from aversive social consequences characterizes many of the situations that produce depression in a therapy group, such as when someone severely criticized during a previous session fails to attend a particular meeting. The therapist observes that the work is not being done, and the remaining activity has the form of statements or speculations of blame for having injured the missing person. When the therapist suggests that there is some connection between the missing member and the members' inability to work, the conversation turns to the task of clarifying the events surrounding the absence of the missing member, and the group returns to work after the absence is defined. The passivity here lies in the turn to blame and criticisms in the face of the aversiveness the absence of the missing member causes rather than direct action to clarify the detailed circumstances surrounding the event. The therapist's prompt provides enough additional support for a discussion of the actual circumstances of the absence to increase the frequency of performances that are incompatible with blame.

The passive aspects of the behavior in the preceding example concern the kind of behavioral control exerted on the person by aversive stimuli. An active repertoire consists of performances that remove, alter, or escape from the aversive situation. In a passive repertoire, the aversive stimulus pro-

duces magical or extended avoidance; or it disrupts the ongoing repertoire by its aversive by-products.

FREQUENCY OF THE DEPRESSED PERSON'S PERFORMANCE IS THE DATUM OF RESEARCH AND THERAPY

Because a behavioral concept of depression defines the behaviors of the depressed person functionally rather than topographically, the main datum is frequency. The focus on the frequency, rather than topography of a performance, is probably the most important characteristic of a behavioral analysis.

Although a description of a depressed person's repertoire stresses activities he does not engage in, these absent performances are usually parts of his present or potential repertoire, but they occur with a low frequency. On many occasions in the past he has dressed, traveled to work, completed his job, and engaged in many performances reinforced by their interpersonal effects. The problem is that the current conditions do not support the activities of which he is potentially capable. A topographic description of the depressed person's repertoire does not distinguish it from the normal one. Almost any item of conduct observed in a depressed person can be seen at one time or another in a nondepressed person. The depressed person is distinguished from one who is not depressed by the relative frequency of these performances in the total repertoire. Most persons, at one time or another, while looking quietly out of a window, say "That was a dumb thing for me to do." They can, at times, be sad, unhappy, or dejected, or lose interest in an activity. In any one of these instances it may not be possible to distinguish them from a pathologically depressed person.

The Basic Behavioral Process Which Contributes to or Reduces the Frequency of a Person's Conduct

Since the common denominator among depressed persons is the decreased frequency of many different kinds of positively reinforced activity, we cannot expect that there will be one cause of depression or a single underlying psychological process, because behavior is a product of so many psychological processes. Using the analogue of genetics, the dependent variable of depression—frequency—is a phenotype that can be caused by a variety of

environmental conditions (genotypes). When we understand all of the processes that can reduce the amount of positively reinforced behavior, we can begin to identify how the person's physical and social environment provides the conditions responsible for them. Although there is considerable argument about how much depression is caused by endogenous factors (such as hormones or neurochemicals) and how much by the environment (internal conflicts and sudden losses) (Beck, 1967, p. 65), the purposes of a behavioral analysis are best served by avoiding the distinction except insofar as functional analyses of the behavior are different. Whatever the physiological substrate of the depressed person's repertoire, we still need to know the functional relation between the behavior and the environment that prompts, shapes, and maintains it.

In most general terms, the processes of behavior fall into three categories: (a) the reinforcement of behavior that explains its origin and cause; (b) its continued maintenance despite infrequent and often uncertain (intermittent) reinforcement; and (c) its selective control by those parts of the physical and social environment that signal the occasions when it can be reinforced.

A LIMITED REPERTOIRE OF OBSERVATION LEADS TO A LOW FREQUENCY OF POSITIVE REINFORCEMENT

Depressed repertoires are commonly clinically categorized as having a distorted, incomplete, and misleading view of the environment. The indications range from hallucinations and delusions, distortions of body image and physical appearance, distortions of the depressed person's competence, exaggeration of errors, complete inability to evaluate the way other people see him, a tendency to take the blame for events for which there really is no responsibility, and a limited and hopeless view of the world. Behaviorally, such a description also alludes to a low frequency of positive reinforcement because so much of the depressed person's activity occurs so inappropriately that it cannot be reinforced. If a person's every act occurred under the circumstances where it could be effective, reinforcement would occur maximally. Conversely, if a person cannot observe the environment around him accurately (the environment does not control the performances that will activate it), much behavior will be unsuccessful and will go unreinforced, thereby

contributing substantially to a depression. Three aspects of the patient's repertoire, from a clinical point of view, bear on the technical behavioral analysis. The patient has (a) a limited view of the world, (b) a "lousy view of the world," and (c) an unchanging view of the world (Chodoff, 1973).

A limited view of the world refers to the differential control of the social and physical environment. Patients' behaviors are not appropriate to the changing circumstances in the external environment. Thus, for example, a person may pout, complain, or sulk in circumstances where he had but to interact along the lines where he needed assistance. We cannot assume that the depressed person actually sees very many of the features of the social world around him. William James' "bloody, blooming confusion" might be the most apt characterization of the depressed person's view of the world.

The lousy view of the world describes the aversive consequences of not avoiding aversive situations, perhaps by not being able to see the environment clearly enough. One aversive condition could be the inability to behave appropriately to a particular environment. Another could be the lack of the repertoire by which one can act effectively and positively without engendering punishment by being aversive to other people.

The unchanging view of the world appears to refer to the processes, probably stemming from the person's developmental history, that prevent the normal exploration of the environment and the clarification and expansion of the repertoire that comes from such exploration. These developmental arrests seem to be the same as the fixation of personality development described psychoanalytically. Behaviorally they would be described as factors that block the cumulative development of a repertoire.

Despite the usefulness of these clinical (and mentalistic) descriptions of the depressed person's observational repertoire, there are distinct advantages of a behavioral account of the same events and circumstances. A behavioral analysis requires that we talk about how the environment prompts and otherwise controls a person's activity rather than our accustomed patterns of talking about perceiving the inside and outside world. Nevertheless, the event that influences the person is the same in both the clinical and behavioral descriptions how-

ever we may talk about them. The behavioral description is more useful than the mentalistic one because it uses more objective details of how a person comes to act distinctively toward the various features of his inside and outside environment. An objective view of clinical interactions can lead to procedures with a larger rational component.

FACTORS THAT BLOCK THE CUMULATIVE DEVELOPMENT OF A REPERTOIRE

Ideally, normal growth and development represent a continuous approximation of a complex repertoire. Should there be a hiatus in development, because contingencies of reinforcement are not consistent with the person's currently emitted behavior, the failure becomes greater because the lack of contact with the current environment reduces the frequency of behavior and prevents the further development of the repertoire. Examples of developmental arrests are most prominent in infancy and early childhood because these are the times when the child's repertoire is rapidly increasing in complexity, even in such commonplace acts as feeding. In the normal process of feeding, whether by breast or bottle, the infant engages in an active interplay with the mother. The child's activities are, from moment to moment, successful or unsuccessful, as conditions change. Behavior that successfully meets the characteristics of the mother and the relevant features of the physical environment produces physical contact and food, which in turn increases the child's competence. The adjustment between the child and mother is usefully thought of as a teaching device from which the child's view of the mother and the physical environment evolves. The sight of the approaching nipple, for example, becomes an occasion that prompts the child to open his mouth as a result of his early activity with it. It is problematical whether the child would in any case notice the mother or be influenced by her if there were not some activity whose outcome were not influenced by some characteristic of her presence. Even the simplest act, such as the child moving his fingers across the mother's arm or touching his blanket, is subject to the same kind of differential reinforcement. The visual characteristics of the blanket or the mother's arm come to control the moment of contact between the hand and blanket or skin. The differential reaction of the mother, such as the way

she acts in return, further distinguishes the occasions on which the child acts on the mother and enlarges the child's perceptual capability.

Development of the child's perceptual repertoire may be interrupted if there is a serious interference with or interruption of the reinforcers maintaining the child's activities. A child, for example, may experience difficulties in feeding which prevent the give-and-take which normally makes food intake a natural result of a continuous interaction with the mother. The mother may not be aware of the flow of milk from the bottle so that the milk passively pours down the child's throat, or the flow might be so slow that it requires such magnitudes of sucking that the movements are not reinforced. A mother who does not react to the tension and relaxation of the child's muscular posture will fail to reinforce the child's movements as he adjusts his posture to produce greater body contact with the mother or to escape from discomfort when the mother produces physical strain because she is holding the child like a "sack of potatoes." Not only is there a loss of repertoire that would normally emerge from the successful reinforcement of these interactions, but there is a corresponding lack of perceptual development. The child who does not interact in close correspondence with his mother as she holds him also does not learn to observe the nuances that prompt and cue the interactions.

When an important performance is not reinforced, an important by-product may be a large-scale emotional reaction. Not only are such reactions momentarily disruptive, but they also influence the parent so much that the parental reaction reinforces the child's atavistic actions.

The child who does not receive food from his mother satisfactorily enough to satiate the underlying deprivation, or one who experiences collateral aversive effects such as choking or extreme physical constraint, may react emotionally. Such activities in turn generate a reaction in the parent, who may either remove the aversive situation by providing the food, or react emotionally (in return) in direct response to the child's elicitation. The result in either case is an increase in frequency of the rage and frustration because of their influence on the parent. Not only does a primitive, atavistic mode of dealing with the parent become a prominent part of the child's repertoire, but it indirectly blocks the enlargement of the child's perception of his world

because the diffuse emotional responses are prepotent over the smaller magnitude component activities of a normal interaction.

The behaviors involved in such disruptions appear to be the same ones described psychodynamically along the dimensions of primary to secondary process. The shift from primary to secondary process appears to describe the adjustment between the child's current behavior and his progressive adjustment to the complex features of his social environment. The child whose interactions with his mother are primarily associated with his own deprivations reinforced because his actions are aversive to her is ultimately blocked from developing an adequate perception of other people, and hence adequate ways of interacting with them interpersonally (secondary process). The child who fails to come under the control of the nuances of the mother's behavior is progressively left behind in his development of interpersonal behaviors, and whole sectors of interpersonal reactivity are not available to him as a means of commerce with the external world, much along the lines of the classical connotations of the fixation of a personality at a particular stage of development.

Such failures in the perceptual area may at once suggest some causes of some kinds of depression and at the same time a means of ameliorating them. Behaviorally, the most general way of increasing the perceptual repertoire is to begin with simple activities whose reinforcement is reliable but not so invariant that there are not some circumstances where the performance is appropriate and others where it is not. The reinforcement of the performance on one occasion and its nonreinforcement on another teach the person to observe the appropriate features. The most important element, however, is an increase in the person's tendency to act positively on the environment rather than to react passively and emotionally.

A useful schedule of reinforcement, applicable to such a problem, is the differential reinforcement of other behavior. The increase in frequency of reinforcement behaviors other than primitive or atavistic activities eventually decreases their frequency by prepotency and nonreinforcement (Ferster & Perrott, 1968). Ideally, a therapeutic interaction with a psychotherapist simulates just such a differential reinforcement of other behavior when the therapist observes and functionally analyzes the current verbal and emotional activity. By his re-

actions and questions he reinforces selected parts of the patient's current interaction. Many of these behaviors constitute the patient's talking about or otherwise observing his activity. Although the ultimate goal of therapy is the patient's activity rather than his talking about it, the verbal action serves an important function. First, it is an increase in general verbal activity which of itself could be of practical use. Second, it becomes a means for the patient to observe his own activity because speech is differentially reinforced (by the therapist) in relation to his own activity. Third, the patient's descriptions of his own primitive reactions to aversive or thwarting situations may prompt more effective ways to escape or produce positive reinforcers, when he observes the incompatibility between what he is doing and what he can say about it rationally. Such talking about one's own behavior needs to be quite durable and of a high frequency before it can be incompatible with and preempt more primitive, less effective forms of conduct.

SCHEDULES OF REINFORCEMENT

A schedule of reinforcement is as important a factor influencing how frequently a reinforced act will occur as any other behavioral process. Performances that occur stably when reinforced frequently will weaken under intermittent reinforcement. Not only does intermittent reinforcement usually reduce the amount of behavior generated by reinforcement, but the kind of intermittency will influence how frequently the act occurs.

Schedules of reinforcement requiring large amounts of behavior to produce the relevant change in the environment (e.g., fixed-ratio schedules of reinforcement; Ferster & Skinner, 1957; Skinner, 1938) are those which are most susceptible to loss. Most work activities are of this sort. A relatively fixed number of shovels of dirt are needed to fill a hole. The critical factor is a fixed and large amount of activity required for each reinforcement. Calling on a large number of persons before consummating a sale, studying all semester for a final examination, working on a term paper, writing a novel, persuading someone, carrying out an experiment which requires long and arduous procedures without indication of success before completion, dealing with a difficult therapeutic encounter where much thought and stress go into

small indicators of progress, and routine housework which may require a fixed and large amount of repetitive work, all exemplify a schedule of reinforcement which can potentially weaken the behavior severely. The result is frequently seen as an abulia in which the novelist, for example, is unable to work for considerable periods of time after completing the previous work. The effects of such schedules of reinforcement are hard to observe at times even though the predominant result is long periods of inactivity. The parallel to the manic side of depression comes immediately to mind. The enormous influence of such schedules of reinforcement apart from the reinforcer or the associated deprivation is conveyed by animal experiments in which a pigeon, for example, pecking for food on a schedule requiring a fixed number of pecks per reinforcement, will starve to death because the bird does not peck often enough to produce the amount of food needed to sustain him. Yet the same bird, when exposed to a variable schedule of reinforcement, sustains its activity easily even when the amount of food received does not meet the bird's metabolic requirement.

It is tempting to speculate that this particular schedule of reinforcement exemplifies the middle period of life when most individuals settle down to a routine in which there is a constant steady work requirement as opposed to the variability in quality and amount of work that occurs as one prepares for a career or to climb a career ladder. Perhaps relevant here is the classical phenomenon of the professional, highly successful in his work, who on reaching the pinnacle of success undergoes a profound depression. The upwardly striving person is one whose schedules of reinforcement are variable, sometimes requiring large amounts of activity for reinforcement and at other times requiring less. Such variable schedules of reinforcement are much less likely to produce low frequencies (strain) than the schedules associated with a stable work situation in which day in and day out there is a constant amount of activity associated with the required accomplishment.

CHANGES IN THE ENVIRONMENT

Where is an organism's behavior when he is not engaging in it? Where is the patellar reflex when it is not being elicited? Where are the reminiscences that occur with a close friend when the

friend is absent? From a behavioral point of view they are in the repertoire, as potential actions which can occur at some time under some circumstances, like an unconscious or suppressed activity. The changing availability of our potential activities is not limited to unconscious or suppressed activities, however. Ordinary day-to-day activity occurs appropriately to the circumstances where it has been and can be reinforced. An unlikely place and unfamiliar surroundings will generate very different thoughts than the accustomed places. Large and sudden changes in the environment, such as the death of a close companion, may produce a loss of behavior. It is even possible to conceive of sudden changes which may virtually denude an individual of his entire repertoire, as, for example, the death of a close companion to a secluded spinster. The seclusion of her life produces a situation in which all of her conduct is so narrowly under the control of her companion, that her sudden death removes the support (reinforcers) for virtually all of her activity.

A case history of an autistic child illustrates the same process. The nearly psychotic mother of a four-year-old girl hired a teen-age babysitter to take care of her daughter for almost a year. Although the mother remained in the house during the whole year, during which time the babysitter took care of the child, she abdicated control to the babysitter completely by having literally nothing to do with the child. For example, if the child said, "Mom, can I have a cookie?" there would be no answer; if she said, "Janet [the babysitter], could I have a cookie?" Janet said yes and gave the child the cookie. If the child said, "Let's go outside," the mother did not answer. Janet, on the other hand, might reply "Okay" and take the child outside. Such interpersonal interactions are functionally identical to the standard pigeon experiments in which the pigeon produces food by pecking a key. When reinforcement depends on the color of the light illuminating the key, the pigeon's pecking is brought under the control of the colors by withholding reinforcement on one occasion and allowing it to occur on the other. When the key is red, pecks do not produce food and hence decrease in frequency. Pecking continues with the green color because these pecks continue to produce food. Such control of the bird's behavior by the environment makes it possible to alter its repertoire rapidly by simply

changing the color of the light behind the key. The mother and the babysitter could be analogized to the red and green keys in the pigeon experiment. The babysitter's presence (the red light) defined an occasion during which any kind of verbal request of nonverbal interaction had a normal effect. When the babysitter left the child alone with the mother at the end of the year there was a loss of almost all of the child's repertoire. She became incontinent, could not be kept in the nursery school, and lost her speech. There is a similar functional parallel between the behavior of the spinster and its control by the presence of her companion.

The normal processes of growth and development, particularly during middle age, occur during a time when similar important changes in life's circumstances take place which require corresponding changes in a person's repertoire. The physical changes associated with aging and normal development can have a major influence on the kinds of positive reinforcement that are possible. Hormonal changes, and the associated changes in amount of sexual activity, are one important area of change. Another area of change lies in the overall physical capacity for work and physical exertion. Even behaviors reinforced by ingesting food become less available as a rewarding activity because decreased physical activity reduces the metabolic requirements of most middle-aged people. Ironically, a person who has worked for years to afford bountiful, rich, and tempting foods cannot partake of them because they would produce obesity. Even important social interactions, which in so many cultures surround food and eating, become stressful or less frequent because of limitations of food ingestion or because of disease or decreased metabolic need. Disease or other kinds of physical incapacities may reduce the change of performances that are possible for the middle-aged or older person.

Retirement may impose a very drastic change in an older person's environment, opposite to the problem facing the adolescent. Just as the adolescent faces a complex world for which he does not yet have an adequate repertoire, the older person also encounters a new environment which needs an entirely new repertoire for its reinforcement. Activities like reading, political or club activity, and personal leisure interactions need a special past history before they can sustain themselves. Some persons' intensive specialization in a particular oc-

cupation may generate a repertoire too different to make contact with the possibilities of a retirement environment. A successful transition depends on whether the retired person has a sufficient repertoire to make contact with the environment of retirement. The problem is doubly complex because the transition may be so sudden.

ANGER AS A FACTOR IN DEPRESSION

Anger, a frequent reference in clinical descriptions, is commonly said to contribute to depression as a by-product of its frequent and severe punishment by parents and others. To understand behaviorally how the punishment of anger can be an important factor in depression, we first need to describe anger as an operant performance which has a large impact on the other person and, second, to understand the processes by which punishment reduces the frequency of the punished act.

Angry or aggressive acts tend to be performances reinforced by the injury or loss they produce to another person. It is tempting to overlook the operant characteristics of anger because it is so often ineffective (and repressed). Angry acts which do not appear to act on others like operant performances are probably extended from past experience of related behaviors which did effectively injure. The injury may be physical, as in a direct attack on the person, or it may be a loss of reinforcers by an attack on property; a withdrawal of attention as in ostracism in the extreme case (or sulking); criticism which is functionally equivalent to a withdrawal of reinforcement; or insult and blame, which are functionally equivalent to a loss of social reinforcement and approval.

Angry or aggressive acts are defined as a class of performances, identified, not by their topography, but by the way they influence another person. Colloquially, the term *aggressive* may refer either to vigorous and pronounced effect of a performance or the injury it produces. Clinical examples tend to refer to acts that have both properties at once. Aggressive acts are frequently disguised or "softened" because a "naked" aggressive act will produce such a large aversive reaction. Sarcasm exemplifies one kind of softening; aggressive humor is another. The form of an aggressive remark may be as unobtrusive as a tendency to comment on the unfavorable aspects of another person's con-

duct, either by criticism or by especially noting unfortunate occasions.

Since aggressive acts are aversive to others by design, their punishment is the rule rather than the exception. Experimental psychology contributes to our understanding of this problem by knowledge of the characteristics of the punishment process. There is some dispute in the psychological literature about whether punishment can directly reduce the frequency of the punished act, as in an algebraic subtraction (Azrin & Holz, 1966) or whether the reduced frequency is *always* a temporary suppression. However this dispute is resolved, it is clear that punished acts are frequently suppressed rather than eliminated from a person's repertoire. The process is illustrated by the child, facing a piece of bric-a-brac, who has been punished for playing with it. The tendency to play with the attractive but fragile toy induces the child to put his hand behind his back. Or the child in school, provoked to laughter by his classmates or a classroom event, bites his lip to the point of pain because the teacher would punish laughter. Both of these performances prevent the punished act because they are incompatible with it. Thus, the smiling and the reaching for the piece of bric-a-brac may remain intact in the repertoire, but with a reduced frequency because any incipient tendency creates an aversive situation whose removal reinforces and increases the frequency of the incompatible performances, such as putting the hands behind the back or biting the lip.

The consequences of such suppression might not be serious if it were limited to one specific act, but the more likely situation is the suppression of the generic class of behaviors, of which the particular act is an example. Someone who becomes angry with another person, besides being inclined to injure, is also confronting him about the situation causing the anger. The punishment of the single act of anger is not nearly as serious as the resulting disinclination to confront others over the interpersonal causes of anger. The phenomenon of psychodynamic suppressions appears to be a close analogue to the examples of everyday children's behavior, except that the performances tend to be verbal. As a word, a phrase, a thought, or an association comes into consciousness (behaviorally we would say, as its probability of emission increases), there is an automatic reinforcement of incompatible behavior. The repression, according

to this process, is an actual activity or performance with a certain persistence and frequency which will occur in a dynamic balance with the punished or anxiety-provoking performance. Because the behaviors that actually suppress the punished acts are a prominent and frequent activity that do not serve any useful function in a person's commerce with the external environment, it subtracts from the finite amount of activity of which a person is capable. The metaphor of a fixed amount of energy which may be apportioned to the repression activity or the external world seems to convey the sense of the behavioral analysis. The repression of punished behavior appears to be a potentially serious contributor to depressions because it commits such a large part of a person's repertoire to activities that do not produce positive reinforcement.

SUPPRESSED ANGER IMPLIES A LOSS OF IMPORTANT SOCIAL REINFORCERS

Because angry or aggressive acts are injurious to the person they are directed at, an important by-product is a loss of reinforcers. There is an obvious incompatibility between acting to injure someone and expecting him to provide positive events in a social interaction. Depression also functionally insulates the person from the vigorous counterreaction it is likely to evoke. Repressed and fantasized forms of anger are much less likely to be punished than overt forms. The usual experience is likely to be an aggressive counterreaction in addition to the loss of reinforcers. It is easy to conjecture vignettes from a child's developmental history in which a parent significantly withdrew from a child, perhaps, totally in the face of his anger. The effect on the child is exacerbated because the withdrawal of reinforcers may increase the child's anger and emotionality, leading to further instances of loss of parental attention, affection, and ordinary items of daily support.

Anger automatically has some of the properties of a "time out," a technical behavior term which describes a specific occasion during which reinforcement is discontinued. The aversiveness of anger because of the loss of positive reinforcement is equally serious even when the angry acts do not influence another person adversely because they are suppressed. Common experience undoubtedly provides many instances that demonstrate and reinforce the incompatibility of being angry at some-

one and expecting positive interactions to continue normally.

The emotional impact of anger, hence its contribution to depression, may also be increased because it comes to function as a "preaversive stimulus"—in this case preceding the loss of positive reinforcement. Such preaversive stimuli, in classical animal experiments, markedly reduce the frequency of the ongoing operant behavior in the sense of an emotional change—a state of the organism which has a global effect. There is every reason to expect that the same process operates under the comparable conditions in human behavior.

Implications of a Behavioral Analysis for Therapy and Research

HOW A VERBAL INTERACTION WITH A THERAPIST CAN INCREASE THE FREQUENCY OF THE PATIENT'S BEHAVIOR ELSEWHERE

Even though conventional therapy primarily involves speaking and listening among several people, a functional analysis of the interaction suggests how an augmented verbal repertoire developed with the therapist can increase the frequency of positive reinforcement elsewhere. The augmentation can occur because a general increase in verbal activity is a means of achieving an accurate view of how the environment works. An accurate view of how the environment works will husband behavior for those occasions when it can be effective and prevent acts that will cause trouble because they occur in inappropriate occasions. The process is clearer behaviorally because of the emphasis on a performance whose reinforcement occurs on one occasion and not another.

Probably the most important way that we learn to observe the environment is to comment on it and describe it verbally. In fact, many kinds of distinctions critically important for human functions can only occur verbally (Skinner, 1957, p. 109). The low frequency of verbal activity, other than complaints, is a serious impediment to an improvement of the depressed person's limited and often distorted view of the world. A person who does not talk to other people very much will not be exposed to the differential reaction that occurs when audiences react differently. Much conversation may go unreinforced when it is inappropriate

to a particular person or to a particular person at a certain time. Such intermittent reinforcement, an inevitable by-product of the process by which the environment is differentiated into its functional parts, may also contribute to a weakening of the verbal behavior. In summary, persistent verbal activity is important because observation of the environment depends on a high enough frequency of interacting with it so that the successful reinforcement of the performance on one occasion and its unsuccessful reinforcement on another occasion eventually tailor it to the environment in which it can be reinforced.

The reader may ask, of course, which came first, the depression in which the person is unsuccessful because he acts without regard for the circumstances or not enough verbal activity that can be used to discover the characteristics of the environment on which the verbal behavior operates. Obviously the two are inexorably tied together. Without actively engaging the environment, there are no means of distinguishing its different parts; without a means of distinguishing the different parts of the environment, reinforcement of the performances cannot be reliable.

A HIGHLY DISCRIMINATIVE VERBAL REPERTOIRE PRODUCES CONDITIONS FOR ALTERING THE ENVIRONMENT

The highly passive character of the depressed person's repertoire is closely connected with the lack of verbal activity and its accompanying lack of clarity about the social environment. The relationship is illustrated by a paranoid reaction to an everyday innocent incident, which is incompatible with a substantial amount of talking about the related events. The shift from primary to secondary process in the development of a child and in psychotherapy is another example closely related to the development of the person's ability to talk accurately about the events that govern his life. An unperceived aversive stimulus disrupts a person's behavior; as soon as verbal performances about the aversive stimulus develop, performances become possible, other than a diffuse emotional response, such as those which terminate or remove the person from the aversive influence. For example, a person may passively and covertly interfere with another person's work or interpersonal relations without his being aware of it (i.e., his being

able to talk about it). When the method of interference becomes openly identified, however, there are many ways of preventing or avoiding it. Examples illustrating this kind of control are common in the interpersonal dynamics of many families where a member may be unaware of the source of disruption because the activity of the person who is causing the acting out is disguised. When the real source of the disruption is observed, effective action becomes possible. Group therapy provides other examples (Ferster, 1972).

A CLARIFICATION OF THE MEANING OF THE TERM BEHAVIOR

Many clinical writers, when they talk about the *behavior* of a person as a surface manifestation of inner processes which are the important determiners of a person's conduct, appear to use the term behavior very differently than behavioral writers. An analysis of behavior is taken to be the study of a collection of reflexes. The "functional analysis of behavior" (Skinner, 1957) of many practitioners of the experimental analysis of behavior, however, implies a systematic description, closer to the clinical than to the Watsonian concept, because the significance of a person's activities is understood by the way it operates on the environment, including, of course, both sides of his skin. Thus, one person who talks compulsively and another who leaves the room as soon as an unfamiliar person enters may be acting in identical ways, even though the acts are very different behaviors from a man walking for exercise, even though the topographies of the two activities are virtually identical. Their behavioral significance is largely derived from the reinforcers maintaining them, rather than their overt form.

Thus, the clinical and behavioral descriptions share the purpose for which they are intended. The behavioral description is not different from a clinical one because it describes different events, but because the components are described objectively into separate components: (*a*) circumstances currently present, (*b*) the person's activities, (*c*) the consequences of the person's acts both inside and outside of his skin, and (*d*) the functional relation between the component events.

What the clinician calls the underlying causes of behavior, the experimental analyst calls a functional analysis of the behavior. A description is

behavioral not because it differs from a clinical interpretation but because the component events of the episode are described as would be the case for any other natural occurrence. Clinical descriptions, using the personal reactivity of both the therapist and patient, have the advantage that they can occur instantly, like a barometer, to register important human events without the necessity of an intellectual functional analysis. As such, they provide the data and objectives for an experimental analysis of behavior. Much research in the area of depression deals with topographic aspects of the depressed person's repertoire such as muscular tension, reaction time, formal characteristics of handwriting, pursuit rotor performances, and paper-and-pencil tests.

Perhaps the tendency to dichotomize "behavior as a syndrome of important events elsewhere" and valid clinical phenomena is one of the reasons why these very indirect and somewhat remote indicators of real events are used rather than direct measurement of relevant phenomena.

The behavioral analysis of a human event into a performance and its effect on the environment does not preclude data like the patient's self-evaluation (Beck, 1967, p. 177). The way a depressed patient talks about himself is an important class of factual information, and it becomes nonbehavioral and unobjective only when it is taken as symptomatic of events elsewhere rather than as an activity of importance in itself. A behavioral analysis of the patient's self-evaluation stresses its functional relation to the person the patient is talking with or to whom he is complaining about himself (Ferster, 1972).

It is possible to measure valid clinical phenomena in the natural environment with the objectivity of paper-and-pencil tests and tests of motor behavior if the events are defined functionally and described as objective aspects of performance and the environment. What prevents objective description of the natural environment is a systematic basis of observations rather than its inherent complexity. A motion picture camera could record a complex humorous event completely, for example. What is lacking is a concept of human nature, like that of a functional analysis of behavior, which can make the description of interrelations between the events as objective as the record of the events themselves, and a way of taking historical factors into account. The aspects of mental life believed heretofore to

be inaccessible to objective descriptions can now be uncovered by recording the functional relation between the objectively observed components of the patient's activity, including the interpersonal effects of the patient's performance. A functional analysis of the patient's behavior into generic classes of activity, defined by their function (reinforcement, past or present), has the potential of reducing the mass of data presented by a clinical episode to manageable records of frequency.

Some starts in this enterprise have already been made (Lewinsohn, 1969; Lieberman, 1970), and the results appear to be valid and successful. Perhaps the near future will see the continued application of objective measurement validated by the intense concentration on the fine-grain analysis of the individual patient that has exemplified psychoanalytic research.

Conclusion

Behavioral and clinical concepts are combined here as a method of uncovering the actual events of psychopathology and the procedures of therapy, rather than an attempt to reconcile or bridge the gap between the conflicting chains of the two camps. The effectiveness of the psychodynamic procedures is probably considerably more than the behavioral psychologists claim and considerably less than would be expected from the huge amount of psychotherapy that occurs in the United States.

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Proposed Bylaws Amendments

At the meeting of August 27 and 30, 1973, the Council of Representatives approved the following recommendations from the Membership Committee and the Board of Directors:

Amendment to Article II, Section 8, of the APA Bylaws to clarify the conditions under which an associate of the American Psychological Association is advanced to full membership by deletion of the word "automatically" which causes confusion as it seems to contradict the fact that an evaluation of eligibility is involved.

Amendment, to be submitted to the membership, of Article XVIII, Section 7, of the APA Bylaws to permit the exemption from dues of a member who has been totally and permanently disabled. The Council further voted that, if this amendment is

approved, a Rule of Council would specify that the determination of disability would be by an employer or by the Social Security Administration.¹

ARTICLE II, SECTION 8

Associates who meet the standards for Member status will, upon application, [automatically] be advanced to Member on the January first next following the *deadline* date of application for such advancement

ARTICLE XVIII, SECTION 7

Any *Fellow, Member, or Associate* who has reached the age of 65 and has been a member of the Association for at least 25 years, *or, regardless of age or length of membership, who has been adjudged totally and permanently disabled*, shall be exempt from dues.

¹ Bracketed material is deleted; italicized material is added.