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Applied Behavior Analysis and Social Marketing: An Integration for Environmental Preservation

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Basic principles of applied behavior analysis and social marketing are reviewed with reference to the development of action plans to protect the environment. Behavior-change procedures that have targeted environmental preservation are categorized as antecedent interventions (including education, prompting, modeling, goal setting and commitment, and engineering and design strategies) or consequence procedures (i.e., reinforcement and punishment). Although past behavior analysis research has demonstrated environmental benefits from applying certain behavior-change interventions, those studies were small-scale and short-lived. This paper offers an integrative model of applied behavior analysis and social marketing as a potential approach to large-scale and long-term intervention for environmental protection. The market analysis and segmentation phases of social marketing, for example, allow for the specialization of behavior-change strategies for particular target groups. This integration requires increased collaboration between behavior analysts and environmental psychologists who study the correlation of individuals' environmental concern and action with their attitudinal, demographic, and personality characteristics. A plea is made to replace armchair theorizing with interdisciplinary and intervention-focused environmental research.

At the 1988 meeting of the American Psychological Association, I heard a memorable invited talk, "The Psychology of Planetary Concern: Self-Deception and the World Crisis" by Daniel J. Goleman, Ph.D., Science News Editor of the *New York Times*. He spoke of irreversible changes in the environment that should concern us all, including acid rain, damage to the earth's ozone layer, ocean pollution, the loss of tropical forests, and the misuse of land and water that

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contributes to worldwide malnutrition, killing 40,000 children per day—one every seven seconds. Then he addressed the fact that most people live their lives as though nothing has changed, showing "global indifference to the potential destruction of our planet," and he presented theory-based explanations for our apparent denial of the "slow death of a planet." He intrigued the audience with conceptualizations and examples of unconscious inattention, perceptual defense, psychological denial, group collusion, public inconsistency and a social trance—all to explain why we do not alter our lifestyles to preserve rather than destroy our ecology.

The audience appeared thoroughly entertained with these theoretical explanations for our overwhelming environmental problems. Most of the numerous questions for Dr. Goleman addressed aspects of his theoretical interpretations, and it seemed to this author that the audience supported the very theme of the address—the denial or avoidance of the problem itself. Then a lady in the front row made my day by asking the simple question, "What can I do?" Finally, someone asked the question that could lead to beneficial environmental outcomes! This person took a proactive rather than a reactive stance (cf. Cone & Hayes, 1980) instead of intellectualizing about the various untestable explanations for individual and societal reaction to a serious problem.

Deriving answers to the question "What can I do?" is the initial challenge of an applied behavior analysis. In fact, applications of behavior analysis for environmental protection have targeted behaviors that deface the environment (e.g., littering, lawn trampling), waste environmental resources (e.g., excessive use of water, gas, and electricity), and reduce environmental problems (e.g., recycling, car pooling, composting). Several comprehensive reviews of attempts to modify behaviors for environmental preservation are available (e.g., Cone & Hayes, 1980; Geller, 1983c, 1986, 1987; Geller, Winett, & Everett, 1982; Stern & Oskamp, 1987). However, it is significant that these reviews cover only a little more than a decade of research (beginning in the early 1970s) and address only a limited number of target behaviors relevant to environmental protection.

A significant amount of behavior-change research has addressed litter control, resource recovery, residential heating and cooling, transportation management, water conservation, noise pollution, and population control. However, behaviors related to environmental issues such as air pollution, land misuse, mineral depletion, hazardous waste, and water contamination have not been studied systematically. This is largely because behaviors that cannot be studied and controlled at the individual level have typically not been addressed by behavior analysis. Yet the greatest differences in the environment can usually be made through large-scale changes in the corporate and government sectors. For example, the government can control contingencies to decrease the environmentally destructive activities of industry and to increase environmental protection programs.

This paper offers a behavior analysis framework from which environmental preservation programs can be designed. Examples of research are cited in order to illustrate behavior-change strategies relevant to the development of action plans for modifying environment-relevant behaviors in desirable directions. The paper does not attempt to list the actions and contingencies that corporations and governments can control to protect and preserve the environment. While the behavior analysis perspective is certainly relevant for large-scale societal control, the possibilities (i.e., key behaviors and contingencies) need to be explored by those policymakers and corporate executives who can control such environment-relevant behaviors and contingencies.

Although it is widely recognized that most of our environmental problems have been caused by human behavior, the real-world application of behavior-change strategies in the domain of environmental protection has been minimal, except for implementation of policies that restrict the behaviors of home owners, corporations, and community groups. This may be partially due to a sparse supply of comprehensive, long-term behavior-change projects in the environmental protection domain (Geller et al., 1982), but is also because of insufficient and ineffective dissemination of behavior-change technology. Not only have behavior analysts failed to get their technology accepted and implemented by environmental policymakers (Geller, 1986), but in addition, their behavior-change perspective has been viewed narrowly and inaccurately by other environmental professionals (e.g., Vining et al., 1988). It seems behavior analysts and other professionals interested in affecting large-scale environmental change need to consider some basic principles of social marketing. This paper integrates concepts from these two disciplines—social marketing and applied behavior analysis—in an attempt to provide insight and direction for environmental protection and preservation.

Applied Behavior Analysis

Applied behavior analysis (ABA) is based on the approach to behavioral science developed by B. F. Skinner (e.g., 1938, 1953). Skinner rejected inferred constructs such as drives, needs, motives, and cognitions, while emphasizing the importance of overt behavior and its observable environmental, social, and physiological determinants. Therefore, behavior analysts usually identify overt behaviors as their dependent variable, and environmental stimuli or contingencies as independent variables. Before implementing intervention strategies, it is necessary to define specific target behaviors and identify environmental contingencies that support such behaviors.

Contrary to some interpretations (e.g., Vining et al., 1988), the behavior analysts who address environmental problems have neither denied nor avoided the concept of environmental attitudes. Environmental attitudes and values cer-

tainly exist, and they influence behaviors toward the environment. Likewise, environmentally protective and destructive behaviors occur and affect one's attitude toward the environment. Which comes first—an environmental attitude or behavior— is anyone's guess; and this is really not an issue, except for those who like to argue "chicken-first vs. egg-first" questions. The issue that separates environmental behavior analysts from other environmental psychologists is whether behaviors or attitudes are studied and treated for the sake of the environment. Environmental behavior analysts hold that it is most cost effective to apply intervention strategies directly to environmentally relevant behaviors, instead of attempting to modify environmental attitudes and values first and hoping for subsequent indirect influence on behaviors. Behavior analysts consider social validity and acceptability (Baer, Wolf, & Risley, 1968, 1987) when developing and implementing behavior-change interventions, even to the point of assessing individual attitudes and opinions during and after a behavior-change intervention (e.g., see Geller, 1987).

Intervention Strategies for Environmental Protection

Most behavior analysts design interventions according to the antecedent–behavior–consequence (ABC) model, a conceptualization that has been referred to as "behavioral engineering" (Ayllon & Michael, 1959; Homme, Baca, Cottingham, & Homme, 1968; Surratt, Ulrich, & Hawkins, 1969). Behavioral engineering is an approach toward behavior change focusing on environmental arrangements (i.e., behavioral antecedents and consequences) that increase the occurrence of desired behaviors and decrease the occurrence of undesired behaviors (Geller, 1987). In other words, behavioral engineering actually blends two technologies for behavior change: *stimulus control* and *contingency management.*

Antecedent Strategies

Antecedent interventions include (a) awareness and education sessions, (b) verbal and written messages, (c) modeling and demonstrations, (d) goal setting and commitment procedures, and (e) engineering and design strategies.

Awareness and education. Before attempting to change behavior, it is important to offer potential participants a sound rationale for the behavior-change program. A reasonable rationale will facilitate a participant's acceptance of attempts to motivate behavior change, and increase the probability that the person will develop an intrinsic justification for the desired behavior and continue this behavior in the absence of the extrinsic motivators (i.e., rewards and punishments).

Research has shown (e.g., Geller & Hahn, 1984; Lewin, 1958) that education directed toward behavior change is more effective in small (i.e., 10–15 people) rather than large groups, and that it should include interactive demonstrations and discussion rather than lecturing or showing films to a passive audience. Change agents should observe this well-known educational principle: TELL THEM AND THEY'LL FORGET—DEMONSTRATE AND THEY'LL REMEMBER—INVOLVE THEM AND THEY'LL UNDERSTAND. Education/awareness sessions and informational packages that did not promote participatory involvement were not successful in motivating newspaper recycling (Geller, Chaffee, & Ingram, 1975; Ingram & Geller, 1975; Witmer & Geller, 1976) nor residential, energy, or water conservation (e.g., Geller, Erickson, & Buttram, 1983; Hayes & Cone, 1977; Heberlein, 1975; Kohlenberg, Phillips, & Proctor, 1976; Palmer, Lloyd, & Lloyd, 1978; Winett, Kagel, Battalio, & Winkler, 1978).

Verbal and written messages. Behavior analysts have identified five characteristics of antecedent messages that enhance the impact of this communication strategy: (a) the target behavior is relatively convenient to emit (unless consequence strategies are applied), (b) the desirable or undesirable behavior is specified in precise terms, (c) convenient alternative desirable behaviors are indicated when avoidance of an undesired behavior is targeted, (d) the message is delivered in close proximity to opportunities for emitting the target behavior (e.g., as in point-of-purchase advertising), and (e) the message is stated in polite language that does not threaten an individual's "perceived freedom" (Geller et al., 1982). For example, Winett (1978) and Delprata (1977) successfully influenced occupants of public buildings to turn off lights in a room by placing at light switches messages that requested the lights to be turned off when the room was unoccupied. Geller, Witmer, and Orebaugh (1976) and Geller, Witmer, and Tuso (1977) observed that 20–30% of the recipients of a grocery store handbill with antilitter messages complied with a specific, polite request to deposit the handbill for recycling in a conveniently located and obtrusive trash receptacle.

Modeling and demonstrations. Modeling refers to the demonstration of specific behaviors for the target individuals, and it sometimes includes the announcement of a reinforcement contingency, such as presenting the model with pleasant or unpleasant consequences immediately following the demonstrated behavior (Bandura, 1977). Modeling can be accomplished by live demonstrations or through film, TV, or videotape. Environmental preservation efforts have essentially ignored modeling strategies, yet modeling (through television or video cassette) has the potential of influencing millions of viewers. Winett and his students (Winett et al., 1982, 1985) found significant increases in conversation of electricity for home heating and cooling after showing residents TV or vid-

eotape presentations that demonstrated simple and convenient conservation behaviors by residents in situations similar to those of the viewers. The presentation also specified financial benefits (i.e., consequences) that resulted from conservation behaviors.

Commitment and goal setting. Commitment and goal-setting tactics involve a verbal or written statement from individuals or groups that specifies a particular response or set of responses to emit (e.g., pick up litter or collect recyclables), or to stop (e.g., stop littering), or that defines a certain environmental protection outcome to reach (e.g., use 25% less energy or water). Pardini and Katzev (1984) and Burn and Oskamp (1986) found substantially increased participation in a neighborhood recycling program after residents signed pledge cards that requested participation; the author and his students demonstrated significant increases in vehicle safety belt use after buckle-up pledge cards were distributed and signed at industrial sites (Geller & Bigelow, 1984), a community hospital (Nimmer & Geller, 1988), and throughout a university campus (Geller, Kalsher, Rudd, & Lehman, 1989).

Engineering and design strategies. Engineering and design antecedents for environmental protection involve the design or redesign of devices, machinery, or environments to facilitate the occurrence of environmental protection by increasing behavioral convenience. For example, Finnie (1973) and Geller, Brasted, and Mann (1979–80) demonstrated that simple modifications of the appearance, positioning, and availability of trash receptacles can increase both litter pickup (i.e., "unlittering") and disposals in trash cans (i.e., "antilittering"). In addition, Jacobs and Bailey (1982) showed household recycling advantages of a "recycle-it" trash receptacle with separate compartments for cans, paper, and plastic. Cope and Geller (1984) found litter-control benefits with a large "put-and-take litter receptacle" that contained a large disposal chute for automobile litter bags and a litter bag dispenser that held 25,000 pull-down-tear-off plastic litter bags.

Consequence Strategies

Behavior change interventions are generally most effective when pleasant or unpleasant consequences are contingent upon the occurrence of the target behavior or upon the outcome of one or more target behaviors. The consequences can be distinct stimuli such as a monetary rebate, a self-photograph, a speeding ticket, a verbal commendation or condemnation. Consequences can also be opportunities to engage in certain behaviors (e.g., use of a preferred parking space, adding one's name to an "Energy Efficient" honor roll, or attending a special resource recovery conference).

Punishment and negative reinforcement procedures to promote beneficial

behavior change usually take the form of laws or ordinances (e.g., fines for littering, illegal dumping, excessive water use, or polluting water or air). Extensive enforcement and legal personnel are required to make legislation of behavior change effective. Applied behavior analysts have deemphasized the use of strategies for large-scale behavior change that are cumbersome to enforce and dependent upon continual use of aversive consequences (i.e., negative reinforcers or punishers). Furthermore, attempts to mandate behavior change through distinctive/punishment tactics frequently elicit negative attitudes.

Behaviorists are concerned about the attitudes that follow behavior change, and therefore, they believe it is more cost effective to target overt behaviors than attempt to influence attitudes. Positive attitudes associated with an effective behavior-change technique maximize the possibility for the desired behavior to become a norm—the socially accepted rule of action. Positive attitudes are more likely to follow incentive/reward techniques, since a positive reinforcement approach is generally perceived as "voluntary," and it does not generate the perception of threats to individual freedom, which may elicit overt noncompliance or other behavior contrary to that requested. Such noncompliance may produce pleasant feelings associated with restored personal freedom, a phenomenon known as "psychological reactance" (Brehm, 1966, 1972). For example, the road sign that announces a $50 fine for littering may actually prompt some motorists to toss litter on the highway when police officers are obviously not available to enforce such a litter control ordinance.

The positive reinforcement consequences that have been applied to benefit environmental protection have varied considerably. Some consequences have been contingent upon the occurrence of a desired behavior, whereas other consequence strategies did not specify a desired response but were contingent on a certain outcome (e.g., on a certain obtained level of environmental cleanliness, energy consumption, or water savings). The following response-contingent consequences significantly increased the rate of the environment-protective behavior indicated: (a) a raffle ticket for paper delivery to a recycling center (Geller et al., 1975), (b) a merchandise token (redeemable for goods and services at local business) for boarding a particular bus (Everett, Haywood, & Meyers, 1974), (c) a coupon redeemable for a soft drink following litter deposits in a particular trash receptacle (Kohlenberg & Phillips, 1973), and (d) one dollar and a posted self-photograph for collecting a specially marked item of litter (Bacon-Prue, Blount, Pickering, & Drabman, 1980).

Examples of outcome-contingent consequences that were effective at increasing the frequency of environment-protective behaviors were (a) ten cents for cleaning a littered yard to criterion (Chapman & Risley, 1974); (b) a tour of a mental health facility for 20% or greater reduction in vehicular miles of travel (Foxx & Hake, 1977); (c) two dollars per week for 5–10% reduction in home-heating energy, three dollars for 11–20% reduction, and five dollars per week for reductions greater than 20% (Winett & Nietzel, 1975); and (e) 75% of energy

savings from expected costs returned to the residents of a master-metered apartment complex (Slavin, Wodarski, & Blackburn, 1981).

Large-Scale Applications

The application of behavior analysis for solving community-based problems is called *behavioral community psychology*. The first textbooks for these subdisciplines of applied behavior analysis (Glenwick & Jason, 1980; Martin & Osborne, 1980; Nietzel, Winett, MacDonald, & Davidson, 1977) gave significant attention to behavioral research for environmental preservation (i.e., litter control, resource recovery, residential energy conservation, and transportation management). Actually, environment-focused studies were among the first community-based behavioral applications. Most other research reported in behavioral community psychology texts targeted problems in closed environments (e.g., schools, businesses, prisons, and mental health centers). A majority of the community-based studies have been short-term demonstration projects, typically dealing with one environmental setting and a limited number of subjects. Thus, criticisms directed at the small-scale nature of this research and lack of a true systems approach are justified (e.g., Stern & Gardner, 1981a,b; Stern & Oskamp, 1987; Willems & McIntire, 1983).

Testing and refining the design of behavior-change strategies on a small scale (perhaps even in the laboratory) is necessary for economic reasons. Behavior analysts are remarkably successful in their intervention efforts when their target is the behavior of individuals or small groups. However, it is desirable to attempt communitywide intervention after successful behavior change strategies are developed. Unfortunately, when behavior analysts have tried to extend their efforts to larger populations, they frequently obtained marginal results, usually as a result of low levels of community support and participation. For example, Geller (1987) reviewed behavior change interventions for environmental preservation and found most could be characterized as small scale and lacking durability. Treatment effects were often small compared to individual and small-group effects, and the effects were often transient. That is, once an intervention was terminated, target behaviors typically returned to preintervention levels. There have been some notable exceptions in the promotion of safety belt use (e.g., Geller, 1983b, 1984; Horne, 1984), usually because local grassroots groups and indigenous volunteers were available to implement and help institutionalize the behavior-change program.

An Applied Behavior Analysis Model

When conducting large-scale interventions (e.g., in communities or organizations), applied behavior analysts usually adhere to the model illustrated in Fig.

Fig. 1. The basic components of applying behavior analysis for real-world and large-scale intervention.

1. The first step is to consider what particular behavior(s) should be targeted in order to resolve a particular societal problem. Likewise, the problem or concern (e.g., environmental defacement or pollution) must be defined in terms of specific behaviors that can be readily observed and measured. Direct observation of behavior provides information necessary to evaluate those behaviors that contribute to social problems and that can be modified in beneficial directions. This requires a systematic evaluation of environmental contingencies (i.e., antecedents and consequences) that support target behaviors.

After selecting a target response, noting existing or potential supportive contingencies, and recording representative baseline data, behavior analysts implement and evaluate interventions. As discussed earlier, the ABC model is used to guide development of an intervention strategy. When behavior analysts go beyond one-on-one interventions to larger scale applications, special issues need to be addressed. These issues (listed below) represent guidelines for large-scale behavior-change intervention, but most of these were not followed by previous studies of behavior-change interventions for environmental protection (Cone & Hayes, 1980; Geller et al., 1982).

- The intervention should be delivered through *indigenous personnel.* This enhances the credibility of intervention, but more importantly, the probability of program maintenance (even institutionalization) is increased by having indigenous personnel deliver the behavior-change strategy.
- The intervention should be applied and evaluated over extended time periods, with a focus on assessing *generalization* and *long-term response maintenance.* Generalization should be studied with regard to (a) the extension of an individual's behavior change to untreated environmental settings (i.e., stimulus generalization), (b) the spread of intervention impact to other behaviors of the target individual (i.e., response generalization), and (c) the transfer of treatment effects to other individuals (i.e., interpersonal generalization).
- An *ecological perspective* and system-level intervention should be considered. Attention should be given to functional relationships between behaviors and environments that are "intertwined within a complex behavioral system of relationships that link person, behavior, social environment, and physical environment" (Willems, 1977, p. 42).
- A detailed *cost-effectiveness analysis* is essential, including large-scale projections from the demonstration project or case study. In addition,

statistical significance is not sufficient. Rather, the behavior-change strategy must compare favorably with other possible interventions in terms of program costs per specified amounts of beneficial outcomes.

In the evaluation phase, the goal of behavior analysis is to demonstrate functional control and cost effectiveness. Furthermore, the impact of particular antecedent and/or consequence conditions on target behaviors should be established empirically. The paradigm typically used to demonstrate functional control is the classic baseline–treatment–withdrawal (i.e., reversal) design or a variant thereof (e.g., a reversal design with a control group or a multiple baseline design). For more details on these evaluation paradigms, see Geller et al. (1982, chap. 2).

Adhering to a reversal paradigm requires (a) observing specified behaviors directly to establish reliable and valid baseline records, (b) continuing to record relevant behaviors in the same field setting over several observational sessions during the intervention phase, and (c) recording the same behaviors after removing the intervention procedures.

When ABA is extended to the community, other evaluation issues become salient. A critical factor is social validity. Baer et al. (1968) defined three terms to distinguish ABA from other fields of psychology and provide a framework for identifying the "social validity" of a research endeavor: *applied, effective,* and *generality.* The label *applied* means that particular environments, individuals, or target behaviors are studied "because of their importance to men and society, rather than their importance to theory" (Baer et al., 1968, p. 92). An *effective* intervention strategy is one that alters the behavior "enough to be socially important" (p. 96), and to determine what is "enough" it is necessary to answer the question, "how much did that behavior need to be changed?" (p. 96). Finally, an intervention that is applied effectively to a socially significant problem shows *generality* if it is "durable over time, if it appears in a wide variety of possible environments, or if it spreads to a wide variety of related behaviors" (p. 96).

Dissemination is the last aspect of the model depicted in Fig. 1. Research in the behavioral and social sciences is usually conducted with little thought or effort directed toward making research available to people outside the "ivory tower." Geller (1983a) identified the following as important aspects of a large-scale dissemination effort:

- Develop an interdisciplinary information and support network by establishing an address file of those individuals concerned with the target problem (including researchers, practitioners, corporate leaders, community volunteers, and government personnel).
- Exchange information with policymakers and grassroots agencies, and avoid academic jargon in such communication.

- Document research in journals, periodicals, and newsletters read by those who are concerned directly with the target problem (i.e., those who can deliver intervention strategies).
- Seek attention from the news media when you have a cost-effective intervention to "sell."
- Seek support from the private sector, which is concerned primarily with arriving at a useful product.

With its technology of behavior change and rigorous evaluations derived from empirical observations of overt behavior, ABA has contributed substantially to the behavioral sciences. However, few behavior analysts have addressed the issue of dissemination. Most have been content to demonstrate functional control of behavior in small-scale demonstration experiments, and to publish their methodologies and findings in academic journals that are read only by other behavior analysts and their students. (Of course, this is essentially the case for most university teachers and researchers, regardless of discipline, and it is perpetuated by the academic contingencies for promotion and tenure.) Thus, behavior analysts know little about effective dissemination of their "products." The author proposes that techniques of social marketing be integrated with ABA technology to produce long-term behavior change that benefits our environment.

Social Marketing

Social marketing has applied marketing technology to promote social action in numerous societal problem areas such as cancer detection, forest fire prevention, dental hygiene, transportation safety, alcoholism, child abuse, family planning, famine, and environmental preservation. Social marketing focuses on the promotion of socially beneficial ideas and behaviors rather than material products. As summarized by Saunders and Smith (1984), "there is no object to sell, no transfer of money, but rather an articulate reshaping of traditional educational strategy to reflect a consumer orientation and a marketing context" (p. 2). Some examples of socially beneficial practices that can be marketed like basic commodities are the following: "Use your safety belt!" "Pick up litter!" "Eat less salt!" "Don't drink and drive!" "Immunize your child before age one!" "Conserve gasoline!" "Purchase recyclable containers!"

Kotler and Zaltman (1971) defined social marketing as "the design, implementation, and control of programs calculated to influence the acceptability of social ideas, and involving considerations of product planning, pricing, communication, distribution, and marketing research" (p. 5). They suggested that social marketing can bridge from the behavioral scientist's knowledge of human behavior to the socially useful implementation of that knowledge. Thus, the foundation for integrating social marketing with ABA was laid by Kotler and Zaltman nearly 20 years ago.

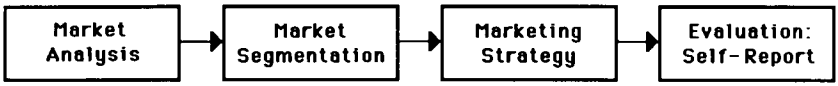

Fig. 2. The basic components of social marketing.

Social marketing can be conceptualized with the generic model illustrated in Fig. 2. First, an analysis is conducted to establish market boundaries and obtain information about the wants, needs, perceptions, attitudes, habits, and satisfaction levels of the potential market (i.e., the target population). The important characteristics of targeted individuals or groups are derived from both primary data (gathered from questionnaires, focus groups, and interviews) and secondary data (obtained from archival investigation). This step is crucial for any marketing effort and provides the foundation upon which market segmentation and marketing strategies are constructed. Obtaining valid, reliable, and relevant information is quite difficult, and data are often based entirely on self-report rather than objective behavioral observation (Bloom & Novelli, 1981).

Market segmentation is the partitioning of a potential market into homogeneous submarkets based on common characteristics identified by market analysis. This provides a basis for selecting target markets and developing optimal promotional programs for individual target segments. Two problems make this process particularly challenging (Bloom & Novelli, 1981). Namely, many social agencies resist the idea of segmentation because their egalitarian philosophy prohibits treating certain groups differentially or treating some groups while ignoring others. Second, self-report information is rarely adequate for objective identification of market segments.

After analyzing the market and determining target segments, social marketers develop a specific marketing intervention to achieve the desired outcome. The primary objective is to develop a marketing strategy that takes account of the interests and characteristics of the target individuals. McCarthy's four "P's" are considered, referring to the development of the right *product*, endorsed by the right *promotion*, put in the right *place*, and at the right *price* (Bloom & Novelli, 1981; Kotler & Zaltman, 1971).

Product. When developing the product, the object is to package the social idea in a manner that (a) is desirable to the target audience, (b) the audience is willing to accept (in terms of attitude change or behavior change), and (c) benefits the social cause. In many cases, no single product can achieve the desired social change; instead, various products and marketing strategies that contribute to the social objective must be developed.

Promotion. Promotion requires communication tactics that make the social idea familiar, acceptable, and desirable to the target audience. It might include

any or all of the following: (a) advertising, which is any form of impersonal presentation of ideas, goods, or services paid for by an identified sponsor; (b) personal selling, which is any form of paid personal presentation or promotion involving direct face-to-face communication; (c) publicity, which is any form of unpaid impersonal presentation of ideas, goods, or services; and (d) sales promotion, which is any promotional activity (other than those listed above) that stimulates interest, trial, or purchase of goods or services.

Place. Place refers to providing optimal distribution and response channels that can reach the relevant public. A distribution network should be established that will (a) permit implementation of the effort for social change on a broad scale, (b) facilitate communication between the change agents and target individuals, and (c) expedite the desired behavior/attitude change.

Price. Price represents cost to the buyer. Such costs may include monetary expenditure, response or time cost, energy cost, and psychological cost. For example, the redistribution cost involved in recycling includes (a) time and inconvenience of separating and storing recyclables prior to a collection day, (b) response cost of putting collected recyclable on the curb (on a certain "collection" day), (c) transportation energy cost of taking recyclables to a collection center, and (d) manpower and transportation costs of delivering large quantities of recyclables to a manufacturing plant (given that such a plant is available that has overcome the costs of incorporating a recyclable into their manufacturing process).

The four P's of marketing do have limitations in the realm of social marketing (Bloom & Novelli, 1981). The product being sold is often complex behavior with attitudinal and cognitive correlates, and these may be difficult to change, even over a long period of time. The price must be designed to minimize barriers that prohibit consumers from emitting desired behaviors, rather than to maximize financial returns. For instance, in the field of resource recovery and recycling, there is ignorance, misunderstanding, and confusion. Many people do not realize the value of recycling, while others believe the outcome is not worth the effort. Then there is the notion of high-technology recycling, which seems to make residential collection of recyclables inconsequential and a waste of time, effort, and money. Some people believe recycling is bad for big business, requiring extra corporate expenses and inconvenience, and resulting in inferior products. It is a common misconception that commodities produced with recyclables are inferior to those manufactured with raw materials. Indeed, some feel recycling is anti-American.

Two additional P's are relevant for social marketing—*politics* and *public opinion* (W. D. Novelli, personal communication, June 1985). Effective social marketing can be facilitated by analyzing relevant political and public pressures,

and by considering ways to employ both politics and public opinion to achieve large-scale intervention. The current political and public pressures associated with reduced landfill space have increased the attractiveness of recycling. The failures of a high-technology approach to resource recovery (see review by Geller, 1981) have also guided politics and public opinion toward low technology, resource recovery, and reuse. In addition, current public and political pressures have resulted in a favorable Zeitgeist for the social marketing of community recycling.

The final stage of the social marketing model is evaluation. Evaluating the effectiveness of a marketing program is challenging for all marketers; however, for social marketers, evaluation is especially formidable. The use of quasi-experimental or randomized experimental designs is difficult, if not impossible, for several reasons: (a) the setting, which can be a small community or a whole country, is often beyond experimental manipulation; (b) specifying objective and reliable measures of marketing effectiveness is problematic, particularly when the dependent variable is an unobservable attitude or a behavior difficult to observe, and (c) the cost of conducting a large-scale evaluation may be prohibitive, especially given the reductions in government funding for social programs.

Because of these and other difficulties, marketing evaluations tend to be static, before–after comparisons, with no control groups (Bloom & Novelli, 1981). Furthermore, such evaluations are generally outcome based, and rely primarily on self-report indices. The lack of internal and external validity in a before–after design with no control group (see Campbell & Stanley, 1963; Cook & Campbell, 1979) makes the demonstration of cause and effect relationships ambiguous, if not impossible. Therefore, cost-effective measures and evaluation paradigms must be developed to provide clear interpretations of relationships between independent and dependent variables in a social-marketing program. Reliance by social marketers on before–after designs with outcome-based and self-report measures will prohibit both an understanding of behavioral and attitudinal change, and a demonstration of functional control between manipulated variables and program results.

An Integrative Model

The model presented in Fig. 3 depicts an integration of social marketing and ABA. The first step, a market analysis, yields information about relevant characteristics of the target individuals and the limits to which information can be generalized. The next phase, market segmentation and target selection, includes a partitioning of the market into homogeneous submarkets (i.e., market segmentation) and an identification of critical behaviors to change (i.e., target selection). These behaviors should be defined, observed, and measured; at the same

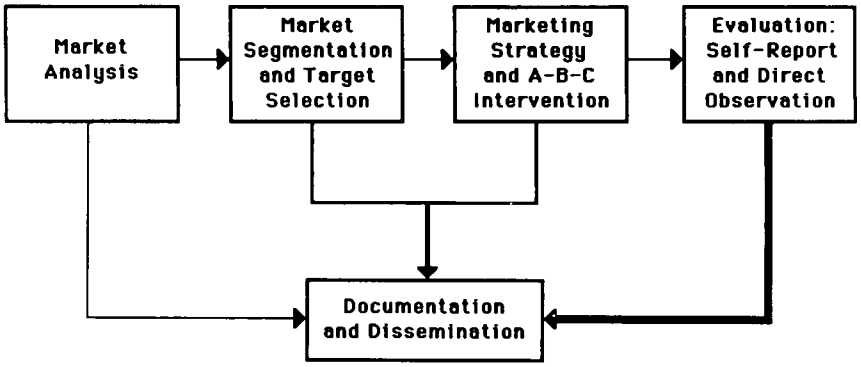

Fig. 3. The basic components of a model that integrates ABA and social marketing. The differential thickness of flow lines to "documentation and dissemination" illustrates increasing importance of this component during later stages of the model.

time, antecedents and consequences that support the targeted behaviors should be assessed systematically.

According to this model, the development of a marketing strategy requires reference to the ABC framework and the various behavior-change strategies (reviewed above) stimulated by the ABC perspective. Therefore, antecedent stimuli that prompt or set the occasion for designated desired behaviors are considered, as well as consequences that can be used to reinforce desired behaviors. For the evaluation phase, both self-report and direct observation of behavior are needed to produce a reliable and valid assessment of intervention impact. The use of a reversal design or a variant thereof will demonstrate functional control and produce cost-effectiveness data. Finally, the behavior-change effort should be fully documented to permit replication, extension, and dissemination, with the intent of making research available to the relevant government agencies, grassroots groups, media, politicians, and citizenry.

An Integrative Example

The relevance of the integrative model for environmental protection is illustrated by a previous conclusion of the author (Geller, 1986) that "the impact of behavior change strategies to prevent environmental problems might be more effective if they were customized for specific target groups" (p. 364). This statement implies market segmentation (i.e., Step 2 in Fig. 3), and that step would benefit from a variety of environmental psychology studies that correlated individuals' actions, demographic characteristics, attitudes, or personality traits with their awareness or concern for preserving the environment (e.g., see review by Van Liere & Dunlap, 1980). Likewise, defining reliable relationships be-

tween propensities to engage in particular environment-preserving behaviors and observable characteristics of individuals (e.g., demographic, attitudinal, or situational factors) would improve market segmentation and target-behavior selection, and subsequently the development and implementation of a more effective behavior-change program.

The development of programs to control litter, for example, ought to pair the target audience with the behavior-change goal, e.g., "antilittering" vs. "unlittering." Antilittering programs (i.e., to decrease littering) should target the litterbug (i.e., individuals who litter the environment regularly or intermittently), whereas unlittering campaigns (i.e., to increase litter pick-up behavior) should focus on those persons who are already concerned about the environment (e.g., members of the local Sierra Club). Indeed, Geller (1986) has recommended that five categories of individuals be considered when designing a promotional campaign for litter control: (a) the habitual litterbug; (b) the intermittent litterbug; (c) the uninvolved nonlitterer, who does not litter, but considers litter control unimportant and never gets involved in environmental projects; (d) the concerned nonlitterer, who is somewhat concerned about environmental litter and has at least considered personal involvement in an environmental project; and (e) the involved nonlitterer, who has shown personal commitment to alleviating environmental problems through intermittent or daily behaviors. Persons in this last category would be most likely to volunteer and support a litter-control program with either antilittering or unlittering goals.

This category analysis of individuals and behaviors as they relate to the design of a litter control campaign is market segmentation and target behavior selection, and is relevant for other areas of environmental concern, such as the eight target categories of ecological stresses identified by Stern and Oskamp (1987)—population, food, land, water, energy, solid wastes, minerals, and atmosphere. For each target domain, goals should be specified and relevant target behaviors identified. Furthermore, particular target behaviors should be matched with specific audiences and situations (i.e., market segmentation) before developing an intervention program. This process is probably simplest for litter control, the target area used in the previous example, but it is noteworthy that litter control is only a subcategory within the larger domain of solid-waste management. Other subcategories within this category of ecological stress include waste reduction, resource recovery, waste treatment and disposal, hazardous waste transportation and dumping, and toxic waste cleanup. Each of these target areas has its own environment-protective goals, target behaviors, and relevant target audiences and potential participants. The challenge of this task is certainly overwhelming and complex, as is the environment itself, but the future of the planet and the life it supports depends upon worldwide acceptance of this challenge. It is time we substituted real-world action plans for ivory-tower speculation.

Concluding Comment

Because environmental degradation, pollution, and resource depletion are such overwhelming and complex problems, they are in urgent need of attention and intervention. Most of these environmental problems can be attributed to human behavior, and solutions to these problems require large-scale and long-term changes in peoples' behaviors, attitudes, and values. While behaviorists advocate a direct attack on behaviors in such a way that concomitant and subsequent attitudes are desirable, other environmental psychologists focus their efforts on attitude change, with expectations that related environmental and protective behaviors will change as a consequence. It is likely that both of these approaches are beneficial, each being optimal for certain situations. Market segmentation, target selection, and intervention development should be guided by research that shows the kind of interventions that work with particular targets and situations. Such research is clearly lacking, not only for environmental problems, but for community-based problems in general. Perhaps some of this much-needed research will be prompted by the present attempt to integrate the basic components of social marketing and ABA. Several demonstrations have shown that certain community-based contingencies can be changed to increase the occurrence of environment-protective behaviors. Most of these successes, however, have been relatively small scale and short-lived. The challenge is to select larger settings, and train and motivate indigenous personnel to implement and maintain behavior-change interventions. This may require incentive manipulation by the municipal or government sectors of communities, cities, or states. However, this is only possible with proper dissemination of success stories about "small wins" (Weick, 1984) to the appropriate government officials and other "movers and shakers" (Stolz, 1981).

This paper began with reference to a provocative American Psychological Association address that defined global environmental problems facing us today and suggested various hypothetical constructs to explain the apparent human denial or avoidance of critical environmental issues. At the end of that address, the present author asked the speaker, the Science News Editor of the *New York Times,* whether it might be wise to define behaviors and contingencies that need to be changed in order to protect and preserve the environment and then set out to intervene for such a change, instead of contemplating reasons for human denial of environmental problems. The speaker affirmed that this was the behavior analysis approach to the problem and that such an approach should be tried. Indeed, he invited the author to try this approach and report back to him in several years. This interchange emphasizes that dissemination *is* a most important challenge for behavioral scientists who want to see their efforts translate into real-world impacts.

References

Ayllon, T., & Michael, J. (1959). The psychiatric nurse as a behavioral engineer. *Journal of Experimental Analysis of Behavior, 2,* 323-334.

Bacon-Prue, A., Blount, R., Pickering, D., & Drabman, R. (1980). An evaluation of three litter control procedures—Trash receptacles, paid workers, and the marked item technique. *Journal of Applied Behavior Analysis, 13,* 165-170.

Baer, D. M., Wolf, M. M., & Risley, T. R. (1968). Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis, 1,* 91-97.

Baer, D. M., Wolf, M. M., & Risley, T. R. (1987). Some still-current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis, 20,* 313-327.

Bandura, A. (1977). *Social learning theory.* Englewood Cliffs, NJ: Prentice-Hall.

Bloom, P. N., & Novelli, W. D. (1981). Problems and challenges in social marketing. *Journal of Marketing, 45,* 79-88.

Brehm, J. W. (1966). *A theory of psychological reactance.* New York: Academic Press.

Brehm, J. W. (1972). *Responses to loss of freedom: A theory of psychological reactance.* New York: General Learning Press.

Burn, S. M., & Oskamp, S. (1986). Increasing community recycling with persuasive communication and public commitment. *Journal of Applied Social Psychology, 16,* 29-41.

Campbell, D. T., & Stanley, J. C. (1963). Experimental and quasi-experimental designs for research on teaching. In N. L. Gage (Ed.), *Handbook of research on teaching.* Chicago: Rand McNally.

Chapman, C., & Risley, T. R. (1974). Anti-litter procedures in an urban high-density area. *Journal of Applied Behavior Analysis, 7,* 377-384.

Cone, J. D., & Hayes, S. C. (1980). *Environmental problems: Behavioral solutions.* Monterey, CA: Brooks/Cole.

Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design and analysis issues for field settings.* Chicago: Rand McNally.

Cope, J. G., & Geller, E. S. (1984). Community-based interventions to increase the use of automobile litter bags. *Journal of Resource Management and Technology, 13,* 127-132.

Delprata, D. J. (1977). *The seventh year: Industrial civilization in transition.* New York: Norton.

Everett, P. B., Hayward, S. C., & Meyers, A. W. (1974). Effects of a token reinforcement procedure in bus ridership. *Journal of Applied Behavior Analysis, 7,* 1–9.

Finnie, W. C. (1973). Field experiments in litter control. *Environment and Behavior, 5,* 123-144.

Foxx, R. M., & Hake, D. F. (1977). Gasoline conservation: A procedure for measuring and reducing the driving of college students. *Journal of Applied Behavior Analysis, 10,* 61-74.

Geller, E. S. (1981). Water reduction and resource recovery: Strategies for energy conservation. In A. Baum & J. E. Singer (Eds.), *Advances in environmental psychology, Vol. III: Energy conservation: Psychological perspectives* (pp. 115-154). Hillsdale, NJ: Erlbaum.

Geller, E. S. (1983a,December). *Community psychology: Ideal vs. actual impact in dissemination of behavioral technology.* Paper presented at meeting of the World Congress on Behavior Therapy, Washington, DC.

Geller, E. S. (1983b). Rewarding safety belt usage at an industrial setting: Tests of treatment generality and response maintenance. *Journal of Applied Behavior Analysis, 16,* 189-202.

Geller, E. S. (1983c). The energy crisis and behavioral science: A conceptual framework for large-scale intervention. In A. W. Childs & G. B. Melton (Eds.), *Rural psychology* (pp. 381-426). New York: Plenum.

Geller, E. S. (1984). A delayed reward strategy for large-scale motivation of safety belt use: A test of long-term impact. *Accident Analysis and Prevention, 16,* 457-463.

Geller, E. S. (1986). Prevention of environmental problems. In B. A. Edelstein & L. Michelson (Eds.), *Handbook of prevention* (pp. 361-383). New York: Plenum.

Geller, E. S. (1987). Environmental psychology and applied behavior analysis: From strange bedfellows to a productive marriage.In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (pp. 361-388). New York: Wiley.

Geller, E. S., & Bigelow, B. E. (1984). Development of corporate incentive programs for motivating safety belt use: A review. *Traffic Safety Evaluation Research Review, 3,* 21-38.

Geller, E. S., Brasted, W., & Mann, M. (1979-80). Waste receptacle designs as interventions for litter control. *Journal of Environmental Systems, 9,* 145-438.

Geller, E. S., Chaffee, J. L., & Ingram, E. E. (1975). Promoting paper-recycling on a university campus. *Journal of Environmental Systems, 5,* 39-57.

Geller, E. S., Erickson, J. B., & Buttram, B. A. (1983). Attempts to promote residential water conservation with educational, behavioral, and engineering strategies. *Population and Environment, 6,* 96-112.

Geller, E. S., & Hahn, H. A. (1984). Promoting safety belt use at industrial sites: An effective program for blue collar employees. *Professional Psychology: Research and Practice, 15,* 533-564.

Geller, E. S., Kalsher, M. J., Rudd, J. R., & Lehman, G. R. (1989). Promoting safety belt use on a university campus: An integration of incentive and commitment strategies. *Journal of Applied Social Psychology, 19,* 3-19.

Geller, E. S., Winett, R. A., & Everett, P. B. (1982). *Preserving the environment: New strategies for behavior change.* Elmsford, NY: Pergamon.

Geller, E. S., Witmer, J. F., & Orebaugh, A. L. (1976). Instructions as a determinant of paper-disposal behaviors. *Environment and Behavior, 8,* 417-438.

Geller, E. S., Witmer, J. F., & Tuso, M. E. (1977). Environmental interventions for litter control. *Journal of Applied Psychology, 62,* 344-351.

Glenwick, D., & Jason, L. (Eds.). (1980). *Preserving the environment: New strategies for behavior change.* Elmsford, NY: Pergamon.

Hayes, S. C., & Cone, J. D. (1977). Reducing residential electrical use: Payments, information, and feedback. *Journal of Applied Behavior Analysis, 14,* 18-88.

Heberlein, T. A. (1975). Conservation information: The energy crisis and electricity consumption in an apartment complex. *Energy Systems and Policy, 1,* 105-117.

Homme, L., Baca, P., Cottingham, L., & Homme, A. (1968). What behavioral engineering is. *Psychological Record, 18,* 425-434.

Horne, T. D. (1984, November). Workshop presentation at the Michigan Life Savers Conference, Boyne Mountain, MI.

Ingram, R. E., & Geller, E. S. (1975). A community integrated, behavior modification approach to facilitating paper recycling. *JSAS Catalog of Selected Documents in Psychology, 5,* 327 (Ms. No. 1097).

Jacobs, H. E., & Bailey, J. S. (1982). Evaluating participation in a residential program. *Journal of Environmental Systems, 13,* 245-254.

Kohlenberg, R., & Phillips, T. (1973). Reinforcement and rate of litter depositing. *Journal of Applied Behavior Analysis, 6,* 391-396.

Kohlenberg, R. J., Phillips, T., & Proctor, W. (1976). A behavioral analysis of peaking in residential electricity energy consumption. *Journal of Applied Behavior Analysis, 9,* 13-18.

Kotler, P., & Zaltman, G. (1971). Social marketing: An approach to planned social change. *Journal of Marketing, 35,* 3-12.

Lewin, K. (1958). Group decision and social change. In E. E. Maccoby, T., M. Newcomb, & E. L. Hartley (Eds.), *Readings in social psychology* (pp. 197-211). New York: Holt, Rinehart & Winston.

Martin, G. L., & Osborne, J. G. (Eds.). (1980). *Helping the community: Behavioral applications.* New York: Plenum.

Nietzel, M. T., Winett, R. A., MacDonald, M. L., & Davidson, W. S. (1977). *Behavioral approaches to community psychology.* New York: Pergamon.

Nimmer, J. G., & Geller, E. S. (1988). Motivating safety belt use at a community hospital: An effective integration of incentive and commitment strategies. *American Journal of Community Psychology, 16,* 381-394.

Palmer, M. H., Lloyd, M. E., & Lloyd, K. E. (1978). An experimental analysis of electricity conservation procedures. *Journal of Applied Behavior Analysis, 10,* 665-672.

Pardini, A. U., & Katzev, R. A. (1984). The effect of strength of commitment on newspaper recycling. *Journal of Environmental Systems, 8,* 471-481.

Saunders, S., & Smith, W. A. (1984). Social marketing: Two views, two opportunities. *Clearinghouse on Development Communication* (No. 47). Washington, DC: U.S. Agency for International Development, Bureau for Science and Technology.

Skinner, B. F. (1938). *The behavior of organisms.* New York: Appleton-Century-Crofts.

Skinner, B. F. (1953). *Science and human behavior.* New York: Macmillan.

Slavin, R. E., Wodarski, J. S., & Blackburn, B. L. (1981). A group contingency for electricity conservation in master-metered apartments. *Journal of Applied Behavior Analysis, 14,* 357-363.

Stern, P. C., & Gardner, G. T. (1981a). Psychological research and energy policy. *American Psychologist, 36,* 329-342.

Stern, P. C., & Gardner, G. T. (1981b). The place of behavior change in the management of environmental problems. *Journal of Environmental Policy, 2,* 213-239.

Stern, P., & Oskamp, S. (1987). Managing scarce environmental resources. In D. Stokols, & I. Altman (Eds.), *Handbook of environmental psychology* (pp. 1043-1088). New York: Wiley.

Stolz, S. B. (1981). Adoption of innovations from applied behavioral research: "Does anybody care?" *Journal of Applied Behavior Analysis, 14,* 491-505.

Surratt, P. R., Ulrich, R. E., & Hawkins, R. P. (1969). An elementary student as a behavioral engineer. *Journal of Applied Behavior Analysis, 2,* 85-92.

Van Liere, K. D., & Dunlap, R. E. (1980). The social bases of environmental concern: A review of hypotheses, explanations and empirical evidence. *Public Opinion Quarterly, 44,* 181-197.

Vining, J., Ebreo, A., Fishwick, L., Black, S., & Liebert, R. (1988). *Changes in recycling attitudes, behavior, and motivation as a result of a community recycling information and education program* (Staff Paper No. 48). Urbana—Champaign: Institute for Environmental Studies, University of Illinois.

Weick, K. E. (1984). Small wins: Redefining the scale of social problems. *American Psychologist, 39,* 40-49.

Willems, E. P. (1977). Steps toward an ecobehavioral technology. In A. Rogers-Warren (Ed.), *Ecological perspectives in behavior analysis* (pp. 9-31). Baltimore, MD: University Park Press.

Willems, E. P., & McIntire, J. D. (1983). A review of "Preserving the environment: New strategies for behavior change." *The Behavior Analyst, 5,* 191-197.

Winett, R. A. (1978). Prompting turning-out lights in unoccupied rooms. *Journal of Environmental Systems, 6,* 237-241.

Winett, R. A., Hatcher, J. W., Fort, T. R., Leckliter, I. N., Love, S. Q., Riley, A. W., & Fishback, J. F. (1982). The effects of videotape modeling and daily feedback on residential electricity conservation, home temperature and humidity, perceived comfort and clothing worn: Winter and summer. *Journal of Applied Behavior Analysis, 15,* 381-402.

Winett, R. A., Kagel, J. H., Battalio, R. C., & Winkler, R. C. (1978). Effects of monetary rebates, feedback and information of residential electricity conservation. *Journal of Applied Psychology, 63,* 73-78.

Winett, R. A., Leckliter, I. N., Chinn, D. E., Stahl, B., & Love, S. Q. (1985). Effects of monetary rebates, feedback, and information on residential electricity conservation. *Journal of Applied Behavior Analysis, 18,* 33-44.

Winett, R. A., & Nietzel, M. (1975). Behavioral ecology: Contingency management of residential energy use. *American Journal of Community Psychology, 3,* 123-133.

Witmer, J. F., & Geller, E. S., (1976). Facilitating paper recycling: Effects of prompts, raffles, and contests. *Journal of Applied Behavior Analysis, 9,* 315-322.

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