

DESIGNING EFFECTIVE EDUCATIONAL PROGRAMS:  
THE ATTITUDINAL BASIS OF MARINE LITTERING

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ABSTRACT

The worldwide concern with marine and coastal debris has sparked recommendations for various abatement interventions. Popular among them have been educational programs. Effectiveness of educational interventions directed toward changing environmental attitudes and behavior has, however, been found wanting, according to some recent assessments. It is argued that problems with educational abatement programs may stem from the lack of appreciation and lack of application of social science knowledge about the basis of environmental beliefs, attitudes, values, and human behavior which affect the environment.

Marine debris abatement efforts can be enhanced by basing them on social science knowledge in three relevant areas: 1) paradigms and the nature of environmental attitude formation; 2) the nature and constraints of the desired nonlittering behavior; and 3) research on attitude and behavior change, including recycling and land litter abatement. Each of these topics is reviewed, with recommendations about its application to marine debris abatement.

INTRODUCTION

At the conference on the topic of fisheries-generated marine debris and derelict fishing gear held approximately 1 year ago in Portland, Oregon, educational programs were assessed by one participant as the most popular marine debris abatement approach. He stated that they are "politically attractive, do not cost much and meet other favorable criteria." However, the author also noted that such programs "often have only modest effectiveness and lack permanence" (Alaska Sea Grant Program 1988, p. 7).

The thesis of this paper is that one of the reasons for the limitation of these educational programs is the failure to understand fully the human and social causes of the problem. It is proposed that this shortcoming is due to the limited participation by social scientists in addressing the

problem. Physical scientists have assessed the extent and nature of the impact of marine debris. From this data base has evolved a determination that a "problem" exists. But the definition of the problem has remained too strongly physical because it lacks the additional perspective of environmental issues provided by the social scientist.

An example of this lack of appreciation of the social component of the marine debris problem is seen in the recommendations made by the Inter-agency Task Force on Persistent Marine Debris formed by the White House Domestic Policy Council. The task force recommended that 1) the (marine debris) problem be quantified, 2) the sources be determined, and 3) ways be found to reduce plastic debris from all sources.

The phrasing of the document suggests that the "source" of the problem is merely a physical location or use or particular economic activity seemingly devoid of human input. Review of this and other documents similarly phrased revealed that there was a missing step in these recommendations. Simply put, the missing step is to ask, "Why do litter and debris exist in the marine and coastal environments?"

The goal of adding this question is to refocus the problem-solving to recognize that human behavior is the cause of the litter and debris and not just a "source." If the human nature of the problem is not addressed in the problem-solving efforts, educational interventions cannot be effective but appear as an afterthought because "something must be done." It is contended that answers to the question of why debris exists must be determined and understood before and if "ways [are to] be found to reduce plastic debris from all sources."

#### SOCIAL SCIENCE FINDINGS RELEVANT TO MARINE DEBRIS ABATEMENT

With the goal of addressing this issue of the human cause of marine debris, three relevant social science topics will be briefly examined. The three topics are:

1. paradigms and the nature of environmental attitude formation,
2. the nature and constraints of the desired nonlittering behavior in the marine environment, and
3. research on attitude and behavior change including recycling and land litter abatement.

Each of these topics is reviewed with recommendations about its application to marine debris abatement.

#### The Nature of Environmental Attitude Formation

##### Societal Paradigm

Members of a society share a common world view embodied in beliefs, attitudes, and values. This world view, frequently referred to as a

paradigm, emanates from the experiences of the members of the society and is functional to the society in that it supports the society's efforts to survive. While the paradigm does not necessarily answer important questions, "it tells us where to look for answers" (Babbie 1989). It also becomes the basis for choosing problems that can be assumed to have solutions (Kuhn 1970). When the existing paradigm no longer serves the members of society, it changes as the established agreed-upon paradigm is modified in favor of a new one(s).

Within each society, subgroups share paradigms useful for supporting their experiences and position in society. For example, different scientific disciplines have different paradigms as do other occupational groups. In order to understand the basis of behavior of members of a society, it is important to appreciate both the general world view of the larger society and those views of the subgroups about which you have specific interest. Both the general and the subgroup will be discussed below.

The paradigm common to the American society has been characterized as the "dominant Western world view" (Dunlap and Van Liere 1984), the "technocratic" paradigm (Drengson 1980), or the "human exemptionalist" paradigm (Catton and Dunlap 1980). This paradigm sees the relationship between humans and the environment as one in which humans utilize the environment for their betterment, even at the expense of the environment. Based on the Judeo-Christian heritage, this paradigm assumes a human superiority over other organisms bequeathed to humans by their special relationship with God. Contained in this perspective of superiority is the belief that any problems which befall the environment during its exploitation can be remedied by humans through technology. A society which holds this paradigm believes that it is exempt from conformity to the natural ecological laws because of its ability to overcome any environmental problems.

The American extension of this paradigm divides the environment into parts which are privately owned for the gain of the owner and parts which are publicly, or commonly, owned (Hardin 1968). The "commons" is shared for the betterment of all members of the society. However, as Hardin (1968) notes, such a common betterment for all becomes impossible once the ratio of the population to the environment surpasses its "carrying capacity." At that point the common good suffers as the individual benefits from use of the commons.

Industrial pollution and littering behavior represent the use of the common for the betterment of individuals and their economic interests. Belief in the right of individuals to so use the commons for their interest is an important belief contained in the American paradigm. Throwing something "away" means simply putting it into the commons when it no longer serves the person's needs.

The strength of this tenet within the western paradigm is evident when we consider the "absurdity" of the idea that all pollution, every single bit, should be totally banned from the commons. To paraphrase, what general societal support would there be for the total prohibition of environmental degradation in all commonly shared environments--air, water,

and public lands? The economic interests would argue that such a position would cause mass bankruptcies. Average citizens would also resist such a ban when they came to realize how it would affect the consumer-oriented lifestyle which has also evolved from the paradigm.

Discarding refuse into the ocean becomes an obvious extension of this paradigm. A series of studies done by sociologists Dunlap and Van Liere (1978, 1984) sought to determine to what extent such a degrading orientation toward the environment was linked to subscription to the western paradigm. In other words, does a person's belief in the dominant western paradigm affect his or her attitudes (and behavior) toward the environment? Van Liere and Dunlap (1980) broke the paradigm down into eight dimensions:

- support for laissez-faire government,
- support for the status quo,
- support for private property rights,
- faith in science and technology,
- support for individual rights,
- support for economic growth,
- faith in material abundance, and
- faith in future prosperity.

Three of these dimensions of the dominant western paradigm were associated negatively with the environmental attitudes scales they also developed. The greater the support for the following, the less the support for the environment:

- support for private property,
- support for economic growth, and
- faith in material abundance.

We may, thus, propose from these research findings that individuals who subscribe closely to the dominant western paradigm--particularly support for private property, economic growth, and belief in material abundance--will more likely not hold proenvironmental attitudes. If such proenvironment attitudes are not held, it is more likely that littering behavior, such as that which results in marine debris, will be exhibited.

An alternative paradigm is evolving as the current paradigm becomes less functional. The paradigm which would reduce the stress on the environment is called the "new environmental paradigm" (Catton and Dunlap 1980) or the "person-planetary" paradigm (Drengson 1980). This paradigm accepts the fact that humans are subject to the same ecological laws as other organisms, and when humans degrade the environment, they are not always able to repair it with technology.

A "paradigm shift" (Kuhn 1970) by the majority of the populace may occur more rapidly than might be anticipated given the escalating environmental problems. Recent political deliberations in southern California were directed at reducing air pollution conditions that are no longer acceptable. The proposal included restricting each family to owning one car and requiring that the family members work near where they live. A

recent proposal by the U.S. Environmental Protection Agency directed toward reducing acid rain indicated that the solution could come with a required dropping of interior household temperature during the winter. While the dominant western paradigm still prevails, the fact that "responsible, mainstream" public officials were making these proposals suggests that the paradigm is shifting.

Educational interventions directed toward antilittering in the marine environment can benefit from an awareness of the target population's paradigm. If it is determined that they subscribe to the traditional paradigm, efforts toward modifying their world view should be included in the communication along with the message directed toward the specific change in littering behavior. If on the other hand, they are shifting their paradigm, then the communication can benefit from "tapping" this new orientation in the message.

### Subgroup Paradigms

Besides the general societal orientation toward the environment, subgroups of the population have been found to vary in their attitudes toward the environment depending on their relationship to it. Awareness of these subdifferences can also benefit educational interventions directed at target populations.

For example, Louisiana has both the most active offshore oil extraction activities in the United States and some of the most prolific spawning grounds for fish and shellfish in the United States. Thus, coastal users include large groups of fishermen and offshore oil rig employees. Should we expect to find these groups different in their attitudes toward marine littering or the same? Popular opinion might argue that the oil rig employees would be likely to have less concern for the environment than fishermen whose livelihood depends on a healthy environment.

Research findings, however, suggest the contrary. Rural residents have been found to be less proenvironment than urban residents because they work in agricultural and mining activities which approach the environment in a more utilitarian, exploitative fashion (Lowe and Pinhey 1982). It is thus likely that the fishermen and oil workers will be more similar than different in their environmental attitudes. Louisiana fishermen have a reputation for considerable littering, as do oil rig employees. They also have strongly resisted steps taken by the Federal Government to protect the environment, such as the requirement that they use turtle excluder devices (TED's) while shrimping to protect the Kemp's ridley sea turtles.

The exploitative orientation toward the environment of some jobs may not be the only influence which engenders human exemptionist attitudes in those whose livelihood depends on the environment. Companies for which such individuals work may themselves have company "cultures" reflecting similar orientations. It may be more cost-effective to use the commons for refuse, and this belief is learned as employees learn what is expected of them on the job. Personal worker economic motivation to perform well on the job compounds their own inclinations to litter.

Other individual characteristics have been found to affect attitudes and behavior toward the environment. Small town residents appear to also be less proenvironment. Van Liere and Dunlap (1980) explain this observation with the "progrowth" orientation of small towns. Urban residents have, to the contrary, been found to be more proenvironment. Environmental deprivation theory is used to explain this finding: Urban residents experience higher levels of pollution and environmental degradation and can thus make a comparison between the existence and nonexistence of pollution, which results in developing a proenvironment orientation (Dillman and Christenson 1972). In addition, urban residents are more likely to appreciate a "social solution" to environmental problems because they experience control over their built environment (Lowe and Pinhey 1982). Thus, they are willing to accept the existence of a problem because they perceive it as solvable. Take for example the predominance of urbanites in the groups who are involved in the annual beach cleanups.

In addition to geographic location, education, race, sex (Sigelman and Yanarella 1986), social class (Buttel and Flinn 1978), and age (Hamilton 1985) have been found to predict attitudes toward the environment. Income has not been found so strongly associated (Constantini and Hanf 1972; Sigelman and Yanarella 1986). Van Liere and Dunlap (1980, p. 190), in summarizing the findings from numerous studies of social characteristics, indicate that the association between income and environmental concern is "quite ambiguous and fail[s] to support the hypothesized positive association." This ambiguity may be due to changes which are taking place in the way in which the less affluent view environmental problems. While they value the jobs that come from industry, which often pollutes, they are becoming more aware that the pollution from such activity often is discarded closer to their communities than to those of the more affluent (Bullard and Wright 1986).

Similar changes may also be occurring in some of the relationships found in the subgroups reviewed above. While fishermen may not have traditionally been inclined to be concerned with the environment, the depletion of the resource such as the threat to the Gulf of Mexico redfish population may also begin to change their orientation to the environment as well.

It is important that the educational interventions being developed to reduce beach and marine debris are oriented toward the expected attitudes which various target groups might hold toward the environment, and that support be given to maintain current information on the attitudes which coastal users hold so that the intervention is relevant to the orientation.

#### Characteristics of Nonlittering Behavior

In addition to appreciating the orientation which coastal users have toward the environment, it is important to understand the nature of the behavior which the educational program attempts to change--i.e., marine littering--and the meaning given to that behavior by those who do it. Conversely, it is also important to recognize the characteristics of the desired behavior--nonlittering--which make conformity to it more difficult than other environment-oriented behaviors.

### Complexity of Desired Behavior

Nonlittering behavior in the marine and coastal setting contains both a "don't do" and a "do" component, making its successful implementation somewhat complex. It is desired that individuals not discard that which is no longer of value to them into the commons--i.e., into the water or along the beach. Then, it is desired that individuals maintain the item in their personal space--in their pocket, on the boat, on the oil rig, with camping and fishing gear--until they are able to discard it in an appropriate refuse-collecting device or area such as a trash barrel, dumpster, junk yard, or landfill.

### Inconvenience

Nonlittering behavior in the marine and coastal setting is an inconvenience to the individual because the appropriate refuse-collecting device is frequently not in the immediate vicinity. It may be at the beach entrance, at a nearby gas station, at home, or, for larger items, at a special location requiring an even longer trip. The inconvenience is defined by the length of time the individual may have to maintain the item which no longer has utility within his or her personal domain--often extended if out at sea--and by the fact that it is occupying part of a very limited space--fishing boat, oil rig, freighter, camper.

### Limitations of Social Control

Littering in the marine and coastal setting is frequently done when there are no other people around to observe the behavior. Or, if others are present, they are experiencing the same need--to discard no longer useful items taking up precious space. Or, the observers are strangers or at such a distance that the litterer can maintain his or her anonymity while violating the norms. This means that the behavior can frequently not be controlled by the knowledge that someone else is observing them doing something contrary to the norm, a manner in which much desired behavior is encouraged.

An anecdote demonstrates norm-control dynamics and the way a litterer can attempt to avoid them. Last summer on a Florida beach, I watched a well-coiffured, expensively dressed beachcomber with cigar in one hand and a soft drink can in the other stop on a crowded beach to dig a small hole in the sand with his toes. He deposited the empty soft drink can in the hole, covered it over, and walked on. This behavior suggested to me that he knew littering was against the norm. If, however, he could hide the object, he would be able to avoid the possible scorn of the onlookers or rationalize that he had not littered because the object was no longer visible--one of the most commonly mentioned qualities of litter being that it is an eyesore.

### Impact Not Obvious

The effect which the littering behavior is having on the environment is not seen or appreciated by the litterer because the discarded item frequently disappears under water or sand. Even when it does not disappear,

the beach and the ocean are so vast that the ratio of litter to commons is miniscule. It is difficult to appreciate the significance of one Styrofoam cup tossed off an oil rig into a vast ocean. Or even a piece of fishing gear or the waste from an ocean-going vessel.

### Implications for Behavior Change

It is argued that awareness of these particular qualities of marine and coastal littering and nonlittering behavior can contribute to the development of more effective educational interventions directed toward curbing such littering behavior.

First, awareness that there is a lack of a clear antilitter norm in the marine environment and a lack of critical observers to enforce whatever norm there is should reduce emphasis on norm conformity in educational programs.

Second, it would be expected that educational campaigns which present graphic evidence of the impact of littering on wildlife--such as the ones recently developed--would improve antilittering behavior. They would help the individual become aware of the impact on the environment of even one small discarded item, albeit seemingly insignificant and invisible when the littering act is committed.

Third, educational campaigns should be implemented in conjunction with strong efforts to provide very convenient locations for disposal of marine refuse.

Examples of the linking of education and convenient refuse disposal are available in the recycling efforts of some communities. One successful pilot community recycling program in Louisiana has stackable containers for curbside pickup clearly marked for glass, aluminum, and paper. The effort to conform is thus quite minimal.

Similarly, studies should be conducted to determine the most convenient refuse disposal configuration at beaches, boat launches, marinas, and harbors. Some disposal services might best be reached from the water so that refuse does not have to be carried onto land by hand. Also, litter bag dispensers could be placed at convenient locations near boat launches and docks to encourage convenient on-boat refuse storage. With such accommodating refuse disposal facilities in place, beach or dockside antilitter signs would be encouraging a more feasible behavior. Once the marine user is practiced in such nonlittering behavior, the behavior will seem "more natural" and such attention to convenient refuse disposal will not be so important. This would be a case of learning to cope with natural hazards (this hazard being to marine life) through participation, as proposed by Sorensen and Mileti (1987).

An example of such facilitating assistance has been tried with success at several Louisiana fishing rodeos. When registering for the rodeo, each entrant was given a trash bag, with a request that it be used and returned to the registration desk at the end of the day. Those entrants who returned their bags filled with the day's refuse qualified for a special drawing for

several significant prizes. The bags were donated, as were the prizes, in return for public recognition that the companies had performed the public service. While the prize component of the activity may not be conducive to continuing the behavior after the fishing rodeo (see below), it might not have a negative effect if the bag contained a recommendation to always take along a trash bag and if trash bags were conveniently dispensed at docks and launch sites on a regular basis.

#### **Research on Attitude and Behavior Change Including Recycling and Land Litter Abatement**

The third social science topic of relevance for improving educational programs directed toward marine debris abatement is the research on attitude and behavior change. Research has been conducted on the content of successful persuasion communication in general and on persuasion directed toward specific attitude and behavior changes. These include self-help behaviors related to health, safety, crime and natural hazards protection (see Weinstein 1987 for a useful review), and energy conservation, recycling, and litter abatement on land. A review of theories useful for attitude and behavior change with regard to solid waste demonstrates the utility of this literature.

There is little systematic theory concerning the social psychological variables which influence littering (Reich and Robertson 1979). However, several theories have been found to be useful in changing littering attitudes and behavior. These include reactance theory (Mazis 1975); cognitive dissonance theory (Weigel and Weigel 1978; Shipee et al. 1980; Cook and Berrenberg 1981) or balance theory (Winham 1972); saliency theory (Cook and Berrenberg 1981); and Bem's self-perception theory (Arbuthnot et al. 1976-77; Pedersen 1979; Pardini and Katzev 1984). Each of these theories explains behavior based on an assessment which people make about themselves or those around them.

Reactance theory asserts that "when a person believes himself free to engage in a given behavior and his freedom is eliminated or threatened with elimination, the individual experiences psychological reactance" (Mazis 1975). When this occurs, the planned intervention results in behavior opposite to what is desired. An example is the TED which has been so strongly resisted by shrimpers in the Gulf of Mexico. While preventing all resistance to the TED's would have been impossible, a greater appreciation of the likelihood of reactance might have engendered different approaches by the environmentalists. Likewise, by knowing what coastal users believe they are free to do in the coastal environment, litter abatement interventions can be developed which will be less likely to cause such reactance.

Dissonance theory also has potential utility. It proposes that dissonance may occur for individuals among various values and beliefs which they hold and observations which they make. When this occurs, a person tries to reduce the dissonance. A person might interpret the observation such that it supports values and beliefs already held. Such dissonance may exist for the marine and coastal user with regard to littering. By determining whether it does, educational programs can be developed encouraging certain attitude and behavior change to "assist" coastal users in reducing their dissonance.

Saliency theory applied to conservation behavior "impl[ies] that the salience of proconservation attitudes will be enhanced primarily through or in anticipation of associations with others" who share proconservation attitudes (Cook and Berrenberg 1981, p. 82). When such persuasions are implemented, the presence of those holding nonlittering attitudes would be likely to increase saliency. Their presence can also be felt by presenting their proconservation statements in their absence or by asking residents to make public commitments to proconservation behavior. Beach cleanups are an example of a way to enhance the saliency of nonlittering behavior. Individuals make a public commitment to proenvironment behavior in the presence of other like-minded individuals.

Likewise, Bem's theory of self-perception can be applied to changing marine littering behavior. Bem proposes that behavior change occurs after a person changes his or her self-image to one capable of the new behavior (Arbuthnot et al. 1976-77). This self-image change can be assisted by educational programs that require small behavior change commitments to start the process of self-image change. Arbuthnot et al.'s successful experiment required minor recycling commitments which then led to a willingness to undertake more extensive recycling. Refuse disposal such as recycling at marinas and harbors could be approached in such an incremental way. Based on this theory, educational programs which encourage refuse disposal by giving prizes would not be expected to work over the long run because individuals do not have to change their self-image. The motivation to dispose correctly remains external to them, i.e., a prize given by someone else.

#### CONCLUSION

It will not be easy to integrate even the few concepts and theories presented in this paper in addressing the marine debris problem. It will be even more difficult to determine and apply the appropriate theories when social science research on relevant topics is more thoroughly reviewed. However, motivation to address the existing research and to respond to it can be found in recognizing the difficulty of success with educational programs in light of resistance from the existing human exemptionalist paradigm. Human behavior is the result of very complex social psychological processes influenced by the structure of the society in which the person lives and his or her position within that society. To have a modicum of lasting success in behavior change, "one needs all the help one can get." It will require a cooperative effort of both physical and social scientists to provide the knowledge base needed by those working directly with the marine debris problem to address its solution in a timely and successful fashion.

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