

Two Avenues for Encouraging Conservation Behaviors

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Abstract

Environmental organizations and natural resource agencies often seek education and communication strategies to encourage effective conservation behaviors. This paper extends the discussion from the Conservation Psychology Dialogue in May 2002 to define two broad avenues for activities that may nudge individuals and society toward more responsible environmental behaviors: the specific route of changing behavior with social marketing tools and the general route of cultivating environmental literacy through educational programs. A review of the research literature identifies some of the factors that encourage targeted behaviors and factors that contribute to environmental literacy. Strategies related to implementing programs in both areas are offered. Behavior change strategies include: ways of tailoring a message to the audience, types of information to provide, and methods for creating commitment. Ideas for how to promote environmental literacy can be found in research concerning significant life experiences and environment-based education.

Keywords: *conservation behavior, social marketing, environmental education, environmentally responsible behavior*

Introduction

The motive for many conservation programs is to encourage human behaviors that reduce our environmental impact on the planet. There is widespread agreement that solutions to environmental problems must involve the public (Stern 2000a, McKenzie-Mohr 2000), and that there are many possible routes for accomplishing this task. Individuals can garden, bicycle, install solar hot water panels, switch to non-consumptive recreational activities like playing cards and canoeing, and support organizations, policies, and candidates that offer promising solutions. Organizations can sponsor campaigns, promote policies, coordinate a process to identify indicators, conduct research on the most effective strategies, and provide feedback on changes. Businesses can

offer technical solutions to enhance efficiency and convenience, making conservation behaviors more attractive. There is no shortage of possible avenues, but the sense that we are short on time and resources compels people to seek the most effective strategies to engage people in enduring conservation behaviors. Thus, discussions about changing human behavior generate questions about predictors of behavior, how behavior can be changed, and the most effective education or communication strategies that promote behavior change.

The threads of these discussions invariably cross the uncomfortable boundary between theoretical research and applied practice. It is a challenging arena in which to work. Many researchers prefer to conduct laboratory experiments than answer practical questions from the field. Researchers who are sensitive to the complementary roles of research and practice may be stymied by institutional constraints and disciplinary limitations (Stringer 1999). Many practitioners are unable to find or make sense of existing research documents, but they are eager to grasp at promising concepts for exhibits, programs, and websites. Adequate evaluations of the myriad of small scale programs in nature centers, parks, and municipalities might determine if the intended results were achieved, but few organizations have the funding to attract the interest of researchers. Unable to fund extensive evaluation activities or control for possible confounding variables, organizations wonder if they have invested in the right strategy.

Fortunately, both worlds are changing. More researchers are working with practitioners to frame researchable questions that provide practical direction for organizations, and such alliances are strengthening all perspectives. Support for action research is increasing (Stringer 1999). More practitioners are writing grant proposals and funding their own research. More organizations are becoming outcome-savvy, seeking to understand the principles behind the strategies that might create the biggest bang for their limited buck. The Center for a New American Dream is one such organization, with a promising website that encourages and supports conservation behavior (see sidebar).

The abundance of competing theories and models can be daunting to the practitioner attempting to understand and

explore human behavior, however. Some publications provide insights into the role of determinants of behavior, for example, but few offer suggestions for how to alter them. Several recent reviews of the literature (Stern 2000b, Vining and Ebreo 2002, Kollmus and Agyeman 2002) have summarized the salient elements of behavior change quite well and it is not the intent to repeat their fine efforts here. The models that are frequently advanced and tested in the context of environmentally responsible behavior have formed the foundation of this document. The panel discussion at the Conservation Psychology Dialogue in May 2002 (see Saunders, this issue) and the Behavior Change Workshop sponsored by the Association of Zoos and Aquariums (AZA) in February 2003 helped frame this article by raising a series of questions: what are conservation behaviors; how do we change behavior; and how do we build environmental literacy that prepares people to adopt environmental behaviors?

What are Conservation Behaviors?

Conservation behaviors are those activities that support a sustainable society. Stern (2000b, 408) defines environmentally significant behavior by the extent to which it changes the availability of resources or alters ecosystems. There are several ways to categorize behaviors: direct behaviors, such as driving a hybrid vehicle, are important, as well as indirect behaviors, such as changing a policy to make hybrid vehicles more affordable. Similarly, behaviors may operate at the individual or societal levels (e.g., putting a nest box in my backyard or joining neighbors in a community habitat improvement event). Clearly, all of these types of behaviors must be employed. Because there are different motives and rewards that draw people to a plethora of environmental opportunities it is rarely possible to “change conservation behavior” with one tool.

Gough (2002) points out that it may be difficult to identify the “correct” environmental behavior because some conservation quandaries are not simple. There are times when all of the options entail some increased level of pollution or degraded habitat, just to different or often incomparable degrees. Protecting forests in North America increases plantation output in South America and requires more fossil fuels in the transport of pulp and paper. Who can say if it is a good or a bad option?

Even in less complex cases, the recommended behavior is likely to vary across a region or nation, reducing the possibility of a clearly “right” behavior for everyone. Where potable water is limited but landfill space plentiful, the environmental cost of washing cotton diapers and porcelain mugs may be greater than that of disposing paper diapers and plastic cups. Eating locally grown food enables some people to consume

Desiring social change: Translating awareness to action

The Center for a New American Dream works with individuals, institutions, communities, and businesses to conserve natural resources, counter the commercialization of our culture, and promote positive changes in the way goods are produced and consumed. *Turn the Tide: 9 Actions for the Planet* is one initiative through which this national non-profit helps Americans translate awareness into action. We asked leading scientists and experts in the field of conservation to identify steps that would be measurable, achievable for most Americans, and most important for Americans to take to reduce global warming, conserve water and energy, and save wildlife and forest habitats. The Center then developed the online tool www.TurntheTide.org to incorporate basic behavior change strategies with simple actions that positively impact our environment.

The nine actions are:

1. Skip one car trip each week
2. Replace one beef meal each week
3. Eat only trap-caught shrimp and other “good” seafood
4. Remove junk mail from your mailbox
5. Install four compact fluorescent bulbs
6. Move the thermostat three degrees: warmer in the summer and cooler in the winter
7. Eliminate lawn pesticides
8. Install efficient showerheads and aerators
9. Inspire two friends to Turn the Tide

An online calculator displays the number of resources each participant is saving as he or she continues taking these actions throughout the year. As of fall 2003, the 14,000 current participants already saved 112 million gallons of water, 324 trees, 20,000 pounds of sea life, and prevented the emission of 9.4 million pounds of climate-warming carbon dioxide. Many of these participants are involved through one of over 100 organizations partnered with Turn the Tide. To contribute to the collective impact of *Human Ecology Review* affiliates, you can login at www.turnthetide.org and enter *Human Ecology Review* as your organization affiliation. Or, go directly to <http://www.newdream.org/turnthetide/register.asp?from=313532>.

Making a positive impact on our environment begins with simple behavioral changes any of us can make. In the psychology of a small win, this collective approach based on easy actions is much more manageable than a shopping list of 50 must-do things, or a presentation of the importance of averting environmental disaster (Weick, K. 1984. *American Psychologist* 39, 3, 40-49). In addition, participants see their contribution to the collective impact of all Turn the Tide members within their partnered organization and as a whole. The campaign combines feedback, social norms, and inspiration — key elements of good social marketing — and shows how each action by every person does matter, especially if we act together. It embodies an American Dream that translates awareness into action by incorporating innovation, conservation and collaboration. Turn the Tide makes working toward our higher environmental ideals easily attainable, one action at a time.

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mangoes while others munch apples. How one prepares recyclables for collection will change with the municipality. Which agency to call for more information can change with

legislation. These examples indicate that appropriate, locality-specific conservation behaviors are those that are less harmful than alternatives, to the best of our current knowledge.

To understand how to encourage conservation behavior, it is important to clearly define a behavior. A behavior is a specific action. Most environmental activities are made up of several discernable behaviors (McKenzie-Mohr and Smith 1999). For a recreational bicyclist to consider commuting to work, several additional behaviors are required: the purchase of gear (saddle bags, night light, fenders, rain gear), identification of a safe route (often not the same that a car or bus might take), building physical stamina to get to work, and identifying facilities to change clothes or remove mud upon arrival. One can imagine a broad range of information and abilities associated with this set of behaviors; any one of them could represent a barrier and prevent the activity.

Stern (2000b) suggests there may be similarities in motives or opportunities that could make it easier to encourage behavior and identifies five different categories of behaviors. Similarly, Hungerford and colleagues' environmental issue investigation curriculum uses five outcomes to describe and teach environmentally responsible behaviors (Winther, Volk and Hungerford 1994). These sets can be combined to suggest five types of behaviors:

- Environmental activism (e.g., actively participating in or leading environmental initiatives)
- Non-activist political behaviors (e.g., joining an organization, voting, signing a petition, or writing a check)
- Consumer behaviors (e.g., purchasing "green" products, recycling, reducing energy use, and altering consumption habits)
- Ecosystem behaviors (e.g., putting up bird boxes, planting sea oats, counting wildlife populations, promoting prescribed fire)
- Other behaviors which are specific to our expertise or workplace (e.g., reducing waste in the production process, establishing mortgage criteria for energy efficient houses, suing a polluter, etc.)

There are some similarities between these categories. One could imagine that opportunity will greatly influence whether one is able to engage in ecosystem behaviors or use one's professional calling to promote environmental action. Peer pressure may help inspire non-activist political behaviors or ecosystem behaviors more than some of the other behavior categories. Within the large category of consumer behaviors, however, other characteristics may subdivide the list. These categories may represent behaviors that have similar motives and could be encouraged with similar types of campaigns:

- Public visibility: Actions that are under public scrutiny (e.g., driving a car) carry with them different

motives and barriers than those that are hidden from the public eye (e.g., buying an efficient hot water heater)

- Frequency: Actions that occur infrequently (e.g., buying compact fluorescent bulbs) may be promoted differently from those that need to become a habit (e.g., turning the compost pile)
- Testability and feedback: Actions that can be tested by others prior to a commitment (e.g., changing laundry soap) are much less risky than those that can't be tested and have no practical return policy (e.g., buying cellulose insulation)

In contrast, some authors speak of "environmentally responsible behavior" in a broad sense, referring not to the specific actions but to an approach to seeking information, making decisions, and valuing a stewardship ethic (Hungerford and Volk 1990; Stern 2000b). The role of education, family, experience, organized religion, and community may be important in cultivating willingness to change or maintaining a new conservation behavior. Indeed, many organizations and agencies may find that their mission allows them to help build and encourage a conservation ethic, but not to overtly manipulate behavior. There is no clear consensus of what to call this ethic, this worldview, this sense of stewardship, but it is often referred to as environmental literacy. In this case environmental literacy means having knowledge, attitudes, skill, and behaviors to be competent and responsible (Disinger and Roth 1992). Unlike other forms of literacy, such as the ability to read, Disinger and Roth suggest that environmental literacy's distinguishing characteristic is its focus on behavior. People who are environmentally literate can be identified by their behaviors; they make choices that are environmentally appropriate. Since the programs that build the environmentally responsible orientation to the world will likely be different from those that encourage specific, targeted behaviors, the remainder of this article will attempt to carve distinctions between the two, referring separately to how we might *change specific behavior* and how we might *cultivate environmental literacy*.

What Predicts Specific Behavior?

A specific behavior is usually thought to be a product of an opportunity and intent, the latter of which is a product of knowledge and attitudes (Fishbein 1967, Zimbardo and Ebbesen 1969). Since significant barriers could derail all but the strongest intention (Schultz and Oskamp 1996), successful campaigns are often designed to reduce barriers to a level more easily overcome. Purchasing locally grown produce, for example, requires that the produce be available where one typically shops (or that one has the ability to add a visit to the

farmer's market to their weekly shopping spree) and that one intends to purchase such food. Intent is thought to be a product of a variety of possible cognitions and affects, such as knowing the advantages and disadvantages of this food, knowing how to prepare and eat this food, knowing that other people would approve of making this purchase (if one cares about what they think), having a positive feeling about the advantages that purchasing this food would bring, and believing that purchasing the food will result in the advantageous consequences (i.e., the environmental benefits will outweigh the environmental costs of the extra mileage to the market). A successful campaign to influence people's intentions might emphasize nutritional value, easy availability, freshness and taste, family values, recipes, the local farmer, the people who buy and enjoy it, and the reduced impact of locally grown produce.

Fishbein and Ajzen's Theory of Reasoned Action (1975) and the modification that created the Theory of Planned Behavior (Ajzen 1985) form the theoretical underpinnings of a diversity of behavior change research. They suggest three elements make up an intention to act:

- The attitude toward the behavior, which is a product of salient beliefs that performing the behavior will lead to a predicted outcome, and a positive evaluation of that outcome.
- The perception of the social pressure regarding the behavior, which is a product of the beliefs that important other people think the behavior should or should not be practiced and the motivation to comply with those expectations.
- The perception that one has the ability to perform this behavior, which is a product of beliefs about personal control over the behavior and actual control. This factor can affect not only intention but also directly influence behavior by preventing intention from becoming realized.

Specificity makes this model valuable. The *intent* to recycle will not result from broad information about resource recovery or attitudes supporting environmental policies, but rather will be a function of attitudes about recycling, perceptions of social norms about recycling, and perceived ability to recycle.

A variety of social marketing techniques that target specific behaviors may be explained with the Theory of Planned Behavior. Social marketing uses commercial marketing techniques to promote an idea or behavior that benefits either the individual or society (Weinreich 1999). Commonly used in the health field to encourage breast self exams, blood pressure monitoring, and contraceptives, environmental organizations have recently begun to use these tools (Monroe, Day and Greiser 2000). Persuasive communication usually pro-

vides specific information about the behavior, the consequences of action, and the benefits of those consequences. The use of models, case studies, and examples in a campaign help to create or redefine a social norm by explaining that the community accepts and applauds the behavior. When feedback is possible, promoting the pounds of recyclables collected or the acres of habitat restored, a positive perception of ability and control are presented. Each of these tools has an extensive literature that suggests they help to change behavior (McKenzie-Mohr and Smith 1999).

What Contributes to Environmental Literacy?

The literature relevant to nurturing a sense of stewardship that might enable people to more readily change and maintain conservation actions is broad, spanning the disciplines of education, economics, sociology, psychology, and philosophy. Two different models are presented here.

Stern and colleagues developed a value-belief-norm theory of environmentalism (Stern 2000b) that links a variety of theories into a chain of variables that lead to conservation behavior. Each variable has the capacity to affect the next, and if it does, the subsequent variable is more likely to be activated. The model begins with three types of values: biospheric, altruistic, and egoistic values that form the basis of environmental attitudes and behaviors. These values are predispositions that make certain beliefs more likely, and these beliefs influence personal moral norms, which in turn influence behavior. Three beliefs are included: a worldview about the role of humans on the planet, beliefs about the threat of environmental conditions, and beliefs about whether actions might alleviate environmental threats. If these beliefs trigger a sense of obligation to take conservation actions (the personal norm), conservation behavior may result.

This theory incorporates Schwartz's norm activation model (Schwartz 1977; Stern, Dietz and Kalof 1993; Vining and Ebreo 2002) which suggests that people are more likely to engage in environmental behaviors when they are aware of the negative consequences and when they believe they have some responsibility for changing the problem. Both elements may be more likely to be changed by longer-term educational activities promoting literacy than on communication activities promoting a behavior. Adult learners are an ideal audience for such a challenge. They bring a sense of self and a variety of experiences to the educational venue, they are motivated by relevant information that will enable them to solve problems, and they are self-directed — continuing to learn if the experience is satisfactory (Knowles 1973, Zemke and Zemke 1984). Adults who are aware of decreasing environmental quality may be motivated to learn new techniques for reducing their impact on the planet.

Decades of educational research at Southern Illinois University have contributed to an Environmental Citizenship Behavior framework that suggests a slightly different set of variables is responsible for building environmental literacy (Hungerford and Volk 1990). Three categories of variables work in concert to predispose someone to responsible actions, and each are made of major and minor variables. The variables and their categories are selected based on theoretical and experimental research.

- *Entry-level variables* seem to be prerequisite to environmental literacy. *Environmental sensitivity* is an empathetic perspective and has been shown to have a dramatic relationship to future behaviors.
- *Ownership variables* are those that personalize environmental issues: *in-depth knowledge of environmental issues*, including the implications of action, and *personal investment in issues* built out of prior activity or extensive knowledge.
- *Empowerment variables* are those that give people a sense that they can take actions that will help resolve environmental problems. *Perceived skill in taking action, knowledge of action strategies, locus of control, and intention to act* are the major variables in this category.

There are clearly significant areas of overlap between these models. The different use of terms between the disciplines, however, makes direct comparison challenging. Environmental sensitivity may be a measure of biospheric and altruistic values. To the extent that sensitivity is based on environmental knowledge, (Hwang, Kim and Jeng 2000), it may be more akin to beliefs in the Value-Belief-Norm model. Perceived skill in action taking may be similar to perceived ability to reduce the environmental threat (the third belief). Personal investment, which is an ownership variable, may be something that increases the likelihood that the sense of obligation (personal norm) will lead to action. Table 1 suggests a comparison of the terms in these two models.

Table 1. Comparison of terms in two models to build environmental literacy.

Value Belief Norm Model	Environmental Citizenship Behavior Model
Biospheric value	Environmental sensitivity
Altruistic value	Environmental sensitivity
Egoistic value	—
Belief — Ecological worldview	Knowledge of ecology and issues
Belief — Adverse consequences	In-depth knowledge of issues
Belief — Ability to reduce threat	Perceived skill in action
Knowledge of action strategies	Locus of control
Norm — Sense of obligation	—

The Environmental Citizenship Behavior model is also limited by the enduring problem of directionality — is behavior the outcome of these variables, or does behavior influence the variables, particularly in the case of perceived skill? Because the model was designed and is most often used by educators, it makes sense to label the variables that an educator can influence as determinants of youth behavior. Other theorists might label the activity of practicing an action as the behavior itself. If empowerment variables are formed and strengthened by practicing the behavior in a classroom context, the activity of conducting the behavior with the support of peers and supervisors may lead to increased ownership and more positive attitudes. Thus the behavior itself may influence the determinants.

The development of environmental literacy should enable people to make appropriate decisions in a wide variety of contexts over time (Hungerford and Volk 1990). The skills of seeking information, comparing opinions, sorting through complexities, and determining the environmentally appropriate course of action should be transferable to a variety of contexts. Enhancing biospheric values, a sense of personal obligation, personal investment, and perceived skill should make it more likely that these skills will be used, and used to promote appropriate environmentally responsible behavior. In this respect, cultivating literacy may be a more efficient long-term strategy than investing in a multitude of campaigns to change specific behaviors. The data are not clear, however. Although students have been identified as involved in more environmentally appropriate behaviors three years after an environmental education experience (Hungerford and Volk 1990), most complex skills such as problem identification and higher order thinking are built in context and over many instances. The success of the case study model used in training doctors, lawyers, and business executives speaks to the effort to which one might go to train environmentally literate decision makers.

A common assumption when seeking the sources of environmentally responsible action is that since environmental behaviors are often inconvenient, expensive, or result in loss of social status, the values that prompt conservation behavior must include altruism — selfless action for the good of society or environment. After all, individuals are asked to override the powerful forces of status quo in a society that favors consumption, excess, and independence. DeYoung (2000) and Kaplan (2000) counter this assumption with the hypothesis that those who perform environmental behaviors may in fact be acting out of self-interest, not altruism. In other words, people might derive other types of rewards that are related to satisfaction, feeling needed, sense of identity, and social group approval. Clary and Snyder (1999) also debunk the requirement of selflessness by identifying six different functions of volunteering, most of which have person-

al benefits (e.g., career advancement or strengthening social relationships).

There are environmentalists who act out of empathy or concern for the environment. Schultz (2000) suggests that the simple act of identifying with an injured animal (i.e., generating empathy) can be used to motivate environmental attitudes. Still, this concern may not be wholly selfless. Those who speak of a deep sense of caring for and connecting to the environment also recognize the benefits they receive from wilderness recreation, nature contemplation, and daily views into their backyard. Perhaps there is some element of self-interest that motivates their behavior (Kaplan 2000). Protecting the environment helps to make their life more enjoyable. In addition, many activists understand that threats to the environment also threaten human health and ecosystem stability — concerns that could be construed as benefiting people. Thus the ability to motivate environmental behaviors certainly does not depend on willingness to sacrifice.

Despite the efforts to explain and cultivate responsible environmental actions with increased environmental literacy, the exercise may never provide significant levels of prediction. Given the distinctions drawn in this article, however, these educational efforts are not intended to be. Predicting behavior should come as a result of concrete activities (usually in the realm of persuasive messages and marketing) to target and affect specific behaviors. Activities that strengthen environmental literacy should not be held to the same standard, but perhaps should be measured by a more intermediate yardstick — increasing personal responsibility, biospheric values, empathy, action skills, and empowerment, for example.

What Strategies Help Change Behavior?

The most convincing and well-documented work in environmental behavior change comes from the world of social marketing — promoting an idea or a behavior to a target audience. Just as product marketers carefully research consumer preferences before launching a new flavor of soda or shape of cracker, social marketing depends upon knowing the audience, particularly discerning the difference between those who already practice the behavior and those who do not. The specificity of both the audience and the behavior enables social marketing techniques to be successful.

The first steps in designing successful interventions are the careful identification of the behavior and understanding the benefits and barriers to this behavior, as perceived by the audience. Behavior identification may occur through one of two opposing strategies: a scientifically informed decision by the organizer about the most effective behavior to change (see sidebar) or a participatory process by members of a community to select the behavior they want to change (Andrews,

Stevens and Wise 2002). Initial research is conducted to explore the differences between those who do the behavior and those who don't. The results of this exploration direct social marketers to the motivations, beliefs, or perceived benefits that enable some people to act and the barriers that prevent others from acting. These key factors are then incorporated into media campaigns or other tools. A toolbox of strategies is used to reduce barriers, increase motives, obtain commitment, support social norms, provide information, and increase intentions to perform the target behavior. Most reports indicate that combinations of these tools are more effective than any single tool (McKenzie-Mohr and Smith 1999). Some clever techniques may embody several tools at once. The common "I voted" sticker acts as both a prompt to others and an indicator of the pervasiveness of this behavior, thus demonstrating a social norm.

Tailoring a Message to the Audience

Audience research enables social marketers to target those values and perceptions that are most likely to move people toward the objective. It is important to realize that these values and perceptions may not be the same as those that motivate the organizers of the campaign. It matters little if people commute by bicycle because they enjoy getting exercise, they can't find a parking place, they don't want to pay for a permit, or they don't want to pollute the atmosphere. It only matters that they do it. Since this behavior has a variety of different benefits, audience research can help determine which are most important to whom. When immediate and personally beneficial incentives exist that complement the moral equivalent of the high environmental ground, perhaps they should be strategically used. In contrast, a program designed to cultivate environmental literacy would not count bicycle commuting for exercise as a success.

The Theory of Planned Behavior might suggest that interventions should provide information and reminders about the consequences of doing the behavior, the social acceptability of the behavior, the ease with which the action can be done, and the effectiveness of this behavior to solve the problem. The analogous social marketing tools of prompts, models, and commitment have been shown to be effective in changing specific behaviors (McKenzie-Mohr and Smith 1999).

Providing Information

The role of information in changing behavior is complex. While researchers agree that information alone will not motivate someone to adopt a new behavior (Schultz 2002, Hungerford and Volk 1990, Stern 2000b, Kollmuss and Agyeman 2002), it is equally clear that a lack of information can be a barrier to changing behavior (Schultz 2002, Kaplan

2000, DeYoung 2000). Information, of course, can build different types of knowledge and can be conveyed in more or less effective ways. Procedural knowledge, the basic how-to-conduct-the-behavior is worth conveying; a lack can be an impediment (DeYoung 1988/89). Similarly, impact knowledge that describes the collective value of behaviors in achieving an environmental target is also a valuable form of positive feedback (see Sidebar). While some models include a broad background in environmental knowledge, this type of knowledge does not appear to separate those who conduct environmental behaviors from those who do not. Rather than directly determining behavior, perhaps this general knowledge is instrumental in forming biospheric values and attitudes of environmental responsibility. If so, perhaps we are not measuring the outcomes of knowledge adequately.

Information can also be used to convey accounts of successes, models, and early adopters who have achieved results of the new behavior. In this sense, a new norm may be created by strategically providing information about the benefits others have derived from the new behavior, their prevalence, and the consequences of their success. These success stories can play an important role in formal education (Bardwell 1991) as well as the informal media.

Information can be presented in a variety of ways. Petty and Cacioppo's Elaboration Likelihood Model (1981) builds on McGuire's process of persuasion (1989) and describes the strategies that will make information more successful. Durable behavior, which is the result of effortful information processing (i.e. elaboration), is more achievable when cognitive involvement is high, arguments are strong, sources are credible, topics are relevant, message is clear, distractions are few, and comparisons are favorable (Petty and Priester 1994). A more risky strategy to switch behaviors is commonly used by the advertising industry to sell products. A peripheral route usually means less elaboration, but people may buy a different brand because of cues that are not relevant to the product — such as when a celebrity endorsement or a sidewalk sale are used to get us to buy something.

Brand-switching may be achieved via the peripheral route, but this strategy does not typically result in changing more complex behaviors. Bator and Cialdini (2000) recommend the more thought provoking approach to changing behavior through public service announcements. More successful PSA's should use vivid descriptions and credible sources to create comprehensible, memorable, and influential communications with a very specific message (Bator and Cialdini 2000). It may be challenging to use mass media effectively, however, if the audience assessment indicates that different elements of the public perceive source credibility differently or are motivated by different values. Marketing a product or idea successfully requires using cultural norms

and values (Han and Shavitt 1994). In some cases a national culture (e.g., American individualism) may be used, but in many communities a mix of cultures will make a broad media approach quite difficult.

Creating Commitment and Utilizing Incentives

Activities that extract a commitment from people, either in writing or merely verbal, also work to increase the likelihood of changing behavior. This is thought to be the result of our basic desire to achieve some consistency between our behaviors and our statements. People who declare that they will recycle because they are convinced it is the right thing to do are more likely to follow through on their commitment because, in some cultures, humans tend to prefer to believe that they keep their word, and because the activity matches beliefs about recycling. Festinger's (1957) cognitive dissonance theory similarly states that the uncomfortable feeling generated when our action and attitudes are not consistent will motivate us to seek information or change the behavior to minimize the discomfort. Some might use this dissonance to justify a new behavior, while others might discount the troublesome information.

Stone et al. (1997) suggest that the individual must first be confronted with the hypocrisy of their actions to significantly arouse dissonance and provide the motivation to adopt a behavior that reduces hypocrisy. The only person on the block who is not recycling may be motivated to bring his actions into alignment with his pro-environment attitudes and reduce his barriers to recycling, or may reaffirm a belief that recycling isn't worth doing, despite existing pro-environment attitudes. Believing that wildfire won't affect a recently burned community may be enough for residents to ignore warnings about taking actions to reduce their risk, even though they have an interest in protecting their property. Particularly in the environmental realm, humans seem to be quite adept at ignoring information that conflicts with their behaviors. Clearly there are other attitudes, motives, and feedback that reinforce the non-environmental behavior.

Incentives and disincentives are similarly tricky to use in manipulating widespread durable conservation behaviors. Although the use of an external incentive can be shown to cause a behavior change, if the behavior does not continue after the incentive is removed, it was not helpful. Most conservation groups cannot afford to continue to provide these incentives. Thus extrinsic incentives are only practical if they kick-start a behavior that continues for other reasons, allowing the incentive to be removed (DeYoung 1993) and if they are small enough to allow an individual to attribute the new behavior to a change in herself. DeYoung (1996) suggests that motives such as intrinsic satisfaction, particularly frugal-

ity and participation (i.e., positive feelings reinforced from community participation), might be those internal, intrinsic incentives that could help individuals continue a behavior. Therefore, small incentives might be useful to engage people in trying a new conservation behavior if the process also involves helping people recognize the benefits and personal motivations that might exist. Discovering a few things about the act of composting kitchen waste — that compost is not so smelly, it reduces the gunk in the bottom of the trash can, it provides an excuse to inspect the backyard, and it reminds me that I'm playing a role in improving the planet — could help me continue to compost, but these motives may not be obvious or believable prior to the trial. Disincentives can be useful for some people, but can also generate reactance. Some people so dislike rules and regulations that they will go to great lengths to circumvent them (Brehm and Brehm 1981).

Rogers' work (1995) on the diffusion of innovations suggests that broad appeals to the masses may not be the most effective way to instill a new behavior in a community, though it may increase awareness at the beginning of the change process. Using a change agent to court the opinion leaders, highlighting the success of the early adopters, providing demonstration areas to show outcomes, and promoting the exchange of information between those who have tried and accepted the new behavior and those who haven't are common strategies used by extension agencies and others (1995).

Social marketing campaigns to change specific behaviors may be improved by incorporating information from research on amotivation for environmental behavior. Pelletier and colleagues (1999) identified four categories of reasons that explain a lack of motivation toward environmental protection: strategies are ineffective, lack of personal capacity to successfully conduct the behavior, inability to sustain the effort required, and helplessness. A campaign that provides feedback on the effectiveness of the behavior and provides support to people to begin and continue this behavior may help overcome these barriers. Broader feelings of helplessness and ability may be best countered by techniques more associated with cultivating environmental literacy (see next section).

In summary, research will support agencies and organizations working toward establishing specific conservation behaviors by:

- Identifying the behavior and the target audience
- Understanding the barriers and benefits that resonate with that audience
- Asking people to make a commitment to undertake the behavior
- Reducing the barriers to the behavior
- Providing vivid, meaningful procedural information about the action

- Reminding people of the ways the action conforms to their view of themselves
- Advertising appropriate social norms that complement the behavior
- Asking people to practice the behavior with the safety and support of a peer group
- Showing people how easy the behavior is and what the consequences will be
- Offering small incentives to enable people to start the behavior
- Reminding people how satisfying they find participating in the behavior
- Providing feedback on the progress being made based on the number of people conducting the action
- Profiling success stories and opinion leaders who have adopted the behavior

What Strategies Help Cultivate Environmental Literacy?

Strategies to nurture and enhance the variables hypothesized to contribute to environmental literacy are numerous. Indeed, anything to promote environmental knowledge, enhance biospheric and altruistic values while decreasing egoistic values, or create lasting belief structures about environmental change and solutions could be used.

Unfortunately, research is less helpful in suggesting educational tools to build environmental literacy for a variety of reasons. The time period between an educational event and the opportunity to practice conservation behaviors is often so long that a huge number of other variables have exerted their influence, undermining whatever educational residue might have existed. If the time period is shortened and youth are involved in particular behaviors, one must question whether the influence of the teacher and peer group are more responsible for the behavior than the education. Finally, the outcome of these interventions — cultivating environmental literacy — is so vague it is difficult to measure consistently and with certainty.

This section explores two dimensions for which the research is promising — significant life experiences and environment-based education — as examples of strategies that may be useful in building environmental literacy.

Significant Life Experiences

Some of the most promising research explores significant life experiences. This research has employed multiple methodologies and samples, from surveying environmental educators to interviewing active environmentalists, in an attempt to determine the formative influences that led to their exemplary commitment to the environment. Chawla (1999)

asked noted environmentalists in Kentucky and Norway to recall the events and characteristics of their lives that helped shape their careers and avocations. The nature of this research limits its generalizability, however some common themes did emerge and suggest things that people believe are the influential elements of their lives:

- Childhood experiences of natural areas
- Family members, both siblings and adults, who valued the environment
- Pro-environmental organizations
- Experiences of the destruction or loss of environment
- School-based education, particularly opportunities to take action

These factors were corroborated in a review of other reports of significant life experiences (Chawla 1998) and complement the research findings on empathizing with nature (Schultz 2000). The factors most commonly mentioned in seven surveys of environmental educators or activists are: positive experiences in natural areas, adult role models, environmental organizations, education, negative experiences of environmental degradation, books and other media, and on-the-job experience (Chawla 1998). The similarity of these results is impressive, but the limitations of the methodology must be considered. For example, there are people who are not committed to the environment who had similar nature experiences to those who are in leadership roles. Conversely, there are conservationists who may have had few formative experiences in nature. The unique accumulation of experiences both in and out of school is important in shaping what we know and what we value.

Still, the role of childhood experiences in nature has drawn considerable interest, in part because of the shrinking available space in natural areas that are accessible to youngsters. One wonders if these childhood play spaces lead to the formation of the values to which Stern attributes responsible environmental behavior.

Young people may have a natural affinity to nature. Youngsters from both rural and urban middle class families attending private preschools demonstrated fairly complex attitudes toward the environment that are not correlated to their residence (Cohen and Horm-Wingerd 1993). The notion that young children should have an opportunity to play, explore, and have fun in the natural world is not new. Liberty Hyde Bailey and Anna Botsford Comstock built a nature study movement around this theme (Comstock 1939). Sobel (1996) recommends this strategy over using environmental issues and encouraging action in young children. By exploring close to home and focusing on play, Sobel believes young children will develop relationships with animals and natural places and grow to feel empathy for them. This foundation

may then evolve into environmentally responsible actions when older youth discover opportunities to develop pro-environmental behavior. Sobel's work (1996) offers an explanation of why young children should not be expected to save a rainforest in a different hemisphere. In interviews and through maps that children draw of their world, Sobel finds that the size of a 4- to 7-year-old's world begins with boundaries near home. From ages 8-11 that world expands to stretch the edges to a hiking radius as the youngsters explore new territory. From 12-15 years, maps often include town centers and socializing hubs, and often become larger and more abstract. Rather than introducing children less than 12 years old to complex environmental issues, abstract concepts, and the need for new behaviors, Sobel suggests that environmental curriculum be matched to children's ability to understand and explore their world. He specifically states that if empowerment is the goal, nature-based play and other activities that foster a love for the earth should be the precursor (Sobel 1996, 39).

The results of the work in significant life experiences are bolstered by research that points to the importance of experiences in nature, bonding with local environments, and socialization with supportive family and mentors to build values and beliefs that might lead to environmental literacy. Rachel Carson wrote eloquently of the "sense of wonder" that must be cultivated in children (Carson 1984) and Roger Hart echoes this sentiment: "an important aspect of pre-adolescent children's relationship to the natural world is that they are innately curious about it..." (Hart 1997, 18).

According to Kals, Schumacher, and Montada, both an emotional affinity toward nature and a cognitive interest in nature appear to be linked to past and present experiences in nature with family members and friends. Importantly, these two variables and a third, indignation about insufficient protection of nature, explained up to 47% of the variance in the willingness of German adults to sign a petition promoting measures to protect nature (1999).

The belief that experience in nature could contribute to environmentally responsible behavior, however, depends on that experience being positive. Bixler, Carlisle, Hammitt, and Floyd (1994) point out that some youth are fearful of nature. These negative preconceptions interfere with their ability to learn and enjoy the field trip. Familiarity with the natural environment plays a role in this fear, since nearly half of the reports of youngsters who express discomfort with big trees, deep woods, or snakes and insects also mention that the youth came from urban areas (Bixler, Carlisle, Hammitt and Floyd 1994). Bixler and Floyd (1997) suggest that a positive experience in nature may hinge on being socialized to enjoy outdoor experiences.

Environment-Based Education

Recent research on environment-based education offers another set of considerations. Environment-based education refers to those projects that are situated in the real world and engage youth in exploring problems and taking action (NEETF 2000). While some programs are based on traditional environmental issues like forest management, water quality, and habitat restoration, others use the social environment to tackle problems of hunger, child abuse, and drugs. Like action education, service learning programs, and projects that use the environment in an integrating context (Lieberman and Hoody 1998), environment-based education tends to incorporate outside partners, teams of teachers, constructivist models, and cooperative learning. Investigations of these programs indicate that teachers and students perceive them to be more engaging, more inspiring, and more valuable than traditional education (Lieberman and Hoody 1998). A comparison of students in these programs and in control classes reveals that environment-based education is responsible for increasing critical thinking skills, improving the disposition to use critical thinking, and enhancing achievement motivation for 9th and 12th grade students (Athman 2003).

Educators have long believed that some aspects of environment-based programs contribute to quality education. Students are involved in meaningful projects, solving problems that they might have selected, planning activities with the help of outside experts, and experiencing success (Hart 1997; Hammond 1994; Robottom 1994; Stapp and Wals 1994; Winther, Volk and Hungerford 1994). They are also engaged in something real, which in addition to empowering students with a sense of purpose provides a complexity that is not common in discipline-bound textbooks. This complexity could involve understanding connections between policy and environment, between hydrology and geology, between biodiversity and climate change, or between valuing nature and exploiting natural resources. Making these connections around an issue they choose enables participants to understand the issue in ways that are not easy to teach through traditional methods. The components of choice, responsibility, participation in decision-making, feedback with results, and clarity that are integral to environment-based education have been used in many different fields to empower learners, engage participants, improve training, and create appropriate development projects (Kaplan 2000). It appears they are working for environment-based education programs as well (Hammond 1996/97).

If these long-term, real-world, action-oriented educational projects can demonstrate improved academic skills that contribute to lifelong success, it would be interesting to learn the extent to which conservation information and a sense of responsibility for the environment are also conveyed. To date

much of the research on education using environmental projects has focused on the development of scholastic skills, not conservation behavior. Will these students reflect back in 20 years to call these projects a significant life experience? Since success with smaller scale challenges can breed an empowering sense of accomplishment that enables people to continue to solve problems (Weick 1984), it is indeed a possibility that environment-based education programs could have this type of long-term conservation value.

Project-based learning programs may enhance self-efficacy, which may be an important ingredient of environmental literacy, through a connection to a perceived ability to reduce a threat (Value-Belief Norm theory), or through locus of control (Environmental Citizenship Behavior Model). Self-efficacy is a belief about one's capabilities to exert influence over events that affect his or her life (Bandura 1994). It is such a broad concept that, when strong, it enables people to approach challenges with purpose and resolve, recover from failure quickly, and to maintain a positive attitude and well-being.

Three sources of self-efficacy are relevant here. Bandura claims the most effective way to create a sense of efficacy is by personally mastering appropriately challenging experiences. Vicarious experience — witnessing the success or failure of role models — is the second strategy for influencing efficacy. People can also be persuaded to believe they have the ability to succeed, a boost which may be enough to overcome self-doubts and disappointments (Bandura 1994). Thus self-efficacy may be more subject to change in the course of powerful educational experience than locus of control (usually explained as the belief that future actions are controllable, internal locus of control, or resigned to fate, external locus of control).

Thus, a group activity to identify, plan, and perform a community service or solve a local problem could begin with stories and examples of others who have solved similar problems and could be led by a teacher who knows when to encourage and bolster or when to detour to a lower level of challenge. Such an activity has the potential of teaching not only knowledge but also building a can-do attitude that may enable youngsters to rise to future challenges. There are challenges to this type of education, as one might imagine, but it is practiced with great success in Australia, Europe, and North America in various environment-based education programs (Hammond 1996/97; Bardwell, Monroe and Tudor 1994; Hungerford and Volk 1990).²

The challenge here is to offer educational programs and learning opportunities with mentors and families that are strong enough to support biospheric values and the formation of an ecological world-view in young children. As children grow and are developmentally able to engage in complex

issues, a variety of environment-based participatory programs could provide a chance to convey information about environmental issues; build self-efficacy; and develop skills in problem solving, decision making, and action taking. Key elements of these programs appear to be empowering students with choice, using local real problems, and enabling youth to witness the results of their activity. In addition to strengthening values and efficacy, these programs may help build a sense of obligation and a vision of success.

Building environmental literacy, however, is not limited to youth education. Young people are merely easier to reach through required formal education and nonformal youth groups. Because adults tend to approach learning with specific applications in mind (e.g., keeping pests out of the garden or land use planning decisions), it may be more difficult to separate adult environmental literacy activities from social marketing strategies that are purposeful and persuasive. According to a model of community-based environmental education, both avenues can easily be merged in an organized plan resulting from community involvement designed to match community interests (Andrews, Stevens and Wise 2002; Wisenfeld and Sanchez 2002). In this case, when people come together to address a community issue, an educational program may emerge to help identify a vision, provide training needs, build capacity, collect data, identify solutions, or implement a plan. Social marketing techniques may in fact be strategies that the community agrees to implement (McKenzie-Mohr 2000).

In summary, the following strategies could be useful in cultivating environmental literacy that could become an internal guide to enhancing conservation behavior:

- Interesting stories, case studies, and success stories of peers, environmental heroes, and community leaders
- Participation in project-based environmental problem solving
- Reinforcement for environmental values from family, school, youth groups, and community programs
- Frequent and sustained experiences in nature, starting in early childhood
- Opportunities for children to explore and creatively play in nature
- Partnerships with experts, mentors, older students, and leaders
- Investigating issues and working on their resolution
- Persuasive encouragement and support for actions to build efficacy
- Information about the environment, environmental issues, and the consequences of human actions
- Making connections between and among the various aspects of an issue or action to more thoroughly understand the choices and consequences,

- Acquisition and practice of action skills, both political and ecological

Summary

Changing behaviors, particularly those linked to Western cultural values such as independence, freedom, social mobility, or security is difficult. Messages about conservation behaviors compete with an overwhelming number of advertisements of consumptive actions that promise economic viability, status, and pleasure. But despite the lack of conservation behaviors among the North American public (Pelletier et al. 1999), there are glimmers of hope across a wide variety of research disciplines and conservation practitioners.

There are two broadly defined strategies that conservation organizations can use to work toward the goal of increasing environmental behaviors. In one strategy, social marketing tools are employed to change a selected behavior in a carefully targeted audience. Specificity leads to success by employing information and attitudes that are about the target behavior. In the other strategy, environmental literacy is cultivated and nurtured through selected educational programs that lead to knowledge, attitudes, skills, and ultimately but not immediately, environmental behaviors. Along the way, increased clarity, self-efficacy, and responsibility suggest that individuals will be more motivated and skilled to act appropriately. Readers will find that these two routes describe many different dichotomies, depending on their academic persuasion. Some will recognize the difference between communication campaigns and education programs while others see them as differentiating between changing behaviors and forming attitudes. The reality of how we communicate messages and educate people further differentiates these strategies by aligning social marketing with adult audiences and educational programs with youth. This need not be true, but contrary examples may be difficult to identify.

Which strategy to use should be determined after a careful consideration of the audience, an agency's or organization's mission, and the niche or opportunity they have to work on the issue. A group of citizens may use social marketing tools to make an environmental practice more convenient and successful in their community. A school system may use service learning projects to enhance literacy and academic achievement. Federal and state agencies may act within their legislative mandates to design prompts and incentives to nudge visitors toward key behaviors, while using informative success stories to provide models and instill a sense of personal responsibility for other actions. Studies have shown that each of these tools has the capacity to work. That we do not see widespread movement toward new behaviors speaks to the possibility that we aren't measuring behavior with a

detailed enough instrument, that we don't yet know everything about human behavior and change, that we are not employing these strategies often or effectively enough, or that these strategies are weaker than the barriers and countervailing forces.

These communication and education strategies can complement the traditional set of policies and regulations that guide environmental behavior. They offer practitioners a firm foundation in theoretical concepts that link information, attitudes, values, and behaviors. If orchestrated thoughtfully, they may help citizens adopt enduring and generalizable conservation behaviors while building meaningful and productive lives.

Endnotes

1. E-mail: mcmonroe@ufl.edu
2. See also Earth Force at www.earthforce.org and the National Service-Learning Clearinghouse at www.servicelearning.org

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