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THE APPLICATION OF BEHAVIOR MODIFICATION TECHNOLOGY TO
THE ALLEVIATION OF SELECTED SOCIAL PROBLEMS¹

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ABSTRACT

The application of behavior modification technology to the alleviation of various social problems is reviewed. Specific items discussed are: energy consumption, pollution control, token economies, architectural control of behavior, welfare, worker performance, social action, crime, and social integration. Where relevant, specific studies are summarized. Future developments and implications for social work practice are reviewed briefly.

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Introduction

Under the rather general label of behavior modification a highly potent behavior change technology is being developed (Bergin and Suinn, 1975; Feldman and Wodarski, 1975; Kazdin, 1975; Thomas, 1974). Technological development in this area has focused largely on changing behavior on the individual level of analysis and to a lesser extent on the group level of analysis which has been characterized by individual programs carried out in group contexts to remedy problem behaviors, rather than through the use of the group as a vehicle of change. Moreover, only a few applications of this technology have been made at organizational, institutional, and societal levels (Lind, 1967; Fellin, Rothman and Meyer, 1967; Arkava, 1974; Luthans and Kreitner, 1975) even though it appears obvious that in order to change behavior and to insure its maintenance such applications are necessary since our laws, norms, and customs specify contingencies for the society as a whole as well as for each of the reference groups to which we belong. These contingencies substantially influence and determine the behaviors we exhibit in specific social contexts. Focus on these levels, therefore, should insure the maintenance and the generalization of behavioral change exhibited by individuals in individual or group interactional situations (Kazdin, 1975). Furthermore, the inclusion of this level of analysis will enable specification of the distribution of reinforcers and punishments by various societal units as well as determine how these units control behavior. Behavior modification theory applied at this level should expedite the solution of such various societal problems as excessive energy consumption, pollution control, economic systems dysfunctions, welfare reform, worker performance, social action, illegal behavior, and social integration, all of which this manuscript will address in a review of many of the pilot efforts made in these areas of research. The upcoming years will witness a greater sophistication of applications and inclusion of variables which will make the control of these behaviors more feasible.

Basic Assumptions of the Social Behavioral Model

The assumption is made that laws of social behavior can be formulated. The desire is to isolate those variables that control behavior and formulate descriptive statements about the operation of those events which control behavior. It is postulated that once these variables are isolated the worker can modify the behavior. Behavior is controlled by the events that occur before the behaviors (antecedents) and consequences that occur after the behavior. Depending upon the situation, either or both of these concepts are utilized in the modification of behavior.

Behavior is defined in terms of observable events in such a manner

that two individuals can agree the behavior has occurred. Likewise, behavior is defined in such a manner that it may be counted in terms of rates per unit of time, and the interest is on changing probabilities of behavior (rates) occurring in the future. Baselines are secured on all behaviors in order to enable evaluation of whether the influence strategy has been effective. The one characteristic of behavior modification technology which differentiates this approach to changing behavior from others is the emphasis placed on the provision of data to facilitate the evaluation of whether worker interventions produced the desired behavioral change.

For the purposes of this manuscript, social entities such as groups, complex organizations, social institutions and so forth are defined as social units that can be characterized as being composed of a series of interconnected reinforcers and punishers and which consist of a plurality of individuals who can control reinforcers, both positive and negative, for each other regardless of the size of the unit and in many instances for other constituencies (Arkava, 1974). The social entities communicate the conditions of reinforcement and punishment, i.e., consequences, through the provision of discriminative stimuli to individuals. Formal discriminative stimuli of social entities are: contracts signed, policy, manuals of rules and regulations, informal norms and folkways of the entities, and so forth. For example, through taxation governments secure a generalized reinforcer from individuals' money and then welfare departments and other agencies redistribute these reinforcers through guidelines (contingencies) set forth by Congress. There is no desire to de-emphasize the complexity of this process, but for the purposes of this manuscript this definition suffices. In the future a more sophisticated model will include other essential variables.

Energy Consumption

One area in which behavioral analysis will be indicated in the next decade is energy consumption. In a pilot study conducted by Wodarski (1977) a four-member household provided the site for the experimental study. The experimental group went through a standard A,B,A,B, design with a follow-up baseline period. A unique measurement system was employed to monitor the amount of time that the television, stereo, radio, oven and heat were used. A point system was devised which consisted of various contingencies and utilized such reinforcers as food; savings, i.e., money deposited in the bank; nights out on the town, including steak dinners and movies; enjoyable activities such as camping and hiking; and so forth and was used to modify consumption of electrical energy. A significant reduction in the use of electrical power was noted during all the periods in which the reinforcement system was utilized. Unfortunately, however, the behaviors were not maintained during the follow-up period. These preliminary data and additional data provided by other investigators indicate that behavior modification

techniques can be utilized to temporarily reduce electrical, natural gas, and fuel-oil energy consumption in a typical household (Kohlenberg, Phillips and Proctor, 1976; Winett and Nietzel, 1975; Kohlenberg, Phillips, and Proctor, 1976; Hayes, and Cone, 1975; Kagel, Battalio, Winkler, and Winett, 1975; Seaver and Patterson, 1976). Furthermore, the implementation of behavior modification techniques was fairly easy and accepted by all members. However, results of the study point to two problems, the need to employ a maintenance procedure once behavior change is achieved and consideration of larger social variables in controlling behavior. While at the same time the family significantly reduced their electrical consumption, the power company increased the general rates by 20%. A societal contingency was imposed on the family which served to punish their attempts to conserve energy. It seems that if indeed there is an energy crisis, then power companies should utilize incentives for people to reduce their electrical consumption rather than penalize them for reducing consumption. However, one could also argue from a behavior modification perspective that as the cost of energy use increases the utilization will decrease accordingly (Ehrlich and Ehrlich, 1974; Winett, 1976).

Pollution Control

In the last few years there seems to be an increasing interest in the use of behavioral analysis to help solve environmental problems such as littering, the lack of citizen participation in mass transit, and the use of non-returnable bottles (Robinson, 1976). Clark, Burgess, and Hendee (1972) and Burgess, Clark, Hendee (1971) were able to modify littering behavior both in a forest campground and a movie theater. In both instances positive reinforcement, i.e., money, comic books, gum, Smokey Bear shoulder patches and so forth were utilized to increase the number of bags of litter that children turned in to a specific area. Likewise, Powers, Osborne, and Anderson (1973) were successful in increasing litter removal in a national forest through the use of a small monetary reward and Kohlenberg and Phillips (1973) increased the deposit of litter in urban parks through the use of a ticket that could be exchanged at the concession stand for a soft drink. The ticket was provided after a litter deposit occurred. Individuals were made aware of the contingencies as they entered the park through a sign which read, "At times persons depositing litter in containers will be rewarded." Chapman and Risley (1974) were moderately successful in reducing the litter in a high-density urban neighborhood and found the most effective contingency in increasing anti-litter responses was a monetary payment for clean yards. Baltes and Hayward (1976) reduced littering at two college football games through the use of monetary incentives and visual prompts. The provision of litter bags with an appeal not to litter had little effect on the behavior, however.

Geller, Farris, and Post (1973) increased the use of returnable

bottles through passing out handbills designed to prompt the purchase of soft drinks in returnable rather than throw-away containers. The handbills provided a rationale in terms of environmental benefits for encouraging purchase of returnables. Likewise, paper recycling was increased through the use of incentives. For every pound of paper individuals who recycled paper were given a ticket which enabled them to increase their chances of winning a prize. Contests where groups of dormitory students could win \$15 for the most paper saved were also successful (Witmer and Geller, 1976). Subsequent research has continued to show littering behavior can be decreased and recycling increased by providing explicit instructions on how to dispose of the litter, monetary payments, and conveniently placed disposal and recycling containers (Geller, Witmer, and Orebaugh, 1976; Reid, Luyben, Rawers, and Bailey, 1976).

In regard to increasing the use of ecologically focused modes of transportation, Everett, Hayward, and Meyers (1974) used token reinforcement procedures to increase the busridership on a college campus. Utilizing a token system in which individuals could exchange tokens for ice cream, beer, pizza, coffee, cigarettes, movies, flowers, records, and so forth at various designated business establishments resulted in a 150% increase in ridership. With the exception of these few research projects, the use of behavior modification in the environmental movement remains a relatively unexplored area of research. However, these preliminary data do indicate that specific reinforcement contingencies can be utilized to effectively control pollution behavior of individuals. Future research endeavors should isolate what combination of techniques yields the best results in terms of reducing pollution. Questions to be answered through future investigations will pertain to whether punishment of undesirable behavior is adequate, whether positive reinforcement for anti-pollution behavior is adequate, or whether a combination of these two techniques is more efficacious. Additionally, the role played by significant models in either producing or reducing pollution behavior will have to be determined as well as what type of observational procedures are necessary to ensure the conservation and improvement of our environment (Christophersen, Doke, Messmer, and Risley, 1975; Willens, 1974).

Token Economies

Present monetary policies of world governments represent a hit and miss approach. It is unfortunate that policy makers in certain countries make economic policy without use of a reliable data base. For affluent individuals, this approach is of minor consequence. However, for the populations dealt with in social work practice the consequences are more serious. Token economies utilized in mental hospitals, correctional institutions, schools, and other agencies represent miniature economic systems and present the behavior modifier with the opportunity to control a variety of variables to determine how they affect the behavior of

individuals. We therefore are able to contribute to the development of a technology of economic behavior. Such an empirical opportunity has rarely been available in economic analysis. The components of the token system correspond with various aspects of our economic systems; e.g., tokens may be considered as currency, amounts of reinforcement as wages, exchange rates as prices, and pay periods as schedules of reinforcement.

Recent experiments utilizing token economies to test various economic principles such as consumption schedules, Engel curves, elasticity of a demand curve and so forth are enabling behavioral scientists to make beginning propositions concerning how certain economic variables affect behaviors. For example, high savings lead to poor performance rates in various behaviors, low savings lead to improved performance rates. Individuals tend to spend more on leisure items as earnings go up and less on basic necessities. Thus, if an individual wants to increase performance behaviors more incentives will have to be provided. One means of increasing incentives is to increase prices. Thus, if a social worker is employing a token economy in a mental hospital to increase such behaviors as work, self-care, academic behaviors, and so forth, an increase in prices should produce a general corresponding increase in desired behaviors. As this knowledge base develops, it would be in the best interest of the social work profession to utilize such data and communicate the findings to world policy makers in order to benefit the individuals we serve. Token economies viewed as miniature economic systems present numerous possibilities for investigating the effects of guaranteed income, negative income tax, the various other welfare programs, and so forth on a scale model. Recommendations therefore can be based on empirical data rather than on faith (Ayllon and Azrin, 1968; Fethke, 1972 and 1973; Kagel and Winkler, 1972; Winkler, 1971a,b; 1972, 1973a,b).

Thus, token economies and simulations have made beginning contributions to the understanding of micro-economics and have the possibility of providing a preliminary data base for present monetary policies. More experimentation will be needed to determine how generalizable the results are to large economic systems. No doubt this process will involve the specification of large numbers of variables and how they affect economic behavior.

Architectural Control of Behavior

Recent research indicates that we can architecturally structure environments to control many behaviors. In the area of crime control, a recent development has been the utilization of bucket seats rather than benches in various terminal facilities where derelicts formerly slept. Also, buildings are now being constructed with corridors and passageways which are open to public observation since recent research evidence indicates that more crime takes place in corridors and passageways that are hidden from public view (Jeffery, 1971 and 1976; Reppetto, 1976).

Additional literature suggests that seating arrangements in waiting rooms and workers' offices either increase or decrease interaction among clients and/or workers. The research further indicates that furniture placed so individuals sit at right angles increases interaction. Likewise, a seating arrangement in a group context definitely either facilitates or deters the interaction among group members with more interaction occurring when individuals are seated in a circle (Dinges and Oetting, 1972; Lauver, Kelley and Froehle, 1971; Seabury, 1971; Widgery and Stackpole, 1972).

New research is being conducted to isolate those variables that are crucial in offering adequate services to children in day care center environments (Twardosz, Cataldo, and Risley, 1974). Preliminary research seems to indicate that open environments where children are continuously visible to staff and the staff are almost continuously visible to supervisors facilitate interaction among the children and staff (Doke and Risley, 1972; LeLaurin and Risley, 1972). Certain toys that require at least two individuals to participate such as cards, checkers, pick-up sticks, Don't Cook Your Goose, Don't Break the Ice, Don't Spill the Beans, and so forth lead to more interaction whereas materials such as crayons, gyroscopes, tinker toys, puzzles, books, Play-Doh, and so forth decrease the interactional levels among children (Quilitch and Risley, 1973). Hospital wards are being remodeled to make use of light colored paint, brightly painted doors, attractive and modern furniture, brightly colored bedspreads, and so forth. These items seem to increase positive behaviors exhibited by the patient; that is, patients' attitudes become more positive and they socialize more (Holahan and Saegert, 1973; Price and Moos, 1975). Moreover, in hospital settings we are learning that seating patterns that place individuals at right angles and closer together increase the interaction between the professional staff and among the patients themselves (Holahan, 1972).

Through providing verbal and nonverbal prompts to individuals in a nursing home such as placing materials in their hands, discussing materials with them, and so forth, McClannahan and Risley (1975) significantly increased such verbal and nonverbal behaviors as talking to one another, nodding, smiling, or visually attending to one another, eating or drinking together, using recreational equipment such as puzzles and participating together in games.

Welfare

In a study conducted by Miller and Miller (1973) wherein positive reinforcers were utilized to increase welfare clients' attendance at self-help group meetings it was demonstrated that the following reinforcers are very practical: toys, stoves, refrigerators, furniture, clothing, rugs, kitchen utensils and information about social services. The authors suggest that these procedures might also be used to increase attendance at adult education programs, in projects that create income for the self-help groups, and in neighborhood rehabilitation projects.

Moreover, Briscoe, Hoffman, and Bailey (1975) helped lower income adults learn appropriate behaviors for participation on a policy board of a federally funded rural community project through behavioral modification techniques such as social praise, video tape feedbacks of behavior acquisition, and so forth. Behavior analysis helped these individuals acquire the ability to define a problem, define and evaluate solutions according to their merits and formulate action plans and implement the solutions. Both of these studies are aimed at changing individual welfare clients' behaviors. It would seem that a feasible solution to the welfare problem in various countries might be found in first specifying what types of behavioral changes are desirable in welfare clients such as increased self-sufficiency and decreased dependency and then in structuring the appropriate institutions to implement the contingencies for exhibition of these behaviors. Currently, most welfare systems structure reinforcement contingencies that do not reinforce self-sufficiency (Piven and Cloward, 1971).

Worker Performance

Two problems certain to be encountered by employers in the future will be absenteeism and decreased worker productivity. Pedalino and Gamboa (1974) executed an interesting study in which they utilized monetary reinforcement contingencies in order to decrease employee absenteeism at an industrial plant. Likewise, Hermann, deMontes, Dominguez, Montes, and Hopkins (1973) utilized monetary reinforcement contingencies with industrial workers to increase punctuality on the job. Much research is beginning to accumulate from behavioral analysis to indicate that monetary reinforcers should be made contingent upon specific job performances. Research indicates that this can improve job finding (Jones and Azrin, 1973), accurate change making in a family style restaurant (Marholin and Gray, 1976), job performance of workers in neighborhood youth corps (Pierce and Risley, 1974), professional and non-professional workers' performance in an institution for the mentally retarded (Iwata, Bailey, Brown, Foshee, and Alpern, 1976; Quilitch, 1974; Patterson, Griffin and Panyan, 1976) and on psychiatric wards (Loeber, 1971; Pomerleau, Bobrove, and Smith, 1973), and teachers' behaviors with students (Harris, Bushell, Sherman, and Kane, 1975). Moreover, research seems to indicate that incentives are necessary for good therapeutic practice; that is, in order for professionals to change their behaviors feedback must occur and incentives be provided for the changes (Rinn and Vernon, 1975). Other research seems to indicate that the workers are more highly productive when they are satisfied with what they are doing, administrators or executives show interest in them and consideration for their concerns, channels of communication are open, when they have autonomy in accomplishing tasks and are reinforced for good work, when administrators set an example in terms of working productively, and when they have a chance to complete a whole task. Such work environments are characterized as being very reinforcing (Katz and Kahn, 1966; Weick, 1969).

Lind (1967) applied social behavior theory to factors linked to individuals' malperformance during committee meetings. The following committee behaviors were chosen for modification: interruption rate, inattentiveness, cross talk, inappropriate comments for the topic under discussion, and so forth. Reinforcement contingencies were implemented to end cross talking and interruptions, to link hand raising and request for recognition, and to limit the length of the discussion. The following positive reinforcers (smiles, recognition through note taking and turning on tape recorders and negative reinforcers (looking away, turning off the tape recorder and temporary termination of note taking) were utilized by the change agent to either decrease or increase appropriate committee behaviors. Moreover, the change agent raised his hand to obtain recognition to speak and spoke only when called upon thereby modelling the appropriate behaviors and facilitating their acquisition by committee members.

Another strategy involved reducing tardiness in workers. The primary contingency for tardiness was punishment; whenever the employee was late the worker would call him to his office and make him wait 5 to 10 minutes in the waiting room before confronting him about his behavior. Punishment was chosen because other positive reinforcers such as monetary incentives, promotion, and bonuses were out of the question due to administrative constraints (Lind, 1967).

Rinn and Vernon (1975) reported the use of monetary incentives in a community health center to facilitate workers' acquisition of knowledge and treatment skills and implementation in terms of record keeping competencies, such as specifying a written contract between the worker and client concerning therapy goals, collecting and graphing data, keeping current dictation on behavior to be modified and techniques to be employed, entering process and termination notes, and so forth. Worker salary increments were then based on how well they executed these functions. The use of concrete standards reduced subjective biases involved in delivering increments (Bolin and Kivens, 1974).

Social Action

An increasing call for social workers to engage in social action with their clients has been noted in recent years. However, the technology for social action has not been available. Behavior analysis now presents us with a beginning methodology for social action. We can ask and determine what reinforcers social workers and their clients possess that can be utilized to manipulate other individuals who distribute such reinforcers as housing, jobs, medical care, and other social services. Our collective reinforcers such as knowledge, money, and so forth, and our ability to effectively organize could be used to exert considerable force on politicians. Once organized, for example, our social action strategies could begin by asking an official to secure more adequate social conditions for certain disadvantaged groups. If this strategy

did not work, the next strategy would be to utilize a punishing contingency such as a demonstration in front of the politician's office or indications to the general public that he does not care about people through such various media as newspapers, radio, T.V. and so forth. Finally, the ultimate strategy would be some type of economic boycott in order to secure necessary items.

Caution should be used while applying such change strategies since empirical guidelines are yet to be developed which will indicate appropriate choices. The approach is applicable to the extent that targets of social action consist of recurrent and habituating behaviors on the part of accessible agency officials. However, some of the most intolerable situations involve relatively inaccessible decision makers engaging in ad hoc behaviors. How to influence such targets needs additional theoretical and empirical development.

Crime

Society has always tried to control behaviors which we have variously labeled as criminal. However, attempts to control these behaviors have met with little success. New research from behavior analysis seems to indicate that three avenues are open to control criminal behavior: eliminate those stimuli that cue criminal behavior, i.e., provide the conditions for it to occur; make the consequences for criminal behavior severe; and/or provide everybody with the opportunity to enjoy positive reinforcers through the provision of adequate employment thus making it unnecessary to engage in criminal behaviors to secure positive reinforcements. The last item is based on the recent conceptual formulation of the tenants of economic theory to criminal behaviors. This data is preliminary and indicates that certain crimes clearly do have an economic base, as demonstrated by fluctuation in their rates with changes in economic conditions of the society; that is, there is a direct relationship between unemployment rates and certain criminal behaviors (Hann, 1972; Rottenberg, 1973; Sullivan, 1973). Moreover, the highjacking of airplanes was handled through a behavioral approach involving developing devices to detect weapons and developing firm consequences for the behavior (Boltwood, Cooper, Fein, and Washburn, 1972). Azrin and Wesolowski (1974) did an interesting experiment that may be very applicable to controlling stealing behavior. They found that requiring children who stole items from each other in one experimental condition to return them did not reduce the rate of stealing behavior. It was only when they implemented a procedure they titled "over correction" that stealing behaviors were reduced drastically. In this procedure not only did the individual have to return the item that was stolen, but he had to add an item of comparable value. Such preliminary research is an example of what is needed to place the control of criminal behavior on an empirical basis.

Social Integration

Societies have always struggled with how to implement procedures to help people interact positively with one another. Historically, people of different faiths, races, nationalities, and so forth have not been able to live harmoniously. Behavior analysis offers a way of structuring reinforcement contingencies to facilitate social integration among individuals. A recent study in which children were reinforced with tokens and social praise to choose interracial teams indicates that liking for other races increased (Hauserman, Walen, and Behling, 1973). Likewise, research suggests that structuring classroom situations where reinforcement of a group of individuals is dependent upon the whole group's performance increases liking for all of the group members. Thus, one strategy for increasing the liking among individuals is to place them in contexts where the reinforcers each individual secures is dependent on other group members' performances (Aronson, Blaney, Sikes, Stephan, and Snapp, 1975; Lucker, Rosenfield, Sikes, and Aronson, 1976; Harris, 1975). These procedures increase the attractiveness each group member has for others since each member's rewards are dependent on other individual performances. Likewise, sharing and enjoying positive reinforcers increase the frequency of positive behavior exchanges among individuals (DeVries and Slavin, 1975; Feldman and Wodarski, 1975; Berscheid and Walster, 1969).

Summary

Historically, most interventive attempts in social work practice have focused on the individual. Analogously, as behavior modification technology developed, it also focused on modifying the individual's behaviors to fit his environment. We have seen evidence to support the application of behavioral analysis to the solution of selected social problems (Tuso and Geller, 1976). Even though this is, at this point, a very futuristic approach, it is believed that in the coming years we will witness more developments in this area and behavior analysis will be applied increasingly to the solution of many other social problems such as increasing participation of low income children in dental care programs (Reiss, Piotrowski, and Bailey, 1976), shoplifting (McNees, Egli, Marshall, Schnelle, and Risley, 1976), population control (Zifferblatt and Hendricks, 1974), and food consumption (Madsen, Madsen and Thompson, 1974); to the study of politician's behaviors (Weisberg and Waldrop, 1972); to the study of different police patrolling strategies and their effects on crime rates (Schnelle, Kirchner, McNees, and Lawler, 1975); to the study of the effects of various changes in institutional policy on clients (Schnell and Lee, 1974); to train people to be their own therapists (Mahoney, 1977; Thoreson and Mahoney, 1974 and Watson and Tharp, 1972; Wodarski, 1975); and so forth.

Perhaps the greatest issue for behavior modification in the next

decade will be the structuring of an individual's environment to insure the maintenance and generalization of behavior change. The process of generalization and maintenance of behavior has been greatly neglected, or left up to chance. More structure hopefully will characterize future sophisticated behavior modification systems.

The manuscript indicates that behavior can be controlled through intervention at various levels i.e., individual, group, organizational, institutional and societal. However, adequate control will be achieved only through coordination of these components and the social work professional should become equipped to provide such coordination.

Implementation of behavior modification interventions through large social systems poses the same ethical and political issues that implementation on the individual level does. However, the inclusion of this level of intervention will increase the probability that the behavior will be modified and maintained. If one can entertain the notion that we already have a social system that modifies and controls our behavior, the question is should we ourselves make the system as human as possible through our control or permit it to act on us in a laissez-faire manner.

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