DETERRING MINOR ACTS OF NONCOMPLIANCE

A LITERATURE REVIEW

MARK E. VANDE KAMP, DARRYLL R. JOHNSON, THOMAS C. SWEARINGEN

Signs Fines Information Uniformed Presence Rewards Education Group Size Limits Fear Appeals Barriers Reminders Site Design Persuasion Use Limits Social Pressure

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Introduction

Jim is a visitor to Paradise Meadows in Mt. Rainier National Park who has just set off on a short hike. Walking along the paved trail about a quarter-mile from the visitor center he notices a particularly brilliant patch of wildflowers. Taking out his camera, he walks ten steps off the path to get a close-up photograph.

Gina is a visitor taking a short day hike along an easily accessible trail in Petrified Forest National Park. She is fascinated by the setting, and wants a souvenir to remember the trip by, so she picks up a small piece of petrified wood and slips it into her pocket.

What are Minor Acts of Noncompliance?

Every day, visitors like Jim and Gina damage and destroy the resources of America's national parks. The damage caused by their actions typifies the many descriptions of damage collected in a system-wide survey conducted by the authors of this review (survey results are described in the companion document to this review; Johnson, Vande Kamp, and Swearingen, 1994). In the survey, managers at National Park Service (NPS) administrative units described the damage caused when visitors broke park rules or did not follow park guidelines (i.e., damage caused by visitor noncompliance). The survey found that in the national park system, visitor noncompliance has caused damage that will cost about $80,000,000 to repair, and that an additional $18,000,000 in recurring annual clean-up and repair costs are associated with visitor noncompliance. Perhaps more importantly, 66% of all units reported damage to irreparable resources caused by visitor noncompliance. Clearly, park managers perceived visitor noncompliance to be a significant problem.

When imagining acts that cause damage to the national parks, many people think of major acts of vandalism or looting rather than the minor rule breaking described above. However, the dollar figures from the survey should not include the damage caused by such spectacular forms of noncompliance. Respondents to the survey were instructed:

Noncompliant visitor behaviors are defined as minor rule violations or failures to comply with minimum impact guidelines. Examples include: off-trail hiking, souvenir collection of plants and rocks, feeding of wild animals, littering, etc. Minor acts of vandalism, such as name carving in picnic tables are also considered noncompliant behavior for the purposes of this project. However, vandalism where substantial resource damage is caused by a single act is not included. Similarly, damage to park resources motivated by obvious criminal intent (poaching, large scale artifact theft) is also excluded from this study.

Keeping this definition of noncompliance in mind is important when interpreting the survey results. The definition also plays a major role in shaping this review. Rather than considering the deterrence of criminal behavior such as major vandalism or poaching, this review focuses on deterring noncompliance with minor rules, attempting to answer questions such as, "How can we keep Jim on the path?" or "What will convince Gina to resist the impulse to pick up a souvenir?"

The Deterrence of Noncompliance and the Dual Mandate of the National Park Service
Given that minor acts of noncompliance are a common part of most peoples' lives (when was the last time you drove over the speed limit?), designing effective programs to deter such actions is a daunting challenge. This challenge is even more formidable in the national parks because of the need to balance the preservation of natural resources against the provision for their public enjoyment as decreed in the NPS dual mandate. According to the National Park Service Organic Act, the mission of the National Park Service is:

> ... to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations.

Consider the validity of each of the following statements in relation to the NPS mandate: 1) Allowing visitor noncompliance to damage NPS resources is contrary to the NPS mandate to preserve park resources "unimpaired for the enjoyment of future generations."

2) Controlling visitor noncompliance by severely limiting the total number of park visitors, through oppressive observation and/or rules, or by any other means detrimental to the visitor's experience of the park is contrary to the NPS mandate to "provide for the enjoyment of the [scenery and the natural and historic objects and the wildlife therein]."

Given that both statements are valid, it is clear that the dual mandate of the NPS could best be satisfied if visitors were persuaded to comply with NPS rules using methods that did not negatively affect their park experience. One of the primary goals of this review is to summarize and evaluate methods of social influence (i.e., visitor control) that hold promise for attaining this goal. However, because some decrease in visitor enjoyment may be justified in cases where damage is particularly likely or is irreparable, this review also considers methods of visitor control that potentially, or even inevitably, have negative impacts on visitors' experiences. Thus, this review represents our attempt to summarize the literature relevant to the general question, "How can we deter noncompliance with NPS rules and guidelines for visitor behavior?"

Narrowing the Focus

Control of noncompliance in the national parks is complicated by the diversity of settings and visitors found in the parks. For example, an intervention that reduces the use of illegal campfires deep in the backcountry would not necessarily reduce off-trail hiking in the areas immediately adjacent to a major visitor center. In order to reduce the complexity of the noncompliance problem, this review focuses primarily on the control of noncompliance in areas of the parks easily accessed by tourists or day-hikers (what we call *frontcountry* areas[1]). There are two reasons for this focus. First, according to the companion NPS system-wide survey (Johnson, Vande Kamp, and Swearingen, 1994), most damage due to

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[1] In this review, we use the term *frontcountry* in referring to any area of any unit of the NPS that is readily accessed by tourists or day-hikers. This definition suits our purposes, in that the resources of the NPS are categorized based on the type of use they are likely to receive. Accordingly, some areas technically classed as backcountry or wilderness areas are included in our definition of frontcountry.

noncompliance is focused in frontcountry areas. And second, almost all NPS units have frontcountry areas, but many units, such as battle memorials or other historic sites, do not contain backcountry or wilderness. Although park managers wishing to control noncompliance in backcountry areas may gain some insights from this review, the discussion and conclusions that follow may or may not be applicable to backcountry noncompliance.

The Organization of this Review

The literature reviewed here was gathered from several fields of behavioral science including sociology, leisure and recreation science, social psychology, and environmental psychology. Research relevant to noncompliance was organized into five basic categories roughly representing the different theoretical bases of the research. These categories include: 1) investigations of the commons dilemma; 2) applied behavior analysis of noncompliance; 3) approaches emphasizing the social environment and its effects on noncompliance; 4) investigations of individual differences related to noncompliance; and 5) noncompliance as affected by punishment and other negative consequences.

Each of the first five chapters of this review concerns research from one of these categories, and some chapters are further divided into sections reporting distinct lines of research. For example, the third chapter consists of four sections: 1) perceptions of the rule's legitimacy; 2) perceptions of the rule-maker's legitimacy; 3) social norms; and 4) group effects.

Each chapter or section up to and including the fifth chapter will concern three aspects of a line of research: 1) description of the research including its theoretical grounding; 2) discussion of the relevance of the research to the control of noncompliance in the national parks; and 3) a summary of implications for the control of noncompliance based on the research findings.

The sixth chapter presents implications for the control of noncompliance based on the various lines of research. The implications are brought together in a general summary that points out findings that are consistent across the different approaches or otherwise

sufficiently important that they were included in a final set of implications intended to be useful to NPS managers.

The seventh and final chapter of the review begins with a very brief description of the current state of affairs in the national parks in regard to the control of noncompliance. Based on this description and the implications presented in the sixth chapter, recommendations are then made for the administration and goals of a research effort intended to design and evaluate programs that combine multiple interventions to deter noncompliance.

Theory and Application in this Review

The literature we have reviewed presents, at best, a fragmentary picture of noncompliance and the methods that might be used to deter it. Most of the research reported in the literature was intended to test specific aspects of social theory, and is often difficult to relate to such applied questions as, "How can this information be used to deter noncompliance?" or "How much noncompliance can be deterred by applying this information?" In this review we intend to explain the theories underlying the research and point out areas where they most require substantiation, but our primary focus remains fixed on the applied questions. In other words, this review's target audience is the NPS manager who is interested in finding interventions that decrease noncompliance, rather than the researcher who is interested primarily in developing social theories of noncompliance. Despite this intention, we hope the review appeals to a broad spectrum of readers from both groups.

I. The National Parks As A Commons Dilemma

What is a commons dilemma?

A commons dilemma is a situation in which the actions of individuals who utilize a common resource lead to short-term personal gains, but also degrade the total value of the resource. The prototypical example of such a situation is attributed to Lloyd (1833):

> Each of ten people owns one 1,000 pound bull, and all ten bulls graze upon a common pasture that is capable of sustaining them all. If an additional bull is introduced the weight of each bull would decrease to 900 pounds; that is, with the introduction of an additional bull, the pasture could support only 9,900 pounds of cattle rather than 10,000. Any individual who introduces an additional bull has increased his wealth by 800 pounds because he now has two 900 pound bulls rather than one 1,000 pound bull. But the total wealth has been reduced by 100 pounds, as has the wealth of each of the other individuals. (p. 97)

This example shows that even rational persons who understand the full implications of their actions may still choose to behave in ways that contribute to the degradation of common resources. However, most persons in commons dilemmas probably do not understand the full consequences of their actions -- they simply act in ways that appear likely to yield the highest individual return (Edney and Harper, 1978). Whether or not persons understand the collective consequences of their actions, unregulated use of common resources almost always increases until the resource collapses (Edney and Harper, 1978)

The potential for a commons dilemma exists whenever there is a shared public resource, and there is presently no effective and accepted means of dealing with these dilemmas. As a result, commons dilemmas frequently arise. For example, bluefin tuna have recently been over-fished to the point that a single fish can command a price of $35,000 in the Tokyo market (CBS evening news, March 8, 1992). And yet, Japanese fishermen and fish salesmen have effectively opposed any regulation of the tuna fishery because each of them stand to make a profit on the sale of any fish that do reach market.

The national parks are also a common resource, and many are currently being degraded by the commons dilemma. For example, this review began with the story of Jim, whose actions clearly illustrate the commons dilemma. By walking off the established trail to photograph some wildflowers, Jim produced an immediate personal award (the opportunity to take a pretty photograph), but also contributed to the long term degradation of the resource (the killing of native vegetation, creation of barren social trails, and decrease in photo opportunities for all). Many other noncompliant actions that tempt park visitors similarly degrade the resources of the national parks.

Currently, the most widely accepted theoretical interpretation of the commons dilemma is that proposed by Platt (1973) who interpreted commons dilemmas in light of the mechanisms of operant conditioning. Operant conditioning is a basic form of learning in which a response that is rewarded is repeated and a response that is punished is avoided. In operant conditioning, rewards following the behavior closely in time are more effective than those that are further removed. Platt believed that a commons dilemma arises when the same behavior results in both a short-term reward for the individual and a long-term negative outcome for all the individuals in the situation. Although the long term consequence may be of greater economic or social importance, the short-term reward controls the behavior because it is more salient to the individual. Thus, the commons dilemma is seen as an inevitable result of behavioral principles.

The National Park Service as the Guardian of a Common Resource

The national parks differ from most common resources in that they are not unregulated, but are governed by the NPS. Although the mere presence of such a regulatory agency can not guarantee the preservation of a resource, discussions of the commons dilemma agree that the creation of a regulatory agency, or some similar system of "mutual coercion mutually

agreed upon" (Hardin, 1968) is a crucial step in averting the destruction of the resource (see also Platt, 1973).[2]

The presence of the NPS is also critical in defining the focus of this review. First, without a governing agency to set rules and guidelines there could be no noncompliance because it is impossible to violate rules that do not exist. Second, by focusing on research that specifically investigates noncompliance with rules and guidelines, this review concerns the implementation of regulatory action rather than the initial creation of a regulatory body to oversee a common resource. Third, our focus on noncompliance sets this review apart from previous attempts to investigate the broader category of all behaviors that degrade natural resources (i.e., depreciative behavior). And finally, our focus on noncompliance limits the relevance of most research on the commons dilemma, which deals almost exclusively with unregulated resources. Despite this limitation, research concerning the commons dilemma contributes several insights relevant to the understanding of noncompliance in the national parks.

Characteristics of effective governing agencies. One relevant article from the commons dilemma literature goes beyond the discussion of unregulated common resources and proposes several characteristics that a regulatory agency should possess in order to effectively implement regulation of a common resource:

> Management of a common pool resource normally requires extensive investment in information-gathering facilities concerning the nature and extent of the resource, the demand or patterns of use, and an assessment of the likely consequences of alternative management programs. In addition, a jurisdiction may need a complex mix of taxing and pricing powers to distribute the costs of the enterprise in a way that will lead toward an optimal pattern

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[2] Some theorists might argue that the national parks are not a commons because they are regulated by the NPS. There is technical merit to this point, but the commons dilemma remains applicable to the national parks because they are a collectively held resource in which a wide range of uses and behaviors are often perceived to be minimally regulated or unregulated.

of use. It may also need police powers to enforce various regulations designed to achieve the desired result (Ostrom and Ostrom, 1977; p. 161).

The first characteristic of effective regulatory agencies, investment in information-gathering, is easy for employees of research offices (such as ourselves) to advocate. Nonetheless, policy decisions based on good information are likely to be more effective than those based on bad information or no information at all. This review is an early step in assessing the likely consequences of many types of management programs. In combination with other systematic efforts to gather information about park resources and users it should lead to more effective management.

The second characteristic, flexibility in taxing and pricing, may be somewhat confusing. By taxing and pricing, Ostrom and Ostrom are referring primarily to the methods by which the use of the resource is allocated, and these methods need not directly involve money. For example, one method of pricing that has been discussed as an option in national parks and wilderness areas is to require that overnight visitors demonstrate knowledge of low-impact camping techniques. The freedom to invoke such novel methods of resource allocation may be crucial to the preservation of the resource.

The final characteristic, the option to invoke powers of enforcement, is already available to the NPS. However, the use of such direct enforcement is controversial (cf. Lucas, 1990; McAvoy and Dustin, 1983). By continuing to gather information, we may eventually learn when and where direct enforcement is necessary and what effects it has on visitor experiences.

Regulating a resource that is valued for its lack of regulation. The regulation of many national parks is complicated by the fact that part of the value of the resource is the perception of freedom or wilderness that people experience while visiting. The preservation of such a "wilderness experience" is of most importance in backcountry areas. However, the opportunity to experience frontcountry areas such as scenic vistas, caverns, and historic

structures without the intrusion of direct means of control such as barriers or regulatory signs is also desirable and park managers sometimes seek to preserve this experience by minimizing the evidence that the resource is regulated.

Although efforts to provide visitors an environment free of behavioral controls may maximize their enjoyment, it is also likely to create an appearance that the resource is unregulated. We have already noted that the behavioral principles underlying the commons dilemma make it extremely likely that unregulated resources will be degraded and destroyed by unrestrained use. In response to such damage, many parks use education-based means of control that do not intrude into the park environment. These means of control are generally presented to visitors upon park entry or in visitor centers and include information about resource damage and persuasive messages designed to increase compliance with park rules. Such informational strategies may deter some noncompliance, but most literature concerning the commons dilemma concludes that information about the state of the resource and calls for voluntary limits on use are not sufficient to prevent resource destruction. Linder states (1982; p. 190), "Unfortunately, in most situations feedback alone does not seem to deter consumption... Instead, some form of regulatory authority must be used..." Similarly, Dustin and McAvoy (1980; p. 40) paraphrase Hardin (1968), saying, "Hardin contends that education alone will not result in the desired change... The only realistic solution to this problem, Hardin maintains, is that of 'mutually agreed upon coercion'." And finally, Ostrom and Ostrom conclude (1977; p. 159), "Solutions to common pool problems inevitably involve some form of public organization to assure collective decisions that can be enforced against all users. This requires recourse to the coercive capabilities inherent in governmental authority." Clearly, the analysis of commons dilemmas suggests that education-based means of control are not sufficient to protect park resources.

Morals and Values in the Commons Dilemma

To this point, our consideration of the commons dilemma has hinged on the assumption that persons will act to gain short-term rewards when utilizing common resources. Although the literature on the commons dilemma emphasizes the validity of this assumption, there are

situations in which it does not hold. Several authors have described one such situation by stating that a commons dilemma can be averted through the development of a "...fundamental extension of morality" (Hardin, 1968). In other words, individuals will not act to gain short-term rewards when their values specify that such actions are morally wrong. At least some of the educational or information-based means of control used in the national parks attempt to instill values that are inconsistent with noncompliance and park resource damage. However, statements by Hardin (1968) and Crowe (1969) that it is very difficult to effectively teach such values suggest that such means of control are unlikely to be effective.

Because the literature on the commons dilemma has little more to say about morals and values, their usefulness in controlling noncompliance may appear minimal[3]. However, the recognition that value systems can affect visitors' likelihood of following park regulations has some utility for NPS managers. Many park visitors hold values that are inconsistent with noncompliance in the parks. For example, some people feel it is simply wrong to break rules, while others may believe that natural systems and nonhuman life should not be disturbed. Messages that activate such values during park visits may effectively limit noncompliance by those persons. Some of the perceived effectiveness of attempts to instill values may not be a result of education, but rather, a result of the activation of existing value systems.

Summary of Literature Concerning the Commons Dilemma.
The commons dilemma serves as an appropriate general framework for examining the actions of national park visitors because the parks are a common resource. Although the literature reviewed is rather long on theory and short on empirical tests, it has important implications for NPS managers.

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[3] A much more developed discussion of values and their relation to noncompliance can be found in chapter 4 of this review.

Unregulated common resources are inevitably damaged. NPS managers would do well to remember the primary point of the commons dilemma, that unregulated common resources are inevitably damaged. The dominant analysis of the commons dilemma suggests that it results from basic principles of behavior. Specifically, that immediate rewards carry more weight than long term negative consequences. Even when persons know that their actions contribute to the destruction of the resource, they generally continue those actions if they are immediately rewarding.

As the regulatory agency of the national parks, the NPS has a critical role in their preservation. The national parks are a common resource for which the major problem examined by much of the commons dilemma literature has already been solved. That is, a regulatory agency (the NPS) has already been instituted to oversee the parks. Unfortunately for NPS managers, little research from the commons dilemma literature has focused on the characteristics of an effective governing agency. Ostrom and Ostrom (1977) provide some useful information in stating that, to be effective, a governing agency must have extensive information, must distribute costs of resource use in ways that lead to optimal use patterns, and must utilize the option of enforcement. Although useful, these general guidelines do not suggest specific methods to be used in preserving park resources.

The use of coercive enforcement is a controversial issue in the national parks. NPS managers often depend heavily on education or information-based approaches to visitor control (Johnson, Vande Kamp, and Swearingen, 1994). However, the literature on the commons dilemma states quite strongly that enforcement is necessary and that attempts to persuade people to voluntarily refrain from resource-damaging actions are not effective.

In regulating the parks, the NPS faces a unique situation in that it must balance resource protection against negative impacts on visitor experiences. NPS managers are faced with a dilemma in that unregulated resources are inevitably degraded, but that the lack of regulation is also a positive aspect of visitor experiences in most national parks. In order to minimize intrusion on the visitor experience, many managers depend on education or

information-based controls that visitors encounter before moving into the park environment. As noted above, literature on the commons dilemma suggests that such approaches are unlikely to limit noncompliance. In most situations, NPS managers must resign themselves to seeking a balance between the alteration of visitors' experiences and the degree of visitor control necessary.

Visitor values may play an important role in programs to reduce visitor noncompliance. In contrast to the repeated statements that enforcement is necessary to break out of commons dilemmas, several authors state that commons dilemmas may be averted when the values of all persons in the dilemma specify that actions that degrade the resource are morally wrong. For NPS managers, the utility of this exception is limited because it is very difficult to instill moral values in park visitors. However, it also suggests that messages activating values that are inconsistent with noncompliance will effectively limit noncompliance by park visitors who hold those values.

Implications for the National Parks

1) NPS regulation of visitor behavior is critical because without such regulation degradation of park resources is inevitable.

2) To regulate effectively the NPS should have extensive information, should distribute costs of resource use in ways that lead to optimal use patterns, and should utilize the option of enforcement.

3) If presented alone, information about the collective damage caused by noncompliance will not effectively prompt voluntary reductions in noncompliance.

3a) Because information alone is unlikely to limit noncompliance, effective interventions will require that NPS managers balance the effectiveness of the intervention against its possible negative impact on visitor experiences.

4) Noncompliance is unlikely when it is inconsistent with a person's moral values. Instilling such values is very difficult, but some noncompliance may be deterred by efforts to activate such values in visitors who hold them.

II. Applied Behavior Analysis Investigations Of Noncompliance

The roots of applied behavior analysis (ABA) lie in behaviorism, a classic psychological school of thought. The three primary principles of behaviorism are: 1) Psychology should be concerned only with observable behavior; 2) Behavior is determined by its association with rewards or punishments; and 3) The association between stimuli and behavior is best thought of as direct, with no intervening processes such as thoughts. This third principle is incompatible with almost all other theories in social science because it implies that theories incorporating thoughts or cognitive interpretation of stimuli will not be productive. Thus, it is not surprising that behaviorist and ABA literature are seldom integrated with other psychological research.

Behaviorists believe that most behavior patterns develop through operant conditioning, the process in which an organism spontaneously emits behaviors and learns to repeat those that are rewarded and to avoid those that are punished. A simple example of operant conditioning is a rat learning to press a bar in order to get food. However, more complex examples of operant conditioning are relevant to the research reviewed below.

ABA is an attempt to apply behaviorist theory and techniques to real-world problems. In other words, the mechanisms of operant conditioning are considered tools that can be applied to modify behavior in desired ways. Following the principles of behaviorism, ABA does not involve theorizing about the thoughts of the individual and is unconcerned with the way individuals interpret control attempts. Instead ABA theorists seek to understand and exploit the stimulus-response relationships governing behavior[4].

An example of ABA in action is the use of reinforcement (such as cookies or compliments) and punishment (such as the removal of TV privileges) to modify the behavior of children at a preschool, but many other types of behavior have also been approached from an ABA

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[4] For a more complete discussion of ABA see Cone and Hayes (1980).

framework. This review will focus on five types of behavior that are relevant to noncompliance in the national parks: 1) speeding, 2) illegal parking, 3) littering, 4) energy conservation, and 5) off-trail hiking and lawn walking.

Speeding

Considerable ABA research on speeding has been conducted by Van Houten and colleagues (Van Houten, Nau, and Marini, 1980; Van Houten and Nau, 1983; Sherer, Friedmann, Rolider, and Van Houten, 1984; Van Houten, 1985) and relies on the premise that the association of speeding with punishment (a ticket) is too infrequently demonstrated to control the behavior. They believe that speeding can be reduced more effectively by providing drivers with feedback through the use of signs along the section of road on which speeding is to be reduced. These signs include the words, "Percent of drivers not speeding yesterday:" and a posted number giving that percentage, as well as the words "Best previous percentage:" and another posted number. In a series of studies conducted in Nova Scotia and Israel, such signs consistently reduced the number of drivers speeding and were especially effective in reducing the number of drivers driving well above the speed limit[5].

ABA theorists would attribute the success of Van Houten's feedback to one of two mechanisms. First, people often learn that a behavior and a consequence (be it a reward or punishment) are associated only when certain indicators called discriminative stimuli are present. For example, people know that speeding results in a ticket only when a police officer is present to observe the behavior. Because the sign implies observation is being made it could serve as a discriminative stimulus indicating that speeding may lead to a ticket. Second, people are often rewarded for mimicking the behavior of others. By indicating that most others are not speeding, the feedback may provide a stimulus for this mimicking behavior. Van Houten and Nau (1983) provide indirect support for this second

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[5] Some research has also investigated the effect of roadside speedometers on speeding (cf., Casey and Lund, 1993). However, this research is not discussed in this review because there are no practical ways to provide park visitors with such instant feedback regarding their compliance with park rules.

mechanism by reporting that the posted feedback is most effective when a lenient criterion for defining speeding is used so that the posted rates of compliance are high (above 90%).

Posting of feedback could be adapted to the control of many acts of noncompliance in the parks. Signs could display the percentage of persons staying on the proper paths, resisting the temptation to feed the animals, or camping appropriately. However, several theoretical and practical problems cast some doubt on the probable effectiveness of such programs.

First, if the feedback works because it serves as a discriminant stimulus for the relationship between speeding and legal citation, its effect relies on the preexistence of that speeding/citation association. In the parks, the same form of critical link between noncompliant behavior and punishment (e.g., feeding the animals and monetary fines) may not be established.

Second, the finding that feedback reduces speeding would be more convincing if it were more widely replicated. Successful applications of feedback are reported only by Van Houten and colleagues, while the only test of the procedure published by another researcher (Roque and Roberts, 1989) reported that the feedback did not reduce speeding.

Third, monitoring the noncompliant behavior so as to provide feedback may be more difficult for noncompliant behaviors such as walking off park paths than it is for speeding. Park managers could avoid this problem by providing false feedback, but (ethical considerations aside) such a strategy might be ineffective if visitors did not believe that observations were being made. Such disbelief might arise if the numbers were implausible, if the numbers were not seen to vary in repeated visits, or if it was obvious that the park had no way to monitor the behavior. Visitor perceptions that the feedback is highly accurate (and that behavior is being closely monitored) are critical if feedback functions as a discriminant stimulus because visitors must believe it is likely that they are being observed. However, if feedback serves primarily as a prompt for mimickry, such perceptions are less

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important because visitors must only believe that the feedback is an accurate estimate of the number of other visitors who comply.

Illegal Parking

ABA research on parking violations has focused on the illegal use of handicapped parking places. Experiments have shown that when ground-level painted symbols designating handicapped parking spaces are supplemented by signs placed in upright, eye-level positions, illegal parking decreases (Jason and Jung, 1984; Suarez de Balcazar, Fawcett, and Balcazar, 1988). Another experiment found that signs threatening a $250 fine were more effective in deterring illegal parking than signs simply designating handicapped parking (White, Jones, Ulicny, Powell, and Mathews, 1988). ABA theorists would interpret these effects as demonstrations of more reliable behavior (legal parking) as a function of the strength of the discriminative stimulus (i.e., the prominence of the handicapped parking sign or the explicitness with which the association between behavior and punishment is signaled, respectively).

The research shows that strengthening a discriminative stimulus can decrease illegal parking. However, no matter how strong it may be, the effectiveness of any discriminative stimulus depends on the strength of the association between behavior and consequence that it signals. Although illegal parking decreased when signs were placed in noticeable positions (Jason and Jung, 1984; Suarez de Balcazar et al., 1988), it is doubtful that the signs would have been effective if people did not believe there was some likelihood that they would be punished for illegally parking. Similarly, the effectiveness of signs that explicitly mention a fine, such as those used by White and colleagues (1988), would probably decrease over time if no tickets were ever written (i.e., the relationship between behavior and consequence would weaken). The importance of the learned association of behavior and consequence is illustrated by a study in which increased police enforcement was found to significantly decrease illegal parking (Suarez de Balcazar et. al., 1988). Apparently, drivers became aware of the increased probablility of punishment and acted to avoid it.

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The primary implication of the illegal parking research for the national parks is its support for the feasibility of fines or legal sanctions as a means of visitor control. Although such actions are controversial and may not be universally successful, this research suggests that they can be effective in at least some conditions. One essential condition of punishment-based programs is that visitors learn and maintain an association of noncompliance with negative consequences. If visitors believe that negative consequences are never imposed, they are likely to exhibit noncompliance even when faced with a strong warning.

Littering

Littering has been the subject of considerable ABA research and is a damaging noncompliant behavior in the national parks. The ABA research on littering has focused on the use of three techniques to control the behavior: threats of punishment for littering, modification of environmental features that reinforce littering, and reinforcement of the proper disposal of trash.

Threats of legal citation and fines have consistently been found ineffective in controlling littering (Clark, Hendee, and Burgess, 1972; Heberlein, 1971; Keep America Beautiful, 1968). Several researchers have attributed the ineffectiveness of legal controls to the fact that they are infrequently enforced (Robinson, 1976; Clark, Hendee, and Burgess, 1972). In ABA terms, the threats of legal or social punishments for littering are ineffective because they serve as discriminative stimuli for an association of littering behavior with punishment has not been well learned. These studies of littering stand in contrast to the findings that signs threatening punishment were effective in deterring illegal handicapped parking (Jason and Jung, 1984; Suarez de Balcazar et al., 1988; White, et al., 1988) and suggest the association of noncompliance and punishment is better learned for illegal parking than for littering.

The reported failures to control litter through threats of punishment are important to park managers because they show that threats of punishment are not universally effective in controlling noncompliance. Also, the reported findings are particularly noteworthy because

littering is one of the most common and most damaging forms of noncompliance reported by park managers (Johnson, Vande Kamp, and Swearingen, 1994). Thus the findings cast some doubt on the potential for threatened punishments to control littering or other noncompliant behavior in the national parks.

Attempts to remove the reinforcement for littering by providing readily accessible trash receptacles (i.e., by eliminating the requirement that persons carry their trash any great distance) have had varying success in controlling littering. Robinson (1976) reviewed studies that investigated littering in a variety of situations and found several inconsistent results. One study found that the presence of litter cans reduced littering along highways and in urban areas (Finnie, 1973) but in another study the presence of litter signs and litter receptacles did not decrease highway litter (Heberlein, 1971). Other research has yielded similarly inconsistent results (cf., Marler, 1971; Burgess, Clark, and Hendee, 1971; Reiter and Samuel, 1980). ABA theorists would conclude that depending on the situation, littering behavior is often determined by factors other than the distance persons are required to carry their trash.

The evidence that increasing available trash receptacles does not always reduce littering suggests that asking the question, "What reward does the visitor gain, or punishment does the visitor avoid by breaking this rule?", and then thinking of ways to remove such incentives is not a foolproof way to reduce noncompliance. Nonetheless, such an approach can suggest novel interventions whose merits can be tested and possibly established as effective in many park situations. For example, visitors may throw coins in hot-springs as part of making a wish or to see how deep the water is. Simple experiments could determine whether placing an artificial wishing well at the trailhead and erecting signs giving the depth of the spring would effectively reduce noncompliance by removing the incentive for the behavior.

Perhaps the most effective ABA approach to litter control has been the use of incentives to reinforce the clean-up and proper disposal of one's own, and other peoples' litter. Incentive programs have been found to effectively decrease litter (see Robinson [1976] for

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a review of such studies). Of particular interest to the national parks are results of several studies showing cost-effective litter control in outdoor areas (Clark, Hendee, and Burgess, 1972; Gramann and Vander Stoep, 1986). In one study trash bags were distributed to children visiting a campground who were then rewarded with one of a variety of inexpensive toys for picking up and properly disposing of litter. In another study, rangers contacted children at a trail-head and offered arm patches for litter pick-up. Robinson (1976) suggests that although these programs targeted children, similar incentive programs can alter the behavior of adults if they use appropriate rewards. Even though such incentives may be more expensive than toys or arm patches, the cost of the programs can be kept down by disbursing rewards on a variable ratio schedule, a method of reward similar to that used by slot machines. For example, in the variable ratio schedule used by Kohlenberg and Phillips (1973), an average of every 10th or 20th proper litter deposit was rewarded with a ticket good for a free soft-drink, but the interval between a given reward and the next was random. As anyone who has visited Las Vegas can attest, variable ratio schedules can be very effective in prompting and maintaining behavior patterns, but the effect of incentive programs aimed at reducing adult noncompliance in national parks is unestablished.

We agree with Robinson (1976) in recognizing that the generalizability of the littering research on incentives is limited because the studies targeted children. However, the success of these anti-littering incentive programs suggests that an emphasis on modifying children's behavior might be productive in many types of programs. Many park visitors are children, their behavior may be more easily modified than that of adults (Gramann and Vander Stoep, 1986; McGuire, 1985), and once children are convinced to comply with park rules they may persuade the adults accompanying them to similarly comply.

Although incentive programs appear to have promise for the control of littering in some park environments, it is not clear that the use of incentives can be applied to the control of noncompliant behaviors other than littering. Littering is a unique behavior in that the damage caused by several (or even many) noncompliant visitors may be removed by one person who is motivated by an incentive. When damage is not so easily reversed, an

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incentive must motivate most or all visitors to comply with the rules. Also, the proper disposal of litter is much easier to monitor and reward than other compliant behaviors such as walking only on marked paths or refraining from feeding the animals. It is not clear how rewards would be disbursed for these types of behavior.

Energy Conservation

Research on energy conservation has also investigated several ABA techniques similar to those used in the research on speeding, illegal parking, and littering. However, it does little to clarify their potential for effective control of noncompliance in the national parks.

Discriminative stimuli such as signs have received weak support as means of increasing energy conservation. In a study with a very weak experimental design, signs prompting the turning-out of lights were found to be most effective when strategically placed and large (Winett, 1977), a finding consistent with the research on signs and unauthorized use of handicapped parking (Jason and Jung, 1984; Suarez de Balcazar et al., 1988). However, another study (Luyben, 1980) found that a large sign did not significantly increase the turning-out of classroom lights when professors had already been notified by letter that such action was desirable. The weakness of these effects may result because signs prompting conservation behavior are discriminative stimuli for a weak association between conservation behavior and rewards. Nonetheless, the studies do little to demonstrate whether or not compliance with energy guidelines or park regulations can be increased by providing strong discriminative stimuli.

Much of the research on feedback and energy conservation is only tangentially relevant to noncompliance in the parks. In considering the role of feedback in energy conservation, Seligman, Becker, and Darley (1981) conclude that the most likely function of feedback is to let consumers know their performance in relation to an existing energy conservation goal (such goals often being based on monetary incentives). If feedback functions similarly in park situations it is unlikely to produce an effect because visitors are unlikely to set analogous goals for compliance. On the other hand, the effectiveness of feedback in studies

of speeding (e.g., Van Houten and Nau, 1983), a noncompliant behavior more similar to park noncompliance, suggested that feedback may function in other ways.

One study of feedback in energy conservation used a procedure in which personal energy conservation goals were unlikely to play a role. Luyben (1984) convinced a large percentage of the faculty and staff at a small college to properly adjust their venetian blinds for maximum energy efficiency by first distributing a bulletin from the college president asking for compliance and then providing feedback that was directly contingent on the individual's behavior (the proper adjustment of the blinds as monitored by custodial staff). The generalizability of this study to the control of park noncompliance is limited, however, because monitoring the compliance of each park visitor in order to provide feedback is usually impractical and often impossible.

Research on the role of monetary incentives in conservation is also unlikely to provide useful insight into the control of park noncompliance. Although studies have found that incentives can increase conservation more than information alone (e.g., Winett and Nietzel, 1975), most wasteful energy consumption is quite different from park noncompliance. Energy wasters could argue that because they pay for their own energy use they are entitled to act as they please. Although some park visitors might also argue that their tax dollars entitle them to act as they wish, their argument is less convincing. The fact that energy use has costs that can easily be manipulated to provide incentive also contrasts with the relatively fixed costs of park use. Finally, energy use is usually easy to monitor and reward, but it is unclear how to monitor and reward most of the compliant behaviors that the NPS wishes to reinforce.

Off-trail Hiking and Lawn Walking

Park managers identify off-trail hiking as a common problem that causes much damage in the NPS (Johnson, Vande Kamp, and Swearingen, 1994). Thus, research concerning off-trail hiking has a direct application to the national parks. Swearingen and Johnson (1988) investigated the effectiveness of several control techniques in controlling off-trail hiking by

visitors to Mt. Rainier National Park. The controls tested included a variety of signs, rope and split-rail barriers, and the presence of a uniformed park employee. Their study had an unusually high degree of statistical power because visitor compliance was observed for thousands of visitors at several sites.

Swearingen and Johnson's (1988) results showed three primary results. First, that the presence of any regulatory sign at common off-trail hiking sites reduced noncompliance, and that a sign stating, "Off-trail hikers will be fined" was significantly more effective than a variety of other texts that did not mention sanctions. Second, that split-rail and yellow nylon rope barriers both reduced noncompliance, with the rope being about twice as effective as the split-rail. And third, the presence of a uniformed employee reduced noncompliance to levels below those observed for any other method of control.

The effects of signs observed by Swearingen and Johnson (1988) are consistent with the effects of signs in deterring illegal parking (White, Jones, Ulicny, Powell, and Mathews, 1988) in that the sign threatening a fine was most effective. This finding establishes that threats of sanction can effectively reduce a damaging form of park visitor noncompliance. Although Swearingen and Johnson do not interpret their results in relation to any particular theory, ABA theory would interpret the results as showing that park visitors have learned an association between noncompliance with park rules and punishment. Given this interpretation, it is not surprising that a sign explicitly referring to this association produces the lowest level of noncompliance (1.7%). It should be noted, however, that the other signs also produced substantial decreases in noncompliance (from 6.9% noncompliance with no sign, to between 4.9% and 3.3% with a variety of sign texts), indicating that they also had considerable effectiveness as discriminative stimuli.

Swearingen and Johnson's (1988) findings that rope and split-rail barriers reduced noncompliance also illustrate the effectiveness of discriminative stimuli. The barriers serve as indicators that walking off the path at a given point may yield negative personal

consequences. Following this reasoning, the yellow rope was more effective than the split-rail because it was a stronger discriminant stimulus.

Continuing with an ABA interpretation, Swearingen and Johnson's (1988) finding that the presence of a uniformed employee reduced noncompliance to levels below those of any other control method tested is unsurprising. What indication that the association between noncompliance and sanction is in effect could be more clear than the presence of a potential enforcement agent? The extremely low noncompliance rates in this condition (0.6%) might even indicate that persons who had not learned the association of noncompliance with sanction were influenced. Such an effect could occur when the presence of the uniformed employee inspires people to avoid any action that might possibly be noncompliant[6]. This finding has particular potential for application because Swearingen and Johnson's experiment was conducted in a manner illustrating the feasibility of using uniformed personnel as a deterrence intervention. The uniformed personnel used in the study were seasonal interpreters working for low wages. Hiring and deploying such persons in areas highly impacted by visitor noncompliance may prove to be very cost-effective.

Outside the realm of the national parks, several authors have investigated inappropriate lawn-walking. Hayes and Cone (1977) investigated the effectiveness of several approaches to decreasing lawn-walking in a park-like area crossed by several gravel walkways. They tested a combination of interventions including chain barriers, signs, and arrangement of park benches. Signs asking persons not to trample the grass decreased inappropriate lawn-walking, but the most effective manipulation was simply to place park benches so as to eliminate the short-cuts across the grassy areas, and to thus remove the reward for the noncompliant behavior.

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[6] Another example illustrating such an effect would be drivers coming to a full stop at a yield sign when a police officer is clearly stationed near the intersection.

In a similar study, Leland, Hughes, Halder, and Rowan (1986) reported that providing a paved path across a grassy area crossed by several unsightly dirt paths reduced lawn walking to negligible levels. They suggest that the path was effective because persons simply wished to cross the area and would actually avoid walking on the grass or dirt paths if an alternative was provided.

These experiments suggest two ways in which park managers might deter off-trail hiking. First, after determining what reward people gain by walking off the path, officials could modify the situation so as to eliminate the reward. Or second, they could allow visitors to continue walking in the same areas but could establish an official trail so as to focus traffic on a single path. Such strategies to remove incentives for noncompliance may prove to be simpler and more effective interventions than programs designed to overcome the incentives for noncompliance.

Noncompliance as a Habit

Nearly all of us have experienced the difficulty of breaking a habit. ABA researchers would explain the difficulty as a result of behavioral principles. A habit is a stimulus-response relationship that has developed because a behavior has been rewarded in some way. In order to break the habit (i.e., extinguish the S-R relationship) it is necessary that the reward be almost entirely eliminated, for as long as the behavior is rewarded it will persist. In fact, breaking habits is particularly difficult because removing the reward only part of the time can actually strengthen the habit rather than weaken it. It is well established that an excellent way to create a persistent habit (i.e., an S-R relationship that is difficult to extinguish) is to reinforce the behavior intermittently at random intervals (Amsel, 1971).

The power of random reinforcement schedules presents a difficult problem for park managers wishing to deter habitual noncompliance. For example, imagine that visitors have developed a habit of walking off official trails because such excursions have yielded rewards such as unique scenic views and opportunities for special photographs. Park managers may be able to remove some of the opportunities for such rewards by using barriers or by

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developing official trails that yield the same views. However, it is unlikely that they will remove all such opportunities. Thus, visitors who habitually wander off the trail are likely to encounter enough random reinforcement to effectively reinforce the behavior.

To this point, our discussion of habits offers little direct hope to park managers confronted with the problem of habitual noncompliance -- it is not clear that rewards can be reduced to a level where habitual behavior will be extinguished. However, because many park visitors have had little opportunity to develop noncompliant habits, efforts to reduce the rewards of noncompliance could reduce the number of those visitors whose experiences favor such habit formation. Thus efforts to reduce the rewards of noncompliance may have a net deterrent effect even while they reinforce the behavior of habitual noncompliers. It is also unclear whether a threat of punishment for noncompliant behavior can effectively interact with a reduction in rewards to decrease habitual noncompliance. Further research is necessary to determine the relative merits of such ABA based interventions in the national parks. Nonetheless, ABA theory makes it clear that park managers would be wise to prevent the formation of noncompliant habits rather than to attack them after they are established.

Summary of the ABA Research

The ABA research establishes that noncompliance in a variety of environments can be deterred by practical interventions, but it also establishes that no single intervention will deter all noncompliant behavior. Thus, each of the summary statements below is not universal, but qualified.

The lack of consistent findings across study environments for ABA interventions such as threatened punishment limits the generalizability of the research. That is, the effectiveness of any intervention in a given environment can not be assumed, but must be empirically tested. In addition, because ABA approaches do not incorporate theories about *how* an intervention works, it is very difficult to even narrow the range of interventions that should be considered most promising in any given environment.

If applied in the national parks, some ABA interventions might deter noncompliance, but also have negative impacts on visitor experiences. Consideration of these impacts is outside the usual scope of ABA research and has thus been absent from this chapter. Nonetheless, the dual mandate of the NPS requires that the degree to which ABA interventions negatively impact visitor experiences be as important to NPS managers as the interventions' effectiveness in deterring noncompliance. Empirical tests of ABA intervention effectiveness should therefore include non ABA measurement of intervention effects on visitor experiences.

This chapter has thus far been organized around the behaviors that have been investigated. However, the summary is organized around the interventions that have been tested and their potential effectiveness based on the ABA research.

Feedback may decrease noncompliance. Several studies of speeding and one study of energy conservation show that feedback can increase compliance. In ABA terms, feedback apparently functions either as a discriminative stimulus that signals an association of noncompliance with punishment, or as a prompt for mimicking behavior. If feedback works because it provides a discriminative stimulus, it requires that the target population has already learned the association. Evidence from the off-trail hiking research suggests that many park visitors have learned such an association for at least that form of noncompliance. As a discriminant stimulus, specific feedback to each visitor concerning his or her compliant and noncompliant actions would be most effective. Such individualized feedback is probably not a feasible intervention in the parks. However, the speeding research suggests that general feedback about the percentage of all visitors complying with a given rule can increase compliance with that rule. Provision of such general feedback is a feasible and promising intervention for NPS managers.

If feedback functions as a prompt for mimicking behavior, it might be an even more promising intervention for NPS managers. Under these conditions, it would not be critical that visitors believe that their own behavior was being observed, but only that a high

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percentage of visitors were compliant. Because visitors are likely to see that observation of noncompliant behavior is difficult in many park environments, it may be easier to convince visitors of the latter belief than the former.

Signs are effective discriminative stimuli in many situations. Studies of illegal parking, energy use, and off-trail hiking shows that signs can effectively limit noncompliance in some, but not all situations. One unanswered question that is critical for NPS applications concerns the duration of the deterrent effects of signs. In the reviewed studies, signs were placed at the site where noncompliance was measured. It is not clear that their effects would persist to later noncompliance opportunities. Measurement of such persistence should be included in future tests of sign effectiveness. Even if signs are found to have only short-term effects, they could still be useful interventions at small and/or highly impacted national park sites.

The ABA research suggests that effective signs are strong discriminative stimuli when they are placed in noticeable positions, have eye-catching clear designs, and hold text that is understandable and powerful. It is not clear exactly what makes text understandable and powerful, but evidence from the illegal parking and off-trail hiking literature shows that explicit mention of the negative consequences of noncompliance (i.e., fines) can increase sign effectiveness.

Threats of punishment are effective deterrents of noncompliance in some situations. Studies of illegal parking and off-trail hiking showed that signs threatening noncompliers with fines were effective deterrents of noncompliance. In contrast, threats of fines did not appear to reduce littering. One explanation for the inconsistent results is that the threatened fines only served as effective discriminative stimuli when people had a strong association between breaking a rule and punishment. If this explanation is valid, threats of punishment will only be effective in park situations where such an association has been learned. The off-trail hiking results suggest that for at least one important form of noncompliance, the necessary association is present.

The study of illegal parking showing increased compliance with increased enforcement suggests that strengthening the association of noncompliance with punishment can increase the effectiveness of signs that threaten fines. It may be difficult, however, to similarly increase the effectiveness of threatened fines in the national parks. Many national parks are primarily frequented by first-time visitors who have had no experience associating a fine with a particular form of noncompliance in that specific park environment. Threatened fines will only deter those visitors if they generalize from associations learned in other environments with other behaviors. The extent to which visitors make such generalizations, and the corresponding effectiveness of threatened fines in deterring many forms of noncompliance in the national parks remains to be established.

Asking, "What are the reasons why people break this rule?" can lead to effective strategies to reduce noncompliance. One of the basic principles of ABA is that people repeat actions for which they are rewarded. Thus, if noncompliance is a problem, there is every reason to believe that it is a rewarding behavior, and that it will cease if the reward is removed. The studies of lawn-walking showed that when incentives for walking on the grass were removed, or when alternate non-damaging behaviors were provided (i.e., when a sidewalk was built) that walking on the grass was decreased.

Unfortunately, there are often many reasons for noncompliance, and the reasons that are important to any given individual may vary. This type of multi-determination may explain why research into littering showed that increasing the number of trash receptacles and thereby making it easier for people to properly dispose of litter did not always decrease littering.

In the national parks, it is not always possible to remove incentives for noncompliance, and the reasons for noncompliance are likely to be complex. Nonetheless, asking, "Why do people break this rule?" is a good first step in approaching problems of noncompliance because the interventions that it leads to may be relatively simple and practical. For example, erosion of a social trail that leads to a view of some natural attraction might be

deterred by a sign pointing out that a better view is accessed by an official trail a short distance away. Even if such an intervention does not reduce the noncompliant actions of persons who habitually use social trails, it may reduce the number of visitors who develop such habits. If noncompliance can be reduced to acceptable levels by such simple interventions, more dramatic methods such as threatened fines will be unnecessary.

The promise of incentive programs is limited to litter-control programs aimed at children. Studies of incentives in controlling litter and prompting energy conservation are not definitive, but suggest that the potential of incentive programs is limited as applied to most forms of noncompliance in the national parks. One major problem associated with incentive programs is monitoring each person's compliance accurately enough to correctly disburse the incentives. It is also unclear whether incentives that would appeal to adults are cheap enough or otherwise practical in NPS applications. The success of incentive based litter-control programs aimed at children does suggest that such programs could be useful in national parks where litter is a problem. Other types of interventions aimed at children visiting national parks have received little scientific attention, but may also have considerable potential.

The presence of a uniformed employee can be a strong deterrent of noncompliance. The study of off-trail hiking found extremely low levels of noncompliance when a uniformed employee was present. The success of this intervention is striking, particularly because the employees participating in the study were seasonal workers working for low wages. Deploying such persons to deter noncompliance may be a cost-effective strategy.

Implications for the National Parks
1)   Information that a high percentage of park visitors comply with a given park rule (i.e., feedback) may motivate other visitors to also comply. When such information is easy to gather and distribute, it may be a highly cost-effective intervention.

2) When using signs, their strength should be maximized by placing them in noticeable positions, by using eye-catching clear designs, and including text that is understandable and direct.

3) Threatened punishment in the form of fines and legal sanction can be an effective means of deterring noncompliance. However, empirical testing is required to demonstrate its effectiveness in diverse park settings.

4) In planning means of controlling noncompliance one should start by asking what reward is motivating the noncompliant behavior. Removing the reward may be easier than instituting measures to overcome it.

5) Incentive programs aimed at children can be an effective means of decreasing litter in the national parks.

6) Deployment of uniformed personnel in areas of the national parks where noncompliance is a problem can reduce noncompliance in those areas to very low levels.

III. The Social Environment And Noncompliance

This chapter discusses the ways in which people determine the limits of socially appropriate behavior. In almost every situation, human behavior is guided by interpretation of both explicit and implicit cues in the social environment. By examining the various factors that affect these interpretations we may find ways to maximize the probability that a given person will comply with a rule or regulation.

Perceptions of the Rule's Legitimacy

Rules are features of the social environment that provide explicit guidelines for expected behavior. However, we all know that rules are not created equally. Our perceptions of rules affect our probability of complying with them. One variable aspect of rules is their legitimacy, that is, the degree to which the rule specifies behavior that benefits not only the rule-maker, but everyone in the environment.

Whom does a rule benefit? One series of investigations into rule legitimacy has focused on the outcomes of compliance for rule-makers and persons ruled. Friedland and colleagues (Friedland, Thibaut, and Walker, 1973; Thibaut, Friedland, and Walker, 1974; Friedland, 1976) used laboratory experiments to explore the effects of various behavioral control techniques in what they called *correspondent situations* (situations in which compliance yields positive outcomes for both rule-makers and persons ruled) and in *noncorrespondent situations* (those in which only the rule-makers benefit from compliance). As might be expected, in all these studies compliance with rules was significantly higher for correspondent than for noncorrespondent situations. In fact, one study found that persons ruled in noncorrespondent situations attempted to hurt the rule-maker by willfully disobeying the rules (Friedland, Thibaut, and Walker, 1973).

Several authors have published research that buttresses the findings of Friedland and colleagues. Brown (1974) found that a general positive orientation toward the law was negatively associated with self-reported legal noncompliance in adolescents, Jonah and

Dawson (1982) reported that the attitude toward seat-belt legislation was as good a predictor of seat-belt use as was the attitude toward seat-belts themselves, and Gramann and Vander Stoep (1987) discuss what they call uninformed violations that occur when park visitors are unaware of the reasons for a rule. On the other hand, our review found one research report in which the legitimacy of the rule appeared to be unimportant in determining noncompliance -- Mason and Calvin (1978) found that tax evasion was unrelated to the belief that the tax system was unfair[7].

Although these results may appear to follow from common sense, they provide important empirical support for continuing national park programs that explain how NPS rules and regulations are designed to limit damage to a valuable resource that we all own. Although information alone is likely to be ineffective in eliciting voluntary abstinence from behavior that damages common resources (see Chapter 1) information that persuades people to view a rule as correspondent may increase compliance with that rule.

Not only did Friedland and colleagues find that correspondent situations generally increase compliance, they also observed that the effects of several control techniques varied from correspondent to noncorrespondent situations. First, they observed that surveillance increased compliance in noncorrespondent but not in correspondent situations (Thibaut, Friedland, and Walker, 1974). Second, they found that when rules were vague, persons in noncorrespondent situations behaved in ways that were only marginally compliant, but that persons in correspondent situations erred on the side of caution, acting in ways that were compliant with a strict interpretation of the rule (Thibaut, Friedland, and Walker, 1974). Third, they found that in correspondent situations threats were interpreted as messages conveying the rule maker's beliefs about the choice of actions that would benefit both the

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[7] Measuring the attitudes toward the law and rated fairness of the law is not identical to measuring the degree of correspondence in the influencer/influencee relationship. However, their conceptual similarity suggests that the measures are likely to be highly correlated.

rule maker and ruled persons, while in noncorrespondent situations suspicion and mutual distrust insured that threats were interpreted as simple methods of coercion.

In summary, the research by Friedland and colleagues suggests that NPS managers should make it clear to visitors that the system of rules and regulations in the national parks constitute a correspondent situation in which compliance preserves park resources and produces long-term benefits for everyone. Fostering such perceptions of a correspondent situation should increase compliance with rules, alter the perception of threats in a positive manner, and make surveillance, penalties, specifically defined rules, and threats either unnecessary or effective at low levels.

Rule justification and park visitors with diverse experiential goals. One illustration of the effectiveness of forging correspondent relationships is reported by Bultena, Albrecht, and Womble (1981) who showed that backpackers at Mount McKinley National Park were solidly in favor of rationing backcountry permits and that support was highest among backpackers who were committed to finding solitude. This report shows that a politically controversial park management strategy can obtain high acceptance if it is seen as beneficial to both the rule-maker and ruled persons. However, the acceptance of the McKinley restrictions may be due largely to the relative homogeneity of the visitors included in the study sample, and is unlikely to generalize to the rest of the national park system. Increasingly, national park users have a diversity of specialized goals, many of which may come into conflict (Williams, 1988), and different experiential expectations can even be found in relatively homogeneous groups of park users, such as canoeists (Wellman, 1982). Thus, a rule that is correspondent and readily accepted by one user group may be noncorrespondent and a source of dissatisfaction for another.

Fostering acceptance of management interventions may be difficult even when users are homogeneous and agree with managers that park resources should be preserved. Researchers have found that managers perceive vegetation and soil damage as more serious than do park visitors (Marion and Lime, 1986), and that visitor satisfaction can be unrelated

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to such damage at trails and campsites (Lucas, 1979). In one case, backcountry campsites that managers considered damaged were even preferred by park visitors (Shelby, Vaske, and Harris, 1988). In such instances, it is unlikely that visitors and managers would agree on the types of interventions that are justified to control impacts. This lack of agreement between managers and visitors, along with the diverse experiential goals of specialized park users, suggests that forging correspondent relationships will be a constant challenge for park management. Further research concerning the experiential goals and expectations of park visitors could help park managers better face this challenge.

When does a rule prompt noncompliance? For persons or agencies wishing to control noncompliance, the worst possible effect of an intervention would be to motivate people to break the rule. Unfortunately, there is evidence that some interventions have just such a boomerang effect (Pennebaker, 1976). The primary theoretical analysis of this phenomenon is reactance theory (Brehm 1966). Reactance theory proposes that when a rule is seen as a threat to a person's freedom of choice, the threat is resisted and the act itself becomes more desirable. Fortunately, the conditions under which the rule will elicit reactance (i.e., noncompliant behavior) appear to be quite narrow. At least one study that set out to elicit reactance through the threat of monetary fines failed to do so (Reiter, 1980). Other studies have shown that reactance is reduced when subjects are given a choice of compliance options (Heilman and Garner, 1975) and when signs tell people what they *should do* rather than what they *shouldn't do* (Durdan, 1985). Respectively, these last studies suggest that NPS signs prohibiting certain behaviors should suggest alternate nondestructive choices, and that signs should be worded positively rather than negatively (e.g., "Please stay on the trail" rather than, "No off-trail hiking").

Although we have included the discussion of reactance in this section dealing with rule legitimacy, the relationship of rule legitimacy to reactance is not clear. As originally proposed, reactance should be a general reaction to all rules or laws that prohibit behavior. However, one would suspect that rules severely limiting an individual's freedom may be accepted if they are seen as legitimate, and that rules lacking legitimacy may be particularly

effective in eliciting reactance. Evidence was noted earlier that persons ruled in noncorrespondent situations willfully disobeyed the same rules that were obeyed in correspondent situations (Friedland et al., 1973). This finding is consistent with an interactive relationship between rule legitimacy and reactance. Further research is necessary to better illuminate this relationship.

Perceptions of the Rule-Maker's Legitimacy

Perceptions of a rule's legitimacy are important, but it is also likely that compliance with a rule is affected by the ruled person's perception of the rule-maker. Almost everyone can recall experiences when a highly legitimate rule-maker made no attempt to justify a request but was nonetheless able to elicit compliance. One might also recall similar situations in which a rule-maker with low legitimacy made requests that spurred the ruled persons to act in a manner directly opposite that requested. Although we might generalize from these anecdotes to illustrate how the perceived legitimacy of the NPS could affect noncompliance in the national parks, little research has addressed the question of whether such perceptions actually do play a role in park noncompliance. One possible exception is a study of off-trail hiking in which Johnson and Swearingen (1987) measured a construct they called ascription to agency norms[8] that may have been related to perceptions of NPS legitimacy. They sent questionnaires that asked about several attitudinal variables to park visitors who had been observed hiking on and straying off an official trail in Mt. Rainier National Park. Scores on ascription to agency norms were found to have a strong negative relationship with off-trail hiking. Although the sequence of events leads one to question whether the attitudinal construct lead to noncompliance or vice-versa, the study provides some measure of support for the idea that perceptions of legitimacy can affect noncompliance.

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[8] The questions used to measure ascription to agency norms were: 1) In the Paradise Meadows area at Mt. Rainier National Park, the Park Service's expectations for me to hike on designated trails is important to me; and 2) Generally speaking, I will comply with National Park Service rules when day-hiking at Paradise Meadows.

Another research area with some tangential relevance to rule-maker legitimacy is the investigation of "compliance-gaining activities" by communication researchers. This research focuses on relationships between individuals rather than on the relationship of governing agencies and individuals. Nevertheless, the research does provide evidence that factors such as the power differential between the rule maker and ruled persons, or like and dislike between individuals plays a role in determining what types of persuasive strategies are used, and how effective such strategies are likely to be (Smith, 1984). Perhaps the major implication this research holds for the national parks follows from the recognition that different strategies are appropriate for different relationships: It may be important to determine how most noncompliant visitors view the NPS in order to design a persuasive message appropriate to that relationship.

Perceptions of the rule-enforcing agents. Another line of research that is related to the effects of rule-maker legitimacy focuses on the agents of the rule-making agency rather than on the agency itself and concerns the effects of symbols of authority on compliance with agents of authority. One way in which a rule-making body may enhance the perceived legitimacy of its agents is by employing symbols of authority. In the context of the national parks, one very important symbol is the uniform worn by park rangers and other employees. Researchers have suggested that uniforms serve as a legitimate base of social power (Raven and French, 1958 [see Bushman, 1984]), and have demonstrated that uniformed persons elicit more compliance with a simple request than do normally clothed persons (Bushman, 1984, Bushman, 1988).

Taken in isolation, these findings suggest that uniformed employees should be widely deployed in the national parks, but other research has shown that when a uniformed policeman is introduced into a situation in which the uniform is deemed inappropriate, the other persons in that situation may react negatively (Muchmore, 1975; Tenzel, Storms, and Sweetwood, 1976). If park visitors see uniformed employees as inappropriate in park environments, such employees might likewise be perceived negatively. In a survey designed to determine if uniformed national park employees elicit negative reactions from park

visitors in frontcountry areas, Swearingen and Johnson (1988) found that the only park visitors who reacted negatively to a park employee clothed in a Class B NPS uniform were those caught breaking park rules. Apparently, uniformed employees were largely perceived to be legitimate agents of the NPS. A majority of the visitors surveyed even felt that encountering such employees was a positive aspect of their park experience. In Chapter 2 we discussed a related study in which Swearingen and Johnson (1988) found that the presence of a uniformed employee was more effective than several types of signs and barriers in controlling noncompliant off-trail hiking. Together, these results show that when deployed in areas sensitive to damage from noncompliance, uniformed park-employees can effectively limit noncompliance while having minimal negative impact on visitor experiences.

Summary of perceptions of rule-maker legitimacy. The current research provides no more than slightly suggestive evidence that visitors' general perceptions of NPS legitimacy can affect noncompliance in the national parks. The research on interpersonal compliance merely suggests that the relationship between visitors and the NPS should affect the effectiveness of various communication strategies. Further investigation of both the importance of perceived NPS legitimacy and the appropriateness of various communication strategies is necessary for recommending any changes in NPS policy.

Research focusing on the legitimacy of enforcement agents employed by rule-making agencies suggests that the uniformed employees deployed in frontcountry areas of the national parks are accepted as legitimate agents of enforcement and that such employees can effectively control noncompliance.

Social Norms

The general effect of social norms on noncompliant behavior is difficult to summarize, largely because the term "norm" and its variations are often poorly defined and may refer to a number of distinct constructs. Research has investigated the effects of subjective norms (Kahle and Beatty, 1987), descriptive norms and injunctive norms (Cialdini, Reno, and Kallgren, 1990), moral norms (Schwartz, 1970), normative influences (Deutsch and Gerard,

1956), normative constraints and normative consensus (Bowers, 1968), and even informational social influence (Deutsch and Gerard, 1956). Fortunately, these labels can be classed as three major constructs[9], each of which is described below.

Descriptive norms. The first type of norm is simply what other people are doing. These norms are referred to as descriptive norms (Cialdini et al., 1990), informational social influences (Deutsch and Gerard, 1956), or releasor-cues (Gramann and Vander Stoep, 1987). Descriptive norms do not explicitly suggest to people that they should act in the same manner as the group. However, evidence suggests that simply observing others actions (Sherif, 1935; Bandura, 1979) has a significant effect on subjects' behavior. Swearingen and Johnson observed evidence for this effect in their study of off-trail hiking at Mount Rainier National Park (Swearingen and Johnson, 1988). Only three percent of all parties observed were in the presence of other noncompliant parties, yet eleven percent of all noncompliance was found in those groups. NPS managers might offset such effects of observing other visitors' noncompliance by providing evidence that most visitors comply with park regulations. Such information could provide a descriptive norm that instigates further compliance. Although the primary support for the effectiveness of such feedback interventions was obtained in ABA research (see Van Houten et. al., 1980, as discussed in Chapter 2)[10], the results from studies using such information provide evidence that messages describing the prevalence of compliant behavior could limit noncompliance in the national parks.

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[9] Within the recreation and leisure science literature the term "norm" is often used in a fourth way. Visitor expectations concerning crowding or impacts to the environment are often referred to as encounter norms or normative impacts, respectively. Encounter norms are not discussed in this review, but differences between manager and visitor perceptions of visitor impacts have been discussed in relation to rule legitimacy.

[10] Van Houten and colleagues might not agree with this theoretical interpretation, but their road signs showing the percentage of persons not speeding may have been providing descriptive norms of compliant behavior.

Viewing indirect evidence of how others have acted can also affect behavior (Cialdini et al., 1990). The well established finding that litter increases in an already littered environment (Heberlein, 1971; Reiter and Samuel, 1980; Krauss, Friedman, and Whitcup, 1978) suggests that indirect evidence of others' behavior can instigate noncompliant behavior. These findings suggest that efforts should be made to remove evidence of noncompliance, be it litter or social trails. If the evidence can not be completely removed, research suggests that making obvious rehabilitation or clean-up efforts may also limit further noncompliance (Cialdini et al., 1990).

Injunctive norms. The second type of norm is referred to as an injunctive norm (Cialdini et al., 1990), but has also been called a moral norm (Schwartz, 1970), or a normative constraint (Bowers, 1968). An injunctive norm is a perception of what other people think one should do. Because what is approved is often what is typically done, injunctive norms are easily confused with descriptive norms (Cialdini et al., 1990).

Research on injunctive norms shows that they have little effect when people believe that the norms are weak in their reference group, or are held only by a small portion of their reference group (Bowers, 1968). The effects of injunctive norms can also be overwhelmed by personal attitudes or values (Miller and Grush, 1986). Finally, for an injunctive norm to affect behavior, the norm must be brought to mind (i.e., activated or made salient) at the time and place in which a noncompliant act is likely to occur (Cialdini et al., 1990; Harvey and Enzle, 1981). These results suggest several guidelines for NPS managers: 1) park visitors should be told that reference groups (e.g., other park visitors, the NPS, or "Ranger Bob") expect compliance with park rules; 2) attempts should be made to foster visitor attitudes that are consistent with compliance; and 3) injunctive norms should be made obvious in the environments where noncompliance is likely.

The ability of the first two suggestions above to deter noncompliance is not established. First, research has provided evidence that motivation to comply with NPS norms is weakly associated with noncompliance (Johnson and Swearingen, 1988), but has not directly

assessed attempts to strengthen visitor's beliefs that important reference groups have injunctive norms of compliance. And second, although attitude change has been the primary focus of traditional visitor control programs, there are compelling reasons to doubt its effectiveness (see Chapter 4). In contrast, the effectiveness of the third suggestion is much better established. ABA research investigating illegal parking showed that making regulatory signs more noticeable made them more effective (Jason and Jung, 1984; Suarez de Balcazar et al., 1988)[11]. Also, Swearingen and Johnson (1988) found that in a national park environment, regulatory signs placed in an area where off-trail hiking was prevalent significantly decreased such behavior compared to a no-sign condition in which visitors' last possible exposure to regulatory signs was at the visitor center or trail-head.

Personal norms. The third type of norm is referred to as a personal norm (Van Liere and Dunlap, 1978) or as an internalized normative constraint (Bishop, 1984). These norms are a form of injunctive norm, differing only in that they have been accepted by persons as a valid guide for their own behavior. Whereas an injunctive norm answers the question, "What does the group say I should do?", a personal norm answers the question, "What do I say I should do?". This type of norm is difficult to differentiate from injunctive norms because personal norms are injunctive norms that have been internalized by the individual. Personal norms are also difficult to differentiate from constructs such as attitudes, values, or beliefs. Because personal norms are a unique characteristic of every person, they are discussed in Chapter 4, *The Characteristics of Noncompliant Persons*.

Group Effects

To this point in the chapter our discussion of the social environment has focused on beliefs in the form of perceptions of legitimacy and social norms. The social environment also includes simpler factors, one of which is the size of the party in which visitors encounter the

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[11] The ABA researchers would not theorize that the signs used in their studies communicated injunctive norms, but their research designs are consistent with this interpretation.

national parks. Noncompliance among park visitors has been found to increase with increases in party size (Swearingen and Johnson, 1988). Research outside the parks provides analogous findings, as well as theory-based reasoning to support them.

Noncompliance as a failure to persuade. A rule and the consequences surrounding it can be thought of as an attempt to persuade people to act in a certain way. Accordingly, noncompliance can be thought of as a failure to persuade. Following this reasoning into the literature on persuasion, it is not surprising that noncompliance is more likely in groups than in individuals. Persuasive attempts have been found to decrease in effectiveness as the size of the group being addressed grows (Latane, 1981). Thus, persuasive messages that effectively deter noncompliance for individuals or small groups of two or three visitors may not be effective for larger groups. The NPS could respond to this phenomenon by designing special messages and visitor control techniques for use with large groups of park visitors, or by limiting the size of visiting groups.

Noncompliance due to diffusion of responsibility. Diffusion of responsibility is a social mechanism commonly used to explain findings in the area of helping behavior or altruism (Latane and Darley, 1975). The basic premise is that in a situation calling for individual action, the action is more likely to take place, and will happen more quickly if there are few people present, than if there are many. Seemingly, persons in groups are inactive because, "Someone else will take care of it." Some forms of noncompliance in the national parks are analogous to this situation. For example, failure of hiking parties to register at trail-heads, or failure of visiting parties to clean up picnic areas or campsites may be a direct result of diffusion of responsibility.

Diffusion of responsibility is usually used to explain situations like those above in which a group of persons fail to act in some socially desirable way because the *duty* to act is distributed across the group. However, if the *accountability* for a negative action can likewise be distributed across the group, diffusion of responsibility may also explain why persons in groups are more likely to act in socially undesirable ways. Following this

reasoning all other acts of noncompliance such as off-trail hiking or littering would also be expected to increase with party size because the responsibility for the act is diffused across the group.

NPS managers could combat diffusion of responsibility in a number of ways. The first would be to limit party sizes[12]. A second option would be to design interventions that focus responsibility on a single party member (Cialdini, 1988). For example, in informal contacts, rangers might ask who is the leader of the party, and then address that person directly when describing park rules, asking them to be responsible for the actions of their group.

Summary of the Effects of the Social Environment

In this chapter we have discussed four aspects of the social environment: 1) rule legitimacy; 2) rule-maker legitimacy; 3) norms; and 4) group effects. Although there may be ways to measure some of these aspects of the social environment, all four aspects affect noncompliance through the actor's perceptions. Because such perceptions of the social environment may vary across individuals, it is important that the conclusions drawn from this section be interpreted in light of the individual differences of the target population. The social environment can have very powerful and general effects, but a deep understanding of behavior only results from examining the interactions of the individual and the environment.

Rule legitimacy. Our discussion of rule legitimacy focused on research by Friedland and colleagues concerning the perceived benefits of compliance. When compliance with a rule is thought to benefit both the rule-maker and the ruled persons the situation is described as correspondent. When compliance is thought to benefit only the rule-maker, the situation is noncorrespondent. The research showed that fostering correspondent situations is

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[12] Party size limits are common in backcountry or wilderness, but, to the authors' knowledge, are used only in guided tours of extremely sensitive frontcountry sites such as caves.

desirable in the national parks because: 1) Correspondent situations instigate more compliance; 2) They make surveillance, penalties, specifically defined rules, and threats either unnecessary or effective at low levels; And 3) Because they may alter the perception of threats in a positive manner.

In this section we also discussed reactance -- the phenomenon arising when persons see a rule as an unacceptable limit on their personal freedom and act contrary to the rule in order to assert that freedom. We suggested that reactance occurs only under certain conditions and that NPS managers can avoid reactance by giving park visitors compliance options, and by wording signs to emphasize compliant behavior (i.e., what visitors *should* do rather than what they *shouldn't* do).

Rule-maker legitimacy. Although we found no literature that directly assessed the impact of rule-maker legitimacy on compliance, a study of attitudes associated with off-trail hiking suggested that perceptions of NPS legitimacy were associated with compliance. Research from communication also showed that in interpersonal relationships persons elicit compliance by utilizing strategies appropriate to the relationship -- A finding that suggests that research in the national parks should assess the nature of the relationship between the NPS and park visitors and evaluate communication strategies to find the most appropriate and effective.

More literature examined the perceptions of rule-enforcing agents. Uniformed persons were more likely to elicit compliance than persons in ordinary dress, or regulatory signs or barriers. And the presence of uniformed personnel in a national park in the Pacific Northwest was seen as appropriate by most visitors, and effectively deterred noncompliance. These results suggested that placing uniformed employees in the field is a desirable method of controlling noncompliance in the parks.

Social Norms. Descriptive norms (what others are doing) were seen to have considerable effects on noncompliant behavior. This prompted two conclusions: that attempts should

be made in the national parks to eliminate evidence that others are noncompliant, and that information showing that most visitors are compliant should be provided.

Injunctive norms (what other people think you should do) were described as most effective when strongly held by a majority of the reference group, when not in conflict with personal values and norms, and when salient at the time and place of action. Existing research suggested that the NPS should focus on the last of these factors and make special attempts to activate injunctive norms at sites where noncompliance is a problem.

Group effects. This section presented two theories to explain the finding that group members are more likely to break rules than individuals. The first, noncompliance as a failure to persuade, proposes that rules are attempts to persuade individuals to act in specified ways. Noncompliance is more prevalent in groups because the impact of the persuasive message is diffused across the group members. The second, noncompliance due to diffusion of responsibility, proposes that because of diffusion of responsibility, group members feel less pressure to do socially-desirable, compliant acts, and feel less accountable for noncompliant acts. Possible NPS responses based on either theory include limits on group size, and addressing messages concerning park rules toward specific individuals.

Implications for the National Parks
Rule legitimacy.

1) Programs explaining that NPS rules and regulations are designed to limit damage to a resource that we all own are effective to the extent that they foster a correspondent situation.

2) Even if the actions of noncompliant visitors are not directly affected by messages fostering a correspondent situation, such messages might still have the beneficial effect of positively altering compliant visitors' perceptions of threats or other more severe forms of control.

3) Reactance, or boomerang effects, are unlikely if efforts are made to direct visitors toward desired actions (rather than simply prohibiting certain behaviors), if visitors

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believe the reasons for regulations to be legitimate, and if visitor freedom of choice is emphasized.

Rule-maker legitimacy.

1) Knowledge of how visitors view their relationship to the NPS may be useful in designing appropriate regulatory messages.

2) The presence of uniformed NPS agents in front-country areas can be an effective deterrent to noncompliance and is not perceived negatively by most park visitors.

Social norms.

1) Attempts should be made to limit visitors' direct and indirect observation of noncompliant behavior. If evidence of noncompliance cannot be removed or repaired, it should be made clear that the noncompliant act is socially undesirable and is exhibited by a minority of visitors.

2) Messages emphasizing that most visitors follow the rules may deter a significant portion of noncompliance.

3) The effectiveness of injunctive norms (what others expect visitors to do) can be maximized by making them obvious to visitors in the environments where noncompliance is likely.

Group effects.

1) Whenever possible, regulatory messages should be targeted at specific individuals. This increases the impact of the message and emphasizes the individual responsibility of the visitor to avoid damaging the park.

2) If no alternatives are available, simply limiting party size may decrease noncompliance.

IV. The Characteristics of Noncompliant Persons

In this section we review research concerning the characteristics of persons who are likely to break rules. Knowing these characteristics could be used to deter noncompliance in the national parks in two ways: First, by describing the visitors who are most likely to be noncompliant we may be able to design messages or other forms of interventions that are specifically targeted for those visitors. For example, if non-English-speaking visitors were found to be responsible for most noncompliance, the provision of multi-lingual signs would be a logical form of intervention. This strategy is limited, however, because noncompliance may be loosely linked with a variety of characteristics, making it difficult to define the group (or groups) most likely to break park rules. In addition, a characteristic that predicts noncompliance in one situation may be useless in another. One must therefore be careful not to overgeneralize from isolated research findings.

Second, if the characteristics that define the noncompliant group can be changed, interventions may attempt to alter those characteristics and thereby alter the behavior. For example, if most persons breaking park rules were found to believe that their actions had no negative effect on park resources, one might assume that the belief caused the noncompliance. In an effort to deter further noncompliance, one might then present subsequent visitors with messages emphasizing the damage caused by individual actions. Of course, for such a program to be effective it is necessary that the characteristic in question actually *cause* the noncompliant behavior. In many cases, correlations between characteristics and noncompliance may not be causal or the causal relationship may be reversed, with the behavior causing the attitude.

Despite their limitations, interventions based on individual characteristics have considerable potential in the control of noncompliant behavior.

Demographic Characteristics

Demographics include such characteristics as sex, age, and nationality, and constitute a basic description that might be used to characterize noncompliant persons. In contrast, internal mental characteristics such as attitudes or levels of moral development are not generally considered demographics and are examined in later sections of this chapter.

Research in outdoor recreation. Very little research has investigated the demographic characteristics of persons who are noncompliant during outdoor recreation such as a visit to a national park. In several related studies, Johnson and Swearingen (1988; Swearingen and Johnson, 1988) observed day-hikers in a sub-alpine meadow and found that teenagers and school-age children were more likely than adults to walk off official NPS trails, that white visitors were less likely to walk off trail than Asian visitors or visitors of other race/ethnicity, that visitors from local areas were more likely to walk off-trail than visitors from out-of-state, and that visitors with more years of formal education were more compliant than those with fewer years. An earlier study of campground behavior (Clark, Hendee, and Campbell, 1971) found a similar relation of age to noncompliance -- teenagers were more likely than children or adults to violate campground rules.

Although these findings suggest that efforts to increase compliance with park rules should focus on children, teens, visitors who are not white, visitors from local areas, and visitors with lower education levels, substantial dependence on such interventions is not justified. The strength of the relationships between demographics and noncompliance were quite weak and did not accurately define the noncompliant visitors. For example, even though adults and whites had lower rates of noncompliance, they make up the largest portion of the national park visitor population and account for a majority of the noncompliant acts observed[13]. Further research is necessary to determine any demographic characteristics that might differentiate between compliant and noncompliant white adults.

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[13] In the Swearingen and Johnson study (1988), 58% of the persons observed walking off trail were adults, and 69% were white.

Suggestions as to further demographic characteristics that might be related to noncompliance in the national parks can be found in the research on environmental attitudes. Persons who hold conservationist/preservationist attitudes might also be expected to comply with NPS rules (the validity of this assumption is examined later in this chapter), and their characteristics should thus correspond to the characteristics of compliant park visitors. Research has shown that persons holding conservationist attitudes (e.g. those who belong to outdoor activity clubs that carry out conservation activities, and members of conservationist organizations) tend to be highly educated with upper-middle class occupations (Hendee, Catton, Marlow, and Brockman, 1968; Harry, Gale, and Hendee, 1969). Accordingly, future studies may find that such socioeconomic variables predict compliance with NPS rules.

Research concerning other types of noncompliance. Investigations of other noncompliant acts such littering, failure to wear seat-belts, illegal parking, and tax evasion have had varying degrees of success in finding demographic characteristics that predict the behaviors. However, among the results reported are several that are consistent with the findings from outdoor recreation.

In a review of the littering research, Robinson (1976) concluded that young people are more likely to litter than older persons, and also cited a finding that blacks littered more often than whites (Finnie, 1973). A study of littering by Durdan (1985) also found that young persons were more likely to litter than older persons, but this difference was only found after anti-littering prompts (i.e., signs) were placed in the environment. Apparently, older persons were more affected by such prompts.

The research focusing on seat-belt use, illegal parking, and tax evasion is more difficult to interpret because the studies reviewed used self-reported behavior as the dependent variable. Although attempts may be made to assure subjects that their responses will be anonymous, self-reported noncompliant behavior is of questionable validity because it is common for people to distort information that reflects negatively on themselves (Greenwald,

1980). Thus, when a relationship is found between, say, level of education attained and self-reported seat-belt use, it is not clear whether education is related to actual seat-belt use, or to the tendency to distort how often one uses seat-belts. Keeping this uncertainty in mind, studies have indeed found that higher educated persons reported higher rates of seat-belt use (Morgan, 1967), that reported parking in handicapped parking spaces was more common among male college students and among students with lower grade point averages (Allred and Cope, 1990), and that admitted tax evasion was more common among citizens who were young, had low incomes, and were male (Mason and Calvin, 1978).

Summary of demographic research. Based on the demographic research it is possible to draw few conclusions relevant to noncompliance. The single most consistent finding is that teens and children tend to be less compliant than adults. A second, less established conclusion is that non-whites tend to be less compliant than whites. Finally, research on self-reported seat-belt use, and on the characteristics of persons with pro-environmental attitudes suggests that higher education and socioeconomic status may be associated with higher compliance with park rules.

Before the demographic characteristics listed above are used in targeting efforts to deter noncompliance, research is necessary to determine the proportion of noncompliance in park environments that is exhibited by visitors with those characteristics. Evidence suggests that many noncompliant visitors often do not have the demographic characteristics listed above. Nonetheless, specific situations in which demographically homogeneous are responsible for most noncompliance may exist in some national parks.

If all these demographic characteristics were strongly related to general noncompliance in the national parks then interventions designed to reduce noncompliance should be targeted at these groups. However, to design interventions with a maximum chance of success one must answer the question, "*Why* are _____ persons more likely to comply with rules?" In other words, the data require a theory. The remaining sections of this chapter describe

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theories that explain why persons with certain characteristics comply with, or break NPS rules.

Ignorance

The simplest mental characteristic that can be used to explain noncompliance is that people may not know the rules. Noncompliance due to ignorance has been referred to as unintentional violations (Gramann and Vander Stoep, 1987) and unintended depreciative behavior (Namba and Dustin, 1992). There is considerable evidence that some form of ignorance is a significant factor in noncompliant behavior, but it is not clear whether the problem is ignorance of the rules, or ignorance of the reasons for the rules. Gramann, Christenson, and Vander Stoep (1992) cite studies showing an 86% reduction in nails hammered into trees by campers (Oliver, Roggenbuck, and Watson, 1985), a 50% reduction in feeding ground squirrels (Schwarzkopf, 1984), and an 88% reduction in climbing on military monuments (Vander Stoep and Gramann, 1987) when the link between actions and resource damage was explained to outdoor recreationists. However, the interventions used in these studies presented both the rule and its justification. Thus, it is unclear whether these effects depended on increased knowledge of the rules or increases in the perceived legitimacy of the rules (see Chapter 3 for a discussion of rule legitimacy).

There is evidence that outdoor recreationists can remain ignorant of rules. Ross and Moeller (1974) found that most campers in an Allegheny National Forest campground were uninformed about the rules. Also, Marler (1971) found that leaflets distributed with camping fee validations were accepted and read by only one-third of campers, demonstrating that at least one common method of communicating rules to visitors could leave many visitors ignorant of the rules. Finally, in a study of off-trail hiking Johnson and Swearingen (1988) found that 10% of visitors in their sample reported that they had never been exposed to minimum impact guidelines, and that about 12% of visitors indicated they did not understand Park Service expectations for their behavior. These studies demonstrate that ignorance can and does exist. However, knowledge about the general proportion of visitors

to national parks who are currently ignorant of park rules is unestablished and would be an important subject of future research.

One study of off-trail hiking in a national park (Swearingen and Johnson, 1988) suggests that ignorance of the rules prohibiting such hiking was responsible for a relatively small proportion of the noncompliance observed. Swearingen and Johnson tested the effect of several types of interventions and one can infer the proportion of visitors who were ignorant of park rules by comparing the deterrent effects of two of them, a sign that simply conveyed the rule, and the presence of a uniformed park employee. The reasoning is based on the following assumptions: 1) off-trail hikers observed when neither a sign nor employee was present include visitors who know the rule against off-trail hiking and visitors who are ignorant of the rule; 2) a sign that simply states the rule will have a small effect on off-trail hikers who already know the rule but a greater effect on those who are ignorant of the rule; 3) the presence of a uniformed employee will have a large effect on off-trail hikers who already know the rule but a small effect on those who are ignorant of the rule. Thus, because Swearingen and Johnson observed that the uniformed employee had a larger deterrent effect (reduction of off-trail hiking from 6.9% to 1.8%) than did a simple sign presenting the rule (reduction of off-trail hiking from 6.9% to 4.1%), one can infer that knowing the rule was not enough to deter most off-trail hikers[14].

In a survey extension of the previous study, Johnson and Swearingen (1988) compared the responses of visitors who had been observed leaving the paved trail at a site of common off-trail hiking to the responses of visitors who had stayed on the trail. They found essentially no difference in self-reported understanding of park service expectations for low impact visitor behavior in environmentally sensitive areas (about 12% of both groups reported a

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[14] It should be noted that all subjects in Swearingen and Johnson's study had the usual opportunities to encounter information about park rules and their justification before being included in the data collection. Thus, the level of noncompliance in the control condition represents "residual noncompliance" that occurred despite exposure to standard NPS messages designed to deter off-trail hiking.

lack of understanding). Although their study design did not allow high sensitivity to differences between compliers and noncompliers, the absence of any difference again suggests that ignorance of park service behavioral expectations (expectations often communicated by rules) was not responsible for most off-trail hiking.

Summary of ignorance. The topic under discussion in the section is not whether communicating the presence of a rule is an important aspect of controlling behavior, but whether ignorance of the rules currently makes a significant contribution to the problem of noncompliance in the national parks. We accept the importance of communicating rules and suggest that it would be imprudent to reduce current programs that communicate rules to park visitors. However, based on the research we reviewed, it is not clear whether expanded programs to communicate NPS rules would have significant deterrent effects. The studies that reduced noncompliance by providing information to visitors have confounded justification of the rules with basic information about what the rules were and little is known about how much knowledge national park visitors actually have about park rules. Two related studies of off-trail hiking suggested that knowledge of park rules would not deter most of the noncompliance that was observed and that there was little difference between compliant and noncompliant visitors in self-reported understanding of park service behavioral expectations. Given these results, and the fact that the presentation of information describing park rules is a common intervention used to deter noncompliance in the national parks (Johnson, Vande Kamp, and Swearingen, 1994), we suspect that ignorance of rules is currently responsible for a relatively small proportion of noncompliance in national parks. However, research is necessary to test such hypotheses and determine whether deterrence of noncompliance in many national parks can be improved by better communication of park rules.

Attitudes

Attitudes are the dominant theoretical construct used in attempts to explain individuals' environmental behavior. For example, many researchers would explain the demographic finding that young people are less compliant than adults during outdoor recreation by

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hypothesizing that young people's attitudes toward the environment are less positive than those of adults.

Recreation managers have traditionally sought to control behavior through informational, educational and interpretive services aimed at altering environmental attitudes (McAvoy and Dustin, 1983; Johnson, Vande Kamp, and Swearingen, 1994). These types of management techniques are the dominant forms of what has been called *indirect management* and have commonly been preferred over *direct management* techniques such as zoning of use, enforcement of rules, and limitation of visitor access (McAvoy and Dustin, 1983; Gramann and Vander Stoep, 1987).

In their discussion of indirect and direct management techniques, McAvoy and Dustin (1983) suggest that indirect, attitude based programs of recreation management are commonly preferred over direct forms of management because they are less threatening to visitors' sense of personal freedom. In advocating indirect management techniques, Gramann and Vander Stoep (1987) agree, and also assert that indirect management is less likely to spark public controversy and is frequently more cost effective. Also, and perhaps most importantly, indirect management techniques are a preferred means of influencing behavior because the attitude change they are intended to create is thought to produce a profound and lasting change in behavior (Ajzen, 1992). By changing a person's attitude toward the environment one might expect to produce a positive long term modification of a wide range of behaviors, including all behaviors involving compliance with NPS rules.

The expectation that changing attitudes will effectively control behavior is based in the literature of social psychology. Information-processing models of human behavior suggest that attitudes are a major determinant of individual behavior (Ajzen, 1988). Outdoor recreation managers rely heavily on the logic that if an individual's beliefs about an object or issue are changed, attitudes and subsequent behavior will follow (McAvoy and Dustin, 1983).

It is unclear how much noncompliance is deterred by existing attitude change interventions in the national parks because we don't know how much noncompliance would be present if the interventions were not in use. Certainly, researchers who advocate reliance on indirect management would suggest that it is deterring significant damage. However, damage to natural resources due to noncompliant visitor behavior remains a major problem (Johnson, Vande Kamp and Swearingen, 1994), suggesting that current indirect, attitude-based visitor control programs are not sufficient to adequately control visitor behavior. A review of the current research on attitudes and behavior reveals several possible reasons for this shortcoming.

The limited conditions in which attitudes are causally linked to behavior. The shortfall of attitude-based approaches to deterring noncompliance may be due to the questionable validity of the central assumption that behaviors follow from attitudes. Examples of inconsistency between attitudes and behavior abound in social psychology (see Wicker, 1969, or McGuire, 1985 for reviews). In one striking example involving littering, Bickman (1972) found that only 1.4% of subjects picked up a prominent piece of litter in their path, but that later, 94% of those same subjects agreed with a statement that picking up litter was everyone's responsibility.

Over the years, such evidence of attitude/behavior inconsistency have forced the very information processing approaches on which attitude-based management was originally justified to propose significant limitations on the conditions in which attitude/behavior consistency can be expected (Greenwald, 1989). For example, Fishbein and Manfredo (1992) write;

> According to the Theory of Reasoned Action, one is most likely to be successful in producing a change in a given (behavioral) intention if one first changes the attitudes and/or norms that directly correspond in terms of action, target, context and time to that intention (p. 35).

This quote suggests that in a park where off-trail hiking does considerable damage, messages and information should go beyond attempts to change visitor attitudes toward the environment, and even beyond attempts to change visitor attitudes toward off-trail hiking in general, and should instead focus on attitudes concerning visitor's intentions to walk only on the official trails during their current visit. Research has shown that increasing the specificity of the attitude increases attitude/behavior congruence (Weigel and Vernon, 1974; Heberlein and Black, 1976), and although no attitude change was attempted, Johnson and Swearingen (1988) found that attitudes toward off-trail hiking behavior were related to visitors' observed off-trail hiking.

Shifting attitude-change strategies to focus on specific behaviorally-linked attitudes might increase their immediate effectiveness, but would be unlikely to produce the profound and lasting changes in behavior cited as a major advantage of attitude change interventions (Ajzen, 1992). One might even argue that such specifically focused interventions are, for all practical purposes, equivalent to Applied Behavioral Analysis techniques and thus share the same limited generalizability and other drawbacks discussed in Chapter 2. Nonetheless, the research suggests that managers would gain by moving from general attitude-change strategies to interventions designed to change specific attitudes; relinquishing the great, but unrealized, potential of the former for the limited but more readily attained benefits of the latter.

The question of which attitudes cause a given behavior. The insufficient effectiveness of current attitude-based management techniques might also be attributed to a failure to recognize that many behaviors are attitudinally complex. Current interventions often assume that by changing a single general attitude, such as the attitude toward the natural environment, one can modify visitor behavior such as off-trail hiking. This fails to recognize that many attitudes are relevant to a visitor's decision to walk off an official trail, and that the attitude toward the environment may, at best, be one of several contributing factors. Determining which attitudes carry the most weight in determining a given behavior may be difficult (Greenwald, 1989). For example, attitudes toward seat-belt laws have been found

to be as good a predictor of seat-belt use as are attitudes about seat-belt use (Jonah and Dawson, 1982)[15]. Research is necessary to determine if techniques intended to change attitudes other than the attitude toward the targeted behavior might help control visitor behavior. For example Chapter 3 reviewed literature suggesting that the attitude toward the NPS may have as great an influence on noncompliance as the attitude toward the noncompliant action.

The question of attitude accessibility. A third reason for the limited effectiveness of current attitude-based interventions is the failure to recognize that an attitude must be accessible, or salient, in order to have an effect on behavior. Even if a visitor holds attitudes that specify compliance with park rules they may still act in noncompliant ways when those attitudes are not accessed from memory at the time of the behavior. The majority of work investigating the causes and effects of attitude accessibility has been done by Fazio and colleagues.

Vincent and Fazio (1992) present a summary of the findings of a series of studies concerning attitude accessibility. In their research, attitudes toward an object or behavior have been found to fall on a continuum of accessibility ranging from no attitude/not accessible to highly accessible. Their studies have shown that attitudes become more accessible with repeated expression and with direct experience. Thus, in the parks, visitors would be expected to act in accordance with rules when they have often expressed attitudes consistent with compliance (e.g., a belief that any damage to the natural environment is wrong) and when those attitudes have been formed as a result of first-hand experiences. Vincent and Fazio suggest that programs using attitude expression and personal experience to enhance the accessibility of such desired attitudes should be incorporated into social influence programs. Brown's (1974) finding that adolescents who often thought about laws were more

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[15] In Jonah and Dawson (1982) Attitudes toward seatbelt use and attitudes toward seatbelt laws had correlations of 0.59 and 0.60, respectively, with self-reported seatbelt use. The correlation between attitudes toward seatbelt use and those toward seatbelt laws was 0.61.

likely to show consistency between their behavior and their attitudes toward laws supports Vincent and Fazio's suggestion.

Vincent and Fazio (1992) also point out that when attitudes are present, but not automatically accessible, they can still be accessed by individuals who have the motivation and opportunity to do so. Thus, if most park visitors hold attitudes consistent with compliance but those attitudes are usually not automatically accessible, interventions that increase the motivation and opportunity for deliberate processing may increase compliance. In support of their argument, Vincent and Fazio cite evidence that when the perceived consequences of an incorrect judgment are high rather than low, persons are more likely to process information carefully before making that judgment. This suggests that the reductions in noncompliance observed when threats of sanction are present (e.g., Swearingen and Johnson, 1988), may occur because the threats prompt some park visitors to access their attitudes and find that they are consistent with compliance.

Finally, attitude accessibility can be increased by the presence of cues that prompt attitude activation. Vincent and Fazio (1992) provide a particularly relevant example by pointing out that a camper is less likely to simply pass by a fellow camper's abandoned campfire if she has just encountered a sign encouraging fire safety. This example and the research supporting it are consistent with the Applied Behavior Analysis research in suggesting that the judicious placement of signs in the parks can deter some noncompliance. The effectiveness of the sign for a given individual still depends on the presence and accessibility of attitudes consistent with compliance, but a sign or other cue eliminates the need for the attitude to be automatically accessible[16].

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[16] It is possible that existing signs and other communications intended to change attitudes may, in fact, be acting as cues prompting attitude activation. Thus, empirical testing of the effectiveness of attitude-change interventions should include appropriate control conditions to test this possibility.

The difficult task of changing attitudes. Even if all the above difficulties are overcome and one finds an attitude that effectively controls a noncompliant behavior, one must still find ways to instill that attitude in park visitors. Despite a huge volume of research, it is generally recognized that the process of changing attitudes (i.e., persuasion) is not fully understood and is certainly not straightforward. In summarizing the research on attitudes and attitude change, McGuire (1985) presents a conceptual framework of the persuasion process that includes five *sets* of input factors (e.g., the set of source factors includes credibility, attractiveness, power, and sub-factors such as trustworthiness and similarity to the target) as well as 12 mediating factors and outcome measures. Furthermore, McGuire recognizes that the five classes of input factors interact, making it hazardous to consider only one class of factors at a time. Obviously, such a complex and cloudy picture of persuasion processes creates a bewildering situation for the NPS manager who is interested only in whether or not an intervention decreases noncompliance.

Attempts have been made to present more workable models of persuasion to recreation managers (e.g., Petty, McMichael, and Brannon, 1992; Slater, 1992; McCool and Braithwaite, 1992), and such models have had some success in changing target person's attitudes. However, the complexity of the persuasion process suggests that the generalizability of such approaches may be limited. Even before instituting such programs the NPS manager must overcome difficult practical problems such as getting the message out to noncompliant visitors and gaining their attention (Harris, 1981; Ross and Moeller, 1974). Recognizing the difficulties associated with changing attitudes makes it even more understandable why current attitude change interventions are not completely successful in deterring noncompliance.

Despite the difficulty of changing attitudes, abandoning current NPS attitude-change programs before assessing their effectiveness would be ill-advised. Research suggests that, because of their impact on children, such programs may be effective, both in the short-term and in long-term ways that are difficult to assess. Susceptibility to persuasion peaks between the ages of approximately nine and twelve (McGuire, 1985), and millions of young children

visit national parks. Persuasive programs may be changing children's attitudes in ways that affect their behavior both on that park visit and on many future park visits. Many of us can relate anecdotes of how the attitudes we formed as children have had profound effects on our behavior. Such experiences illustrate a possible long-term benefit of the current attitude-change programs that the NPS should take care to protect.

Summary of Attitude Research. Currently, many units of the NPS attempt to decrease noncompliance by using interventions that rely on attitude change as an intermediate step (Johnson, Vande Kamp, and Swearingen, 1994). However, the continuing presence of significant resource damage due to visitor noncompliance suggests that existing attitude change interventions are insufficient to fully control noncompliance. Our review of the attitude research found four possible reasons why it is difficult to control behavior through attitudes: 1) Attitudes cause behavior only under limited conditions; 2) It is often unclear which attitudes are most closely linked with a given behavior; 3) Attitudes must be accessible in memory at the time of the behavior in order to have an effect; and 4) Persuading people to change their attitudes is a complex and poorly understood process.

Attitude-based interventions clearly face substantial hurdles. However, the research that clarified the four problems also suggested the following ways to minimize them when designing interventions. First, persuasion attempts should focus on attitudes that are specifically linked with behavior rather than on general pro-environmental or pro-park attitudes. Second, attempts should be made to determine attitudes that have strong indirect effects on noncompliant behavior and to change those attitudes. Third, because attitudes must be activated to have an effect, attempts to *activate* attitudes that are consistent with noncompliance are at least as important as attempts to *instill* such attitudes. And fourth, persuasion attempts aimed at children aged nine to twelve are likely to have a greater payoff than other persuasive messages because attitude change is most easily obtained in that age range and because attitudes that are instilled at such a young age may be able to prompt compliant behaviors in many park visits across each person's lifetime.

In the national parks, it is unclear how much noncompliance the existing attitude-based interventions are deterring because we don't know how much noncompliance would be present if the interventions were not in use. Research assessing the effectiveness of current interventions would be difficult for several reasons: First, one could not simply observe visitors' behavior immediately following the persuasive message and make conclusions based on those observations -- persuasive messages may act only after several repetitions and/or with extended latency periods. And second, the persuasive message may also act indirectly on the noncompliant behavior by serving as a catalyst for the effectiveness of other interventions. For example, attempts to instill a positive attitude toward the natural environment may not decrease off-trail hiking, but may increase the effectiveness of a sign threatening a fine for such noncompliance. Despite these difficulties, research should be conducted to evaluate the effectiveness of both existing attitude-based techniques and of techniques that incorporate the suggestions made above. By knowing more about the current and potential effectiveness of attitude based interventions we could better assess the role of such interventions in general programs to reduce noncompliance.

Personal Norms

Personal norms are another construct used to explain individual variations in environmental behavior. We are using the term *personal norm* to refer to injunctive social norms that have been internalized and that create a sense of moral obligation to perform, or refrain from certain behaviors. In the national parks, common examples of interventions utilizing personal norms would be messages designed to either instill or activate personal norms that are consistent with compliance with park rules. For example, a sign reading, "When you break park rules you cause damage that degrades the wilderness experience of all future visitors", is an attempt to activate a personal norm specifying that it is wrong to selfishly impact others' experiences.

Attempts to use social norms to control visitor behavior may also activate personal norms in those visitors who have internalized the social norm. However, the distinction between social and personal norms is both theoretically and practically meaningful. Personal and

social norms provide theoretically distinct motivations for behavior -- people comply with social norms in order to satisfy others (i.e., an external audience), but they comply with personal norms in order to satisfy their own sense of right and wrong (i.e., an internal audience). In practical terms, the best social norms to evoke are those specifically involving the form of noncompliance of concern (e.g., "Ranger Rick stays on the official trail and thinks you should too."), but because few park visitors are likely to have internalized such specific norms, interventions utilizing personal norms should activate norms that specify a moral obligation to prevent damage to the natural environment and link such general norms with the specific behavior (e.g., "Throwing rocks off cliffs endangers hikers in the canyon below. Please do not throw rocks.").

The distinction between personal norms and social norms is subtle, but that between personal norms and attitudes is even less clear. One primary distinction can be made. While personal norms motivate behavior by invoking a sense of moral right and wrong, attitudes are thought to be positive or negative evaluations of objects that prompt behavior consistent with that evaluation. For example, a personal norm would simply specify that it is wrong to walk off the official trail and harm the meadow, while attitudes might specify that *because I like* the meadow plants I don't want to walk off the trail and harm them. It is not clear whether visitor behavior could be most effectively controlled by altering attitudes or by altering personal norms. Future research is necessary to clarify their respective importance in determining visitor behavior.

Strengths and weaknesses of the personal norm approach. Although personal norms are theoretically distinct from attitudes, they share many of the same potential strengths as a means of controlling visitor behavior. Interventions designed to instill or activate personal norms would be expected to encourage a broad range of environmentally sound behaviors and such behavior would be expected to persist over time.

Interventions utilizing personal norms also share many of the weaknesses of attitudes. For many behaviors, a wide range of attitudes, characteristics of the social environment, and

personal norms may combine to determine behavior. The personal norm on which the intervention focuses may play only a small role in determining the behavior. In addition, the process by which social norms are internalized to become personal norms is not well understood and it seems unlikely that the limited opportunities for communication that are available in the national parks are sufficient to instill personal norms in most visitors. Finally, even in individuals with pro-environmental personal norms, such norms must be activated in order to affect a given behavior. This last point is the most thoroughly researched aspect of interventions utilizing personal norms.

Research investigating personal norms. The concept of personal norms originated and has been most actively investigated in an area of research broadly referred to as prosocial behavior theory (Eisenberg, 1982). Prosocial behavior theory concerns instances in which persons voluntarily act to benefit others. Several researchers interested in resource management have proposed that resource protection can be classed as prosocial behavior and thus, behaviors related to resource protection can be explained by prosocial behavior theory (Gramann and Vander Stoep, 1987; Heberlein, 1972; Van Liere and Dunlap, 1978). Researchers interested in prosocial behavior often consider personal norms to be an extremely promising deterrent to noncompliance because they observe very strong correlations between pro-environmental personal norms and compliance with park rules (e.g., Gramann, Christensen, and Vander Stoep, 1992). However, such high correlations may be misleading. In many national park environments the vast majority of visitors are compliant, yet noncompliance remains a serious problem. In such situations personal norms may be highly associated with compliance, but attempts to instill or activate personal norms in the small proportion of visitors who fail to comply are likely to be ineffectual, particularly if (as in many park environments) almost all visitors have already been exposed to messages designed to activate personal norms. Thus, high correlations should not be taken as indications of great predictive power.

The existing research concerning prosocial behavior has primarily utilized a norm-activation model (Schwartz, 1970) that suggests behavior is most likely to be consistent with personal

norms when persons know that their behavior may affect others (i.e., they have *awareness of consequences* [AC]), and when they accept responsibility for their behavior (i.e., they have *ascription of responsibility* [AR]). If AC and AR are not present, persons will not be aware that they are faced with a moral choice, and personal norms will not affect their behavior (Schwartz, 1970). The absence of AC and AR can be illustrated by the excuses that people make when caught breaking rules such as those against off-trail hiking. The excuse, "I didn't think it would hurt anything" reveals a lack of AC, while, "The vast majority of damage was already done when I got here. I'm not making any difference" shows no AR.

Applications of Schwartz's norm-activation model have been tested in relation to several environmentally relevant behaviors. Van Liere and Dunlap (1978) found that AR and AC were generally correlated with the decision whether or not to burn yard waste as specified by Schwartz's model. However, Noe, Hull, and Wellman (1982) found that AR and AC had little power in predicting use of off-road vehicles (ORVs) in a seashore environment. They concluded that Schwartz's model may not be the most appropriate for predicting conformity in a recreational situation.

The equivocal nature of these studies is hardly surprising when one considers the necessary conditions for the success of such interventions: First, the personal norm must be present in most of the target population. In the yard waste burning study (Van Liere and Dunlap, 1978) this seems a safe assumption because the critical personal norm was that it is wrong to physically harm one's neighbors (smoke from burning yard waste is a potential health risk). In contrast, Noe, Hull, and Wellman (1982) suggest that ORV users should feel morally constrained to limit their damage to the environment and/or to limit their impact on other users, but it is not clear that ORV users, particularly those most responsible for conflicts with other users, should hold such personal norms.

Second, the personal norm must dominate other factors that affect the behavior. Here again, it is easy to see how the personal norms activated in the yard waste burning study had a more consistent effect than the norms activated in the ORV study (most people would feel

that harming the health of one's neighbors is a very serious matter, certainly more serious than annoying some beachcombers one has never met). Because the breaking of rules in the national parks can seldom be presented as having immediate negative effects on the health of other visitors (or similarly important and well-recognized negative consequences), we can not assume that even interventions that effectively activate personal norms will consistently deter noncompliance in the national parks.

Third, the final necessary condition is that the individuals to be affected by an intervention must be at a stage of intellectual and moral development in which personal norms are considered in behavioral choices. Discussion of this last condition is deferred until the next section of this chapter.

Summary of Personal Norms. Although personal norms have theoretical potential for the control of visitor behavior, the current research on such interventions does more to show the limitations of the approach than to suggest ways of harnessing its potential. Although the research available for this review was limited, the only case in which activation of personal norms was significantly related to behavior was when that behavior was clearly linked with health risks to other people (Van Liere and Dunlap, 1978). It appears likely that the personal norms associated with damage to the environment or with damage to other visitors' recreational experiences are less prevalent or weaker than norms concerning physical harm, and thus, are less likely to be an effective means of intervention.

One reason that personal norms have received attention as a means of visitor control may be due to the well known human tendency to believe that others think as they do (Krueger and Klement, 1994). Most park managers have highly developed personal norms concerning acceptable behavior in the parks. When evaluating a message designed to activate such norms park managers are likely to think, "I wouldn't break the rule after seeing this message. It should be effective." However, many visitors do not share the manager's system of personal norms, and messages that managers are sure will be effective may not alter visitor behavior.

Our review suggests that interventions focusing on personal norms may aid in deterring noncompliance among visitors who have pro-environmental personal norms, but that they are unlikely to deter noncompliance in the remaining visitors -- visitors who may be responsible for the majority of noncompliance in many park environments. One could attempt to link park rules with other personal norms that are present in nearly all park visitors and that have strong effects on behavior (e.g., norms specifying that it is wrong to physically harm other people), but it is difficult to make such links plausible. Despite these limitations, it is probably to the benefit of the NPS to support the development of social and personal norms specifying environmentally sound behavior. Such efforts may have positive long-term or indirect effects similar to the effects of persuasive messages instilling pro-environmental attitudes that were discussed earlier in this chapter.

Moral Development

Earlier, in discussing personal norms, the level of moral development was mentioned as a factor limiting the effects of personal norms. The mediating role of moral development in the effect of personal norms will be discussed more fully below, but the implications of moral development for park managers go beyond this single insight. Several researchers have proposed that an understanding of moral development theory can help park managers greatly improve the effectiveness of messages meant to deter visitor noncompliance (Swearingen, 1989; Dustin, 1985; Christenson and Dustin, 1989).

Stages of moral development. The theory of moral development, developed by Kohlberg (Kohlberg, Levine, and Hewer, 1983), posits that people progress through six stages of moral development. The early stages are linked with the development of cognitive abilities, but the theory does not attempt to link all changes in moral reasoning to such cognitive changes. Kohlberg's stages describe the typical reasoning persons use when making a decision with moral components. In stage 1, the overriding concern is the fear of punishment. For example, "Will I be punished for walking off the trail?" Stage 2, is similar, but more sophisticated in that the probability of punishment and severity of that punishment are weighed against the possible gain. For example, "I want to walk off the trail to see that

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deer. If I do, I probably won't get caught, and am even less likely to be fined." In stage 3, social influence begins to play a role. The reactions of significant others are of concern. For example, "Do my friends and family think I should always walk on the official trail?" Stage 4 also concerns social influence, but the generalized reactions of a larger society are the primary focus. "Have most people agreed that we should all stay on the official trail?" Finally, stage 5 and 6 move to a more abstract form of reasoning. In stage 5, the overriding concern is whether moral constraints are just or fair. For example, "Is it fair to rule that I should walk only on the official trail?" Finally, in stage 6, the question of self-respect is the primary concern. "How would I feel about myself if I walked off the official trail?"

Kohlberg's ideas have motivated considerable scientific discussion and research by other scientists who have criticized and modified his framework. Swearingen (1989) reviewed the critiques of Kohlberg's postconventional stages and summarized several main points: 1) Kohlberg acknowledged that his developmental stage theory of justice reasoning does not completely describe the process of adult development of morality (Kohlberg, Levine, and Hewer, 1983); 2) Kohlberg was unable to empirically verify Stage 6 reasoning (Kohlberg, et.al., 1983); and 3) Kohlberg accepted a contention by Gilligan (1982) that the moral domain should be expanded to include the care and response orientation. Although these criticisms prompted revision of Kohlberg's theory, they primarily applied to the latter stages of development. Swearingen (1989) concluded that most of the evidence indicated the lower stages of Kohlberg's hierarchy are accurate. Thus, in the rest of this section we will discuss moral development using Kohlberg's framework.

Literature discussing moral development and environmental behavior. It is obvious from the description of Kohlberg's stages of development that different types of information affect the moral decisions of persons at different stages of development. Several authors have published articles that agree with this basic insight and have applied this reasoning to recreation management, and each has also made contributions moving the theory and application forward. Dustin (1985) presented an informal discussion linking Kohlberg's stages of morality to his own, and others', compliance with park rules. He suggested that

messages designed to appeal to persons at all stages of reasoning should increase compliance. Christensen and Dustin (1989) present a more complete discussion of this point, recognizing criticisms of Kohlberg's work, and calling for evaluation of the effectiveness of interventions based on theories of moral development. However, no empirical data are presented. Finally, Swearingen (1989) takes several further steps in developing approaches based on moral development, and reports data that test several aspects of his approach.

Swearingen's major departure from Christensen and Dustin (1989) was to move away from a focus on general moral development, and to begin development of a more specialized instrument to measure environmental ethical development. Swearingen tested his instrument, the environmental ethics questionnaire, by mailing it to national park visitors. His analyses showed the instrument had desirable properties, and was related to demographic variables in ways that supported its validity. But more importantly, a relationship was found between park visitor's level of environmental ethical reasoning and their actual (observed) compliance with park rules. This last result is particularly impressive because practical considerations made the research design relatively insensitive to such a relationship. The fact that the effect was robust enough to be detected suggests that with refinement, this type of measure could help managers to both characterize those visitors most likely to break park rules, and to design interventions focused on them.

Although persons at early stages of moral development are likely to remain unaffected by messages addressed to later stages of reasoning, it is not clear how persons at later stages respond to messages addressed to early stage levels of reasoning. One potential complication of utilizing messages to address persons at specific levels of moral development is that persons who are at higher levels of development may respond negatively to messages intended for persons at early stages. For example, a park manager might find that threats of sanction are effective deterrents of noncompliance, but that compliant visitors who are at higher stages of moral development see such messages as obtrusive and offensive. Research is necessary to determine if such reactions occur.

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Summary of moral development approaches. This review suggests that moral development may eventually prove useful as a way to characterize noncompliant park visitors. However, considerable research would be necessary to design effective interventions. It is not known whether the relation of noncompliance to particular levels of moral development is consistent across situations. It is also unclear how to design messages that will target the groups most likely to break rules. Finally, even if such messages are designed, they must be presented in effective ways -- The optimum message will have no effect if it is not read.

Given its current undeveloped state, the moral development approach might best be used as a source of several general implications for park managers. First, it reemphasizes the pitfalls of intuitively evaluating the probable effectiveness of interventions. Park managers and other NPS employees are likely to have a more developed sense of environmental ethics than most park visitors, and messages that appeal to park employees may be ineffective, or even incomprehensible to park visitors. Second, the approach suggests that a range of messages may be necessary to deter noncompliance. It is unlikely that persons at a single level of moral development are responsible for all, or even most noncompliance. Therefore, to produce maximum compliance, multiple messages should be presented. And third, the approach suggests several types of reasoning toward which messages might be focused in order to deter noncompliance in a wide variety of visitors.

Summary: Characteristics of Noncompliant Persons

This chapter began by describing two ways in which one could use knowledge about the characteristics of noncompliant persons in attempts to deter noncompliance. These approaches can be referred to as: 1) a targeting approach, in which the knowledge is used in designing interventions that are specifically targeted at those persons who are likely to break rules, and 2) a visitor change approach in which noncompliant persons are described using characteristics that are thought to be causally linked with noncompliance, and attempts are made to change those characteristics. Each of the sections of this chapter can be evaluated in light of these approaches.

Demographic characteristics. Demographic description of noncompliant visitors is clearly a targeting approach, given that it is unlikely that one could believe that demographic characteristics directly cause noncompliance or that one could deter noncompliance by changing such characteristics (e.g., imagine a noncompliance intervention in which one makes visitors older). Our review found that the research to this date has provided a very limited description of the demographic characteristics of noncompliant persons. The characteristic most strongly associated with noncompliance was age, with younger persons and children being more likely to break rules than older adults. Several other demographic characteristics were directly or indirectly linked with noncompliance. Non-whites appear to be less compliant than whites, and highly educated park visitors with upper-middle-class occupations are more likely to obey park rules than are visitors of lower socio-economic status. Although these characteristics might be used in targeting some messages, they do not appear to accurately define all, or even a majority of noncompliant park visitors. Future research may provide a better demographic picture of noncompliant park visitors that could be used to improve the deterrence of noncompliance. Such a clear picture is more likely to arise in research focusing on specific acts of noncompliance in well-defined environments than in general characterization of the "noncompliant visitor".

Ignorance. Based on the research we reviewed, it is not clear whether expanded programs to decrease ignorance of NPS rules would have practical deterrent effects. Research on ignorance in outdoor settings has done a poor job of differentiating between ignorance of rules and ignorance of the reasons for rules. What little is known about the proportion of national park visitors who are ignorant of park rules suggests that increasing knowledge of the rules might deter less than half of existing noncompliance. Further research is necessary to test when, where, and if deterrence of noncompliance in the national parks can be improved by better communication of park rules.

Although increasing visitors' knowledge of park rules over current levels may not increase compliance, decreasing current programs that explain park rules is not recommended. Rules are undoubtedly an important determinant of visitor behavior. The critical question is not

whether ignorance of rules is important, but whether current levels of ignorance in the national parks are responsible for an important proportion of noncompliance with park rules.

Attitudes. The concept of attitudes is very widely used in current interventions to reduce noncompliance. Attitudes can be used in targeting approaches, but are more common in visitor change approaches because they are usually assumed to be a major determinant of behavior. It is difficult to assess the true impact of existing attitude-based interventions, but the prevalence of rule-breaking in the parks suggests that, at best, such current approaches are insufficient to reduce noncompliance to acceptable levels.

Our review of the attitude literature related to noncompliance in the national parks focused on the difficulty of relating attitudes directly to behavior. We concluded that because both the relation of attitudes to behavior and the process of changing attitudes are complex and poorly understood, interventions designed to deter noncompliance by changing attitudes should not be the primary means of visitor control in the national parks. However, it was possible that attempts to change attitudes could have beneficial indirect or long-term effects. Some research indirectly supports these effects but they have not been unequivocally demonstrated.

The concept of attitudes also appeared to be useful in a targeting approach in which attempts were made to activate pro-environment or pro-compliance attitudes in the park visitors who hold them. Obviously such approaches would not affect those visitors who lack such attitudes, but in some parks those visitors might constitute a small minority of visitors or their noncompliance might be deterred by other types of interventions.

Personal norms. Although the construct of personal norms is theoretically distinct from attitudes, our review found that both constructs share similar strengths and weaknesses. Because so little is known about the development of personal norms, we concluded that visitor-change approaches to personal norms are likely to have, at best, only a long-term

positive effect. Targeting approaches have received more attention in the form of research on norm activation. However, such approaches have also had limited success. Interventions utilizing personal norms appeared to have limited potential as primary means of control in the national parks.

Moral development. In the final section of this chapter we discussed theories of moral development in relation to noncompliance. The small amount of literature in this area is all focused on the use of moral development theory in a targeting approach. Although moral development is considered to have potential in such targeting approaches, substantial research is necessary to design messages that would effectively deter noncompliance among persons who show moral reasoning consistent with differing stages of moral development. Research is also necessary to determine if the content of such messages is likely to detract from the experiences of visitors whose moral development does not match the level to which the message is intended. In the meantime, moral development approaches generally suggest that multiple messages may be necessary, and also suggest several types of reasoning on which to focus such messages.

Summary of problems associated with visitor-change approaches. Based on the research, we suggest that visitor-change approaches might best be considered long-term, and secondary means of deterring noncompliance. The processes of changing attitudes and personal norms are poorly understood and the communication opportunities in the national parks can be extremely limited. Although visitors have the opportunity to read information and view other forms of media designed to change their attitudes or personal norms, it is entirely possible to enter frontcountry areas without processing any such information. Even if a person holds attitudes or personal norms consistent with compliance, those constructs may not affect their behavior -- they may be inactive at the time of the noncompliant act, or the person may make moral decisions at a stage in which internal personal constructs are not taken into account.

Despite the limitations of the visitor change approaches, they probably have beneficial long-term effects. Over the course of one or more park visits, some visitors, particularly children, may indeed develop attitudes or personal norms that are consistent with park rules. Change interventions may also increase compliance indirectly, by altering visitor attitudes toward the rules themselves. Given these possibilities, and the fact that the true effect of current visitor change programs is unknown, we do not recommend that visitor change programs be abandoned. We do suspect that such approaches are currently overemphasized.

Summary of the potential of targeting approaches. Our review suggests that the primary use of information describing the characteristics of noncompliant persons is in developing messages targeted specifically on those persons. There are two keys to successfully developing such approaches: 1) Avoiding the tendency to evaluate interventions based on an intuitive sense of their probable effectiveness; and 2) Retaining multiple target groups in the intervention plan.

In designing or selecting interventions to deter noncompliance, park managers are quite likely to evaluate the probable effectiveness of the intervention by asking, "would this intervention keep me from breaking the rule?" Such evaluation is likely to lead to errors because park visitors are unlikely to hold the same attitudes and personal norms as park managers, and those that do are probably relatively unlikely to break park rules. Even if park managers can effectively predict an intervention's effect on persons like themselves[17], it is very unlikely that this information will allow them to select interventions that will be generally effective.

Managers may be better served by remembering that there are an infinite number of reasons for either complying with, or breaking a given rule. By recognizing that the same

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[17] The assumption that managers can effectively predict even their own reactions to specific interventions is questionable in light of social psychological research showing that the reasons people give for their behavior are often unrelated to the actual causes (Nisbett and Wilson, 1977).

behavior can result from different reasoning, park managers may be less likely to let their own characteristics unduly influence their choice of interventions. Managers must also turn to researchers who can empirically test the effectiveness of various interventions. It is apparent from our review that such research is currently both scattered and limited.

The second key to developing a successful targeting style intervention is, in part, a reaction to the poorly developed state of the research. By retaining multiple target groups in the intervention plan one is using what might be termed a shotgun approach -- a broad range of interventions are deployed with the expectation that the target group will fall somewhere within that range. The research suggests that attempts to activate attitudes and personal norms can deter noncompliance in persons who both hold the appropriate attitude or norm, and who take such constructs into account when making decisions[18]. However, there is also evidence that much of the noncompliance in the parks is exhibited by other types of visitors (Swearingen, 1989). This suggests that the pattern of interventions should be broadened. Based on moral development theory one might include interventions intended to affect persons whose reasoning focuses on the expectations of others (such interventions have already been discussed in Chapter 3 concerning the social environment) and interventions intended to affect those persons whose reasoning focuses on the certainty and severity of punishment (such interventions are discussed in Chapter 5).

Implications for the National Parks.
Demographics.
1) Demographic characteristics can not currently be used to accurately characterize a majority of the visitors generally responsible for noncompliance in the national parks. Thus park managers should not expect to eliminate all noncompliance problems by focusing efforts on specific demographic groups. Future research may discover specific instances in which a well defined group is primarily responsible for damage

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[18] Kohlberg (Kohlberg, Levine, and Hewer, 1983) would characterize persons with moral reasoning at this level as falling in developmental stages 5 and 6.

associated with noncompliance. In such instances, interventions targeted at those visitors should be effective.

2) Because age was the characteristic most commonly associated with noncompliance, messages addressed toward children and adolescents are the most promising form of targeting based on demographics.

Ignorance.

1) One can not assume that the only visitors breaking park rules are those who are unaware of such rules.

2) It is currently impossible to predict whether increased efforts to communicate park rules will decrease noncompliance in a particular park. Future research is necessary to alter this situation.

Attitudes.

1) Persuasive messages intended to foster general pro-environment attitudes are unlikely to have an immediate, direct deterrent effect on noncompliance. Such messages should be seen as indirect interventions intended to increase the effectiveness of other types of messages, or as long-term deterrents with maximum effectiveness when aimed at children.

2) If used as a direct deterrent of noncompliance, persuasive messages should focus on attitudes that are specifically linked with compliant behaviors. For example, rather than persuading visitors of the beauty of a hot spring the message should persuade them that throwing things in the hot spring is a bad thing to do.

3) Rather than persuading visitors to change their attitudes, messages might better be aimed at activating attitudes that are consistent with compliance in all visitors who hold them.

Personal norms.

1) Some noncompliance can be deterred by activating personal norms that are consistent with compliance in all visitors who hold them. Attempts to activate both attitudes and personal norms might be combined.

2) Attempts to instill personal norms may have beneficial long-term effects, particularly on children.

Moral development.

1) Interventions designed to deter noncompliance may prove to be most effective when they include multiple appeals aimed at modes of reasoning associated with several stages of moral development.

2) Research is necessary to determine if certain appeals are likely to have a negative impact on the compliance or park experiences of visitors whose moral development does not match the level to which the message is intended.

General visitor change approaches.

1) Attempts to change visitor characteristics and thus deter noncompliance can best be considered long-term interventions and may most effectively be focused on children.

General targeting approaches.

1) When designing interventions targeting visitors who are most likely to break rules, park managers should avoid evaluating their likely effectiveness by asking, "would this keep me from breaking the rule?"

2) Intervention programs should include multiple target groups to produce a "shotgun effect" in which messages are addressed to a broad range of noncompliant visitors.

V. Noncompliance As Affected By Punishment
And Other Negative Consequences

This chapter concerns research and theories concerning the effects of punishment or other negative consequences on noncompliance. In our society, the deterrent value of punishment is one of the foundations of criminal justice (Rankin and Walls, 1982). Citizens of the U.S. generally believe that one can decrease the incidence of illegal behavior by either increasing the severity of the punishment, or by increasing the probability that law breakers will be apprehended (Friedland, 1990; Howe and Brandau, 1988). Similarly, many park managers believe that noncompliance can be deterred by instituting sanctions (Christensen, 1984; Johnson, Vande Kamp, and Swearingen, 1994). The effects of severity and certainty of punishment are the basic components of what has been called the doctrine of deterrence, or deterrence theory. In this chapter we will discuss research investigating the validity of these components, and the conditions under which they hold true. Because deterrence theory is generally conceptualized as a utility theory of behavior, much of this research investigates the implications of utility theory in relation to deterrence. At the end of this chapter, we will briefly discuss the effect of fear appeals on noncompliant behavior. This final section is included in this chapter because fear for one's personal safety and fear of official punishment may have similar effects on behavior.

Principles of Deterrence Theory

Deterrence theory rests primarily on the premises that either increasing the severity of punishment, or increasing the certainty of punishment, will deter noncompliant behavior (Note: Throughout this chapter we will be referring to the implementation of threatened sanctions and/or the increased certainty or severity of such sanctions as *deterrence interventions*)[19]. Implicit or explicit in most research discussions of deterrence theory are

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[19] Several deterrence researchers have also investigated the deterrent effect of changes in the swiftness with which punishment is administered. However, our review will focus only on the severity and certainty of punishment for two reasons: 1) the research on swiftness of punishment is in its early stages, and has not established a relationship with deterrence

inferences based on utility theory. Persons are thought to break rules when the perceived benefits of noncompliance outweigh some combination of the perceived severity and certainty of punishment (i.e., when the utility of the entire situation is positive). However, there is reason to suspect that not all persons make decisions based on such reasoning. For example, utility-based thinking is only consistent with one of Kohlberg's stages of moral reasoning (i.e., stage two). Thus, Kohlberg's model would suggest that deterrence principles may apply only to persons at that stage of moral development.

Researchers have increasingly recognized that differences in individuals may alter the effects of deterrence interventions (e.g., Palmer and Bartlett, 1977). Most investigations have compared the effect of deterrence interventions among persons who have, or lack, internalized behavioral norms for compliance, (i.e., personal norms). Grasmick and McLaughlin (1978) critically reviewed a data set and showed that the internalization of norms (or moral commitment to a law) had a primary effect on illegal behavior and that the certainty of legal punishment and threats of social disapproval only had effects on persons with a low moral commitment. Similarly, Bishop (1984) studied adolescents, and found that deterrence effects were strongest when societal rules and regulations had not been internalized. In contrast, Grasmick and Green (1981) reported that both adults who are morally committed to lawful behavior, and those with no moral commitment, report unlawful behavior in the past and intentions to repeat the behavior in the future, and that in both groups, the belief that punishment would be relatively certain and severe has similar deterrent effects.

Based on these studies, it is not clear whether, or to what extent, the effects of deterrence interventions are limited by differences in individuals. If such limitations exist, deterrence interventions will not be universally effective in prompting visitors to comply with park rules. Thus, it may be necessary to apply deterrence interventions as part of a program that

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(Friedland, 1990); and 2) it would be difficult to greatly modify the swiftness with which punishment is administered as an intervention to deter noncompliance in the parks.

includes several interventions intended to affect a wide range of visitors. However, an intervention program based only on deterrence principles may reduce noncompliance to acceptable levels if the visitors who are most likely to break rules are also those most affected by the certainty and severity of punishment.

Research Investigating Deterrence Effects

Does the certainty of punishment affect rule breaking? Considerable research has tested the hypothesis that the certainty of punishment affects noncompliance, and results of this research have not been consistent. Several studies have supported the importance of certainty: Mason and Calvin (1978) found that certainty of punishment was related to self-reported tax evasion; Grasmick and Green (1981) found that certainty was related to both self-reported illegal activity, and to the intention to repeat such activity in the future; and Howe and Brandau (1988) found that certainty of punishment had a significant effect when people were asked to judge the deterrent value of various crime and punishment scenarios.

One particularly interesting aspect of the Grasmick and Green (1978) study was that the deterrent effect of certainty was evident even in persons who reported that doing the behavior was wrong. This finding suggests that in the parks, increased certainty of punishment may quite effectively deter noncompliance by a broad range of visitors, including those who are morally committed to the rule.

In contrast to the findings showing correlations between certainty and self-reported illegal activity, certainty has been found to be only weakly related to misbehavior in schools (Pestello, 1983). Similarly, Paternoster (1989) observed only equivocal and very weak evidence for certainty effects on delinquent behavior. Even more damaging to the case that certainty affects noncompliance, a study by Paternoster, Saltzman, Waldo, and Chiricos (1983) found that the relationship of past criminal activity to certainty of punishment was stronger than the relationship between certainty of punishment and subsequent illegal activity. This result indicates that observed correlations between past criminal behavior and certainty of punishment probably arise because criminal activity affects certainty, rather than

because certainty affects criminal activity. Thus, studies that show a correlation between past behavior and certainty of punishment can not be interpreted as support for interventions designed to deter noncompliance by increasing the certainty of punishment.

These laboratory and survey studies provide no conclusion about the deterrent effect of certainty. However, several field studies suggest that certainty can alter behavior in real-world situations. The presence of an enforcement agent is a factor in the certainty of punishment, and the presence of police has been shown to decrease speeding (Hauer, Ahlin, and Bowser, 1982; Liswood, 1975; Galizio, Jackson, and Steele, 1979). Increased enforcement of handicapped parking ordinances has also been shown to reduce illegal parking in handicapped zones (Suarez de Balcazar, Fawcett, and Balcazar, 1988). Finally, Swearingen and Johnson (1989) found that the presence of a uniformed park employee was more effective in deterring off-trail hiking than were any of several signs they studied. Although the presence of an enforcement agent affects the certainty of punishment, these studies do not establish that certainty is the mechanism responsible for the observed reductions in noncompliance. It is possible that the mechanism by which the agent reduces noncompliance may differ for different persons (Boag, 1985). For example, a uniformed park employee may prompt visitors to recall attitudes or personal norms that are consistent with compliance. Further research is necessary to establish whether certainty of punishment is a powerful determinant of noncompliance.

Does the severity of punishment affect rule breaking? Research has also failed to establish that severity of punishment is a strong determinant of noncompliance. Citizens of the U.S. generally believe that severity affects deterrence (Howe and Brandau, 1988; Friedland, 1990), but this belief is not supported by the literature. Paternoster (1989) found that the perceived severity of punishment had virtually no effect on adolescent decisions to participate in delinquent behavior. And Pestello (1984, p. 594) writes, "The research that has been done on severity of punishment in the field of criminal justice has been ambiguous and difficult to interpret."

Grasmick and McLaughlin (1978) disagree, arguing that severity has an effect and that two factors have mislead authors to conclude otherwise. First, they point out that severity may only have an effect when certainty is high, and that this interaction may mask severity effects in much research. Second, they suggest that much research fails to consider individual differences in subjects' perceptions of punishment severity: increases in punishment severity that are significant to one person may be inconsequential to another. One study by Grasmick, Jacobs, and McCollom (1983) provides weak support for this latter assertion. They found that the existing legal punishments for minor illegal acts had a larger deterrent effect for persons with low socio-economic status than for persons with high socio-economic status. In a study of delinquency, however, Paternoster (1989) found no effect of perceived severity of punishment.

Although it is not clear that increasing the severity of existing punishment has a deterrent effect, there is evidence that instituting punishment where it was previously absent can deter noncompliance. One experiment found that signs threatening a $250 fine were more effective in deterring illegal parking than signs simply designating handicapped parking (White, Jones, Ulicny, Powell, and Mathews, 1988), and Swearingen and Johnson (1988) found that the sign stating, "Off-trail hikers will be fined" was significantly more effective in deterring off-trail hiking than were a variety of other texts that did not mention sanctions. In contrast, threats of legal citation and fines have consistently been found ineffective in controlling littering (Clark, Hendee, and Burgess, 1972; Heberlein, 1971; KAB, 1968). Although instituting punishment for noncompliance is not universally effective, it can apparently be effective in some instances.

The severity of social punishments affects noncompliance. Although traditional deterrence theory has failed to establish that the severity of official punishments such as fines or prison terms can deter illegal or noncompliant behavior, other deterrence research has produced considerable evidence that the severity of unofficial punishments, such as social disapproval, have a strong effect. In a study of employee rule-breaking, the perceived threat that fellow workers would react negatively had a much stronger effect than the perceived threat of

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official disapproval and punishment (Hollinger and Clark, 1982). Similarly, Paternoster (1989) found that the strongest predictor of delinquent behavior was the social cost if apprehended. These studies suggests that the deterrent effect of official sanctions may lie in their social consequences rather than their costs in dollars. Research investigating the relative effects of increasing the severity of fines versus the severity of social consequences might help park managers more effectively design deterrence interventions.

An article by Grasmick, Bursik, and Kinsey (1991) suggests that interventions designed to increase the deterrent effect of shame and embarrassment may be useful in deterring minor noncompliance. They surveyed Oklahoma citizens five years prior (1982) and two years after (1989) the state instituted an anti-littering campaign that appealed to citizens' conscience and sense of community pride. In 1982, 39 percent of respondents reported that they probably would litter in the future, compared to 31 percent in 1989. In 1982, only 37 percent strongly agreed that they would feel guilty if they littered, compared to 67 percent in 1989. Likewise, in 1982, only 8 percent believed they definitely would lose the respect of others if they littered, compared to 21 percent in 1989. Although interesting, this study provides only weak evidence for the effectiveness of social deterrents because there was no control group and because there was no measure of actual littering behavior. Similar, but more powerfully designed, research should test the effectiveness of interventions like those used in Oklahoma when they are applied to deter noncompliance in the national parks.

Noncompliance as a Rational Act

One of the major questions concerning the validity of deterrence theory, and other utility theories, is the questionable validity of the assumption that decisions whether or not to comply with rules are rational. Utility theory assumes that persons somehow (either deliberately or unconsciously) weigh the severity and certainty of punishment in relation to the payoff of the behavior, and then make a rational decision. There is considerable evidence that for many people, this is not the case. The moral development literature, although early in its development, already provides a theoretical basis for several other forms of reasoning. Other research shows that many decisions are made using simple,

efficient, thinking strategies called heuristics (Simon, 1957), or that people may act according to a well-learned course of events called a script (Schank and Abelson, 1977). If individuals are reacting heuristically or following a script they will not fully process information and the effects of deterrence principles will have no opportunity to manifest themselves. Such "thoughtless" actions may severely limit the effectiveness of interventions utilizing deterrence principles.

One example of heuristic reasoning that can lead to noncompliance occurs when people decide to simply follow the actions of their group. In such cases, noncompliance by one group member may lead the whole group to break the rule. A finding that off-trail hiking increased with increasing group size (Johnson and Swearingen, 1988) suggests that such a heuristic may affect noncompliance in the national parks.

Although the assumption of rational behavior suggests a limiting condition of deterrence theory, there are at least two reasons to believe that it does not invalidate the use of threatened punishments as a means of visitor control. First, the presence of significant consequences for nonconpliance is likely to motivate people to expend the energy necessary to engage in a rational analysis of the situation (Vincent and Fazio, 1992). And second, many park visitors may use simple heuristics such as, "don't do things that are against the rules," or, "don't do things that could cost a lot of money." In these cases, threatened punishments may have even greater deterrent effects than if they were weighed rationally in a utility analysis.

Deterrence Interventions Versus Indirect Interventions
In the literature on resource management, much of the debate concerning the use of punishment (i.e., deterrence interventions) has occurred in discussing the merits of indirect versus direct forms of visitor management. Indirect measures include informational, educational, and interpretive services while direct measures include zoning of use, limitation of visitor access, and enforcement of rules and regulations. In park settings, indirect approaches have traditionally been preferred over direct approaches because they are

thought to place fewer limits on visitor freedom and to produce general visitor attitudes favoring positive visitor behavior (McAvoy and Dustin, 1983).

Although enforcement of rules certainly places limits on visitor freedom, there is reason to suspect that such limits need not have negative impacts on visitor experiences. Friedland (1976) suggested that when persons understand that compliance with a rule benefits both themselves and the rule-maker, threats of punishment can be perceived as a source of information rather than an attempt at coercion. Visitor freedom may also be enhanced by telling visitors the many types of activities that are not against park rules. Although they did not assess the attitudes of their subjects, Heilman and Garner (1975) found that compliance with a threatened sanction was increased when subjects were given a choice of ways in which to comply. Finally, the presence of a uniformed park employee would seem to present a distinct limit on visitor freedom, yet Swearingen and Johnson (1988) found that the majority of park visitors they surveyed felt that a uniformed park employee either enhanced their trip enjoyment or had no effect. The less than three percent who felt the presence of a uniformed employee detracted from trip enjoyment consisted primarily of persons who had been observed breaking park rules.

These studies indicate that deterrence interventions can have minimal negative impact on visitor experiences, but they do not establish that it will do so in all situations. Research utilizing deterrence interventions should focus both on their effectiveness in reducing noncompliance and on their potential negative effects on visitors' experiences in the park. It is important that noncompliance be deterred, but not without considering the cost to all visitor experiences.

The second reason for the traditional preference for indirect methods of visitor management was the belief that such methods create general attitudes that are consistent with compliance across many situations[20]. Proponents of indirect methods would argue that indirect

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[20] The validity of this belief is also questioned in Chapter 4.

controls create such attitudes because they lead persons to make internal attributions for the causes of their behavior. For example, an indirect control is thought to lead one to stay on the path in many present and future environments because one infers, "I am staying on the path because I don't want to hurt the environment that I value". In contrast, a direct control would be thought to have only a short-term effect because one infers, "I am staying on this path because if I go off I will be fined." McAvoy and Dustin (1983) argue that park visitors are unlikely to make such narrow, externally focused attributions, and thus direct methods of visitor management such as deterrence interventions should be as effective as indirect methods in eliciting attitudes consistent with long-term behavior change. Other research supporting McAvoy and Dustin's argument include studies of mandatory seat-belt use (Fhaner and Hane, 1979) and mandatory deposits on soft-drink bottles (Kahle and Beatty, 1987) which have found that compliance with these regulations increases attitudes and attributions consistent with continued compliance. Future research investigating the use of deterrence interventions in the national parks could provide a better test of their long-term effects by recording actual noncompliance in tempting situations that are encountered long after the deterrence intervention, rather than asking about attitudes toward compliance.

Summary of Literature Concerning Deterrence Theory

The primary conclusion to be gained from the literature on deterrence theory is that we know very little about the effects of threatened punishment on noncompliant behavior. Thus, deterrence theory and the research examining its principles are, in themselves, incomplete bases for recommending policy in the national parks. However, research showing that a sign threatening a fine was twice as effective than any other sign message in deterring noncompliance in a national park (Swearingen and Johnson, 1988), as well as research on illegal handicapped parking (Jason and Jung, 1984; Suarez de Balcazar et al., 1988; White, et al., 1988) and speeding (Hauer, et al., 1982; Liswood, 1975; Galizio, et al., 1979), clearly suggest that implementing sanctions or increasing their certainty can be effective means of visitor control. This effectiveness may justify the use of deterrence interventions in parks that are sensitive to damage caused by noncompliance.

Research on deterrence principles has investigated individual differences in the effectiveness of deterrence interventions and thus is consistent with previously reviewed approaches to deterring noncompliance that support the use of multi-pronged, or shotgun, interventions. Although deterrence interventions may not affect all visitors equally, some multi-pronged intervention programs will likely be required to incorporate deterrence interventions in order to be maximally effective.

Although the research does not establish that visible agents of enforcement limit noncompliance by increasing the perceived certainty of punishment, the presence of such agents was found to reduce several forms of noncompliance, including off-trail hiking in a national park. These research findings suggest that deployment of uniformed agents holds considerable promise as a means of deterring noncompliance, particularly in light of associated research showing that most park visitors who encountered a uniformed park employee felt the encounter either enhanced their trip enjoyment or had no effect.

The punishments imposed in deterrence interventions are usually assumed to be monetary. However, the presence of social sanctions such as shame and embarrassment appear to be effective deterrents in at least some situations. Messages designed to evoke such social sanctions may have considerable potential in park applications.

Although deterrence interventions impose limits on visitor freedom in park settings, research suggests that the negative impact of such imposition can be limited for most visitors. Research using deterrence interventions in the national parks should monitor any negative impact on visitors so that such impacts can be minimized and weighed against the deterrent effect of the interventions when evaluating their general usefulness.

Because deterrence interventions provide visitors with external motivations for compliance with park rules, proponents of indirect methods of visitor management expect them to have only temporary deterrent effects. Although it is unknown if long term behavior was altered,

research has shown that deterrence interventions can lead to shifts in attitude that are consistent with long-term compliance.

The research reviewed in this section suggests that deterrence interventions have potential as effective deterrents of noncompliance in the national parks. Further investigations of deterrence interventions is necessary, and such research should focus on both their deterrent effects and their potential negative effects on visitor experiences. Research designs should examine the entire range of park visitors, including those who are likely to break the rules and those who are not.

Fear Appeals

Fear appeals are attempts at persuasion or behavioral influence that relate the possible negative consequences of a behavior in a vivid and frightening manner. Classic examples of fear appeals include drivers' education films showing the gruesome aftermath of vehicle accidents, or anti-smoking messages including gory descriptions and pictures of cancerous lungs. Fear appeals are sometimes used in the parks, particularly in cases where physical danger to visitors is directly related to compliance with park rules.

Considerable research has investigated the effects of fear appeals in changing attitudes. This research has generally found that fear appeals are most effective when they do not overwhelm the observer and when they provide specific information about how to avoid the negative consequences (Rogers and Mewborn, 1976). However, the direct effect of fear appeals on behavior has received less attention.

In an intervention to prompt seat-belt use, Weinstein (1986) found that a program with a fear-appeal component was effective. The effect of the appeal was confounded, however, with other aspects of the program. Another study, in which people were asked what factors would affect their seat-belt use (Stasson, 1990) found that perceived risk was only an indirect predictor of use. Neither of these studies provides a compelling case for the use of fear-appeals.

In contrast, two studies conducted in recreational settings suggest that fear-appeals may be very effective. Sipprell (1982) found that a fear-arousing slide-show was effective in educating people about safe behavior on a potentially hazardous trail and in reducing dangerous behaviors by approximately one-half. Similarly, Schwarzkopf (1984) found that a sign warning visitors not to feed ground squirrels because they sometimes harbor bubonic plague was twice as effective as a standard sign advising visitors that non-native foods were not good for the squirrels. Together these studies provide considerable evidence for the effectiveness of fear appeals in deterring noncompliant behaviors. The Schwarzkopf study is particularly important because it illustrates that the appeal need not be an elaborate or time consuming production -- even a simple sign may suffice.

Like threats of punishment, fear appeals must be evaluated not only for effectiveness, but also for their effects on the visitor experience. The only data bearing directly on this question were presented by Sipprell (1982), who found that interpretive rangers who worked closely with visitors at the visitor center noted comments from some visitors that the slide-show was unpleasantly frightening, and that children were often frightened by it. Although these comments suggest that the interventions had some negative effects on visitor experiences, they do very little to demonstrate the actual fear levels. Future research should assess the negative effects and fear levels so they can be balanced against the data showing the program's effectiveness in increasing safety. Sipprell noted that while the interpretive rangers were concerned about the negative effects of the programs the field rangers made several comments that groups were *much* more orderly when shown the slide-show.

In summary, fear appeals appear to hold considerable promise as a means of deterring noncompliance, particularly for situations involving genuine danger to visitors in which some possible impingement upon visitor experiences is clearly justified. More research is necessary to establish the true extent of negative effects on visitor experiences before fear appeals can be recommended for wide use as a means of deterring noncompliance.

Implications for the National Parks

Deterrence theory.

1) Deterrence interventions instituting punishment for noncompliance can be an effective means of reducing noncompliance to low levels.

2) Deterrence interventions may not deter noncompliance by all park visitors, but are likely to work well in combination with other types of interventions.

3) Deterrence theory supports the deployment of uniformed employees as an effective means of deterring noncompliance.

4) Social sanctions such as shame and embarrassment have potential use in interventions to reduce park visitor noncompliance.

5) Negative impacts on visitor experiences are not inevitable, but they should be monitored in any use of deterrence interventions.

6) Deterrence interventions can lead to attitude change that supports long-term compliance but actual long-term effectiveness of deterrence interventions is not established.

Fear appeals.

1) With monitoring and consideration of possible negative effects on visitor experiences, fear appeals can reduce the likelihood of dangerous accidents due to visitor noncompliance.

VI. Implications of Current Research: A Summary for Park Managers

This chapter summarizes, in the form of general principles, statements concerning the control of noncompliance that can be made given the existing research. The principles are not stated in an integrated framework primarily because the research does not support such a synthesis. The body of reviewed research was gathered under the assumptions of a variety of theories and it provides an uneven and sometimes confusing picture of the social factors affecting noncompliance. Because no single theoretical approach reviewed can be considered the best approach to the understanding of noncompliance, no attempt is made to fit these principles into an existing theory. Eleven principles are suggested. The chapter concludes with a statement concerning the context in which NPS managers must evaluate interventions designed to deter noncompliance.

1) Multiple deterrence interventions should be used when attempting to deter noncompliance because no single intervention is likely to counteract the many motives that induce visitors to break park rules.

The diversity of the literature cited in our review suggests that using a single label, "noncompliance" to describe the huge variety of behaviors that are against some rule in some environment conveys a false sense of simplicity. Not only are there many forms of noncompliance, there are also many motives for each type. For example, visitors may walk off an official path to examine flowers, to get away from other visitors, to stay with a group of fellow visitors, or to assert their freedom from coercion by park rules. Thus, a single NPS environment may be affected by many noncompliant behaviors each of which occurs for a number of reasons. No single deterrence technique can be assumed to deter a large porportion of noncompliance in such an environment.

2) Decisions about deterrence interventions should not be made based on the intuitive assessment of NPS managers using their own reactions to the intervention.

In scientific terms, each NPS manager constitutes a one-person sample who is unlikely to represent most visitors to their unit. Not only are they a biased sample, but research from

social psychology also suggests that managers are often unaware of the factors that actually affect their own behavior. Clearly the intuitive assessment of park managers is a poor basis for selecting deterrence interventions.

The ideal alternative to intuitive assessment would be empirical studies that establish the relative effectiveness of various interventions in a broad range of park environments. However, the current literature does not provide such information and the studies necessary to establish even a minimum basis for such decisions would constitute a large research program. In the absence of empirical data, decisions by park managers might still be improved if, when evaluating interventions to deter noncompliance, each park manager were to imagine a wide variety of visitors reacting to deterrence interventions and then were to select the interventions that affect the broadest range of visitors.

3) NPS managers should consider stationing uniformed employees within sight of areas damaged by visitor noncompliance because the presence of such employees is one of the most promising means of deterring noncompliance.

The reviewed research suggests that the presence of a uniformed park employee may deter noncompliance in a variety of ways that affect a wide variety of visitors and thus may effectively deter noncompliance. For example, spotting a uniformed employee may strengthen visitor beliefs that noncompliance will lead to negative social consequences such as embarrassment, or to official sanctions such as fines. The uniformed employee may also remind some visitors of their own attitudes or personal norms that are inconsistent with noncompliance.

Concerns about possible negative visitor reactions to uniformed employees can not be completely discounted, but one study conducted in a national park showed that uniformed employees were perceived as a neutral or positive part of the park experience by the vast majority of visitors, while simultaneously reducing noncompliance (off-trail hiking) to very low levels.

4) NPS managers should ask, "What are the reasons why visitors are breaking this rule?" as a first step in controlling noncompliance. If incentives can be readily removed, noncompliance may drop to acceptable levels.

Psychological theories such as applied behavior analysis and utility theory specify that people generally act to gain rewards or avoid punishments. Accordingly, park managers may find that removing rewards that prompts noncompliance may be easier than overcoming their presence. For example, a social trail that cuts a switchback may see less use if thorny native vegetation is planted at its entrance and exit.

5) To maximize effectiveness, messages designed to limit noncompliance should be presented as close as possible to the place and time in which noncompliance is likely to occur.

Studies from applied behavior analysis, attitude theory, and investigations of social norms have all found that messages designed to deter noncompliance are most effective when presented as close as possible to the place and time in which noncompliance is likely to occur. Signs were generally an effective means of communicating such messages, particularly when posted so as to be easily noticed.

6) The current NPS focus on deterring noncompliance by instilling beliefs consistent with compliance should be altered in two ways: 1) Rather than changing beliefs, interventions intended to immediately deter noncompliance should first focus on activating beliefs consistent with noncompliance in all the visitors who already have them; and 2) Interventions intended to change beliefs should be considered long-term investments and should be aimed primarily at children.

A broad range of research has shown that it is extremely difficult to change visitor beliefs such as attitudes and personal norms, particularly in short-term programs when opportunities to communicate are limited (i.e., the type of interventions available to park managers). However, related research has also shown that activating existing beliefs can substantially alter behavior. Accordingly, more noncompliance would probably be deterred by erecting several trail-side signs that say, "Help preserve the meadow. Stay on the trail.", than by

adding a visitor-center display describing the unique nature of the meadow. Depending on the proportion of visitors who hold beliefs consistent with compliance, such interventions may, or may not, reduce noncompliance to acceptable levels. Nonetheless, pointing out that noncompliance is inconsistent with many commonly held attitudes or personal norms is a good first step in a program to deter noncompliance.

Attempts to control noncompliance by activating beliefs will fail, however, if visitors do not hold beliefs that are consistent with compliance. It is not clear how park visitors develop such beliefs, but the NPS could best insure that many future visitors will hold them by focusing current persuasive messages at children. Research has shown that children are more easily persuaded to change their beliefs than are adults. Thus, children who visit national parks and encounter persuasive messages should become the visitors who are most likely to follow park rules in many future visits to national parks.

7) Showing visitors that noncompliant behavior damages NPS resources will not deter noncompliance for visitors who do not hold strong values inconsistent with such damage. Basic behavioral principles suggest that short-term rewards generally have more control over behavior than long-term negative consequences. For example, many visitors will pick up small bits of rock or vegetation as souvenirs even if they are aware that, in the long-term, such actions cause substantial damage. Knowledge about long-term consequences will deter noncompliance only for visitors who have strong values inconsistent with harming the environment. The majority of noncompliance at many NPS units may be attributed to visitors who do not hold such values. Thus, control of noncompliance at those units will require deterrence techniques other than information about the damage being done to the resource.

8) Noncompliance can be reduced by removing evidence of prior noncompliance, and by providing information that most visitors follow the rules.
Research on social norms and related studies of noncompliance suggest that decreasing direct and indirect observation of noncompliance can decrease further noncompliance by

observers. For example, one study found that off-trail hiking was most likely to occur when visitors were within visual distance of other off-trail hikers, and several other studies found that littering increases in already-littered environments and decreased when the environment was cleaned. Apparently, noncompliance is linked to the perception that most visitors do, or do not, comply with rules, and noncompliance can thus be reduced by removing the evidence of prior noncompliance. Research on speeding and other phenomena suggests that park noncompliance can also be reduced by simply providing messages that most visitors follow the rules. For example, speeding was reduced by signs stating, "Percentage of cars not speeding yesterday: **%", when ** was approximately 90.

9) When noncompliance is deterred by threats of punishment, the threats should be accompanied by messages emphasizing visitor benefits from compliance.

Research has shown that threats of punishment can effectively deter noncompliance, and such direct enforcement is one of the interventions most commonly used by park managers to deter noncompliance (Johnson, Vande Kamp, and Swearingen, 1994). Evidence from social psychology suggests that threats of punishment will be most effective and have the least negative impact on visitor experiences when visitors believe that compliance benefits them, as well as NPS managers. Thus, educational programs emphasizing the public benefits of preserving park resources may deter little noncompliance on their own, but may increase the effectiveness and visitor acceptance of threatened punishments. For example, a sign reading, "OFF-TRAIL HIKERS WILL BE FINED", might be improved by adding the sub-text, "Off trail hiking does damage to the meadow that can take centuries to disappear. By staying on the path you help preserve the beauty of the meadow for your children and grandchildren."

10) NPS rules can produce boomerang effects of deliberate noncompliance when visitors feel their freedom is threatened. To reduce the probability of such effects visitor options should be emphasized.

Reactance theory suggests that when threats of punishment are communicated, messages should emphasize the visitor's freedom to choose ways in which to comply. For example,

a regulatory sign might say, "Fine of $100 for off-trail hiking", then continue, "Because this is a high traffic area, visitors are not allowed to walk off official trails. If you are interested in walking through an alpine meadow you may take hike #12 to Golden Meadow."

11) Noncompliance may be reduced by limiting the size of visitor parties.
Noncompliance was found to be more common as group size increases. If this finding is due to mimicking behavior, limiting party size will decrease the overall level of noncompliance by decreasing the probability that any given group will have one member break a rule and serve as a model for other group members to imitate. Large groups may also be associated with noncompliance because noncomplying members perceive that their chances of being punished are reduced by the presence of other noncompliant members. Reduced party sizes would also reduce this perception and the noncompliance associated with it. Finally, members of large groups may exhibit a phenomenon called diffusion of responsibility and thus be more likely to break park rules because the responsibility for individual actions are perceived to be spread across the whole group. Here again, a reduction in party size would reduce noncompliance.

The Context is Critical in Defining a Successful Deterrence Intervention

In evaluating a deterrence intervention, NPS managers must consider its deterrent effect, its potential for negative impact on visitor experiences, and the level of noncompliance that is acceptable in their units. If resource preservation was the only requirement of NPS managers, there would be no noncompliance problems. Managers could fence in visitors, institute prison sentences for noncompliance, or simply exclude visitors entirely. However, the dual mandate of the NPS specifies that the national parks should be managed so as to both maximize visitor enjoyment and preserve park resources unimpaired for future enjoyment. The delicate balance between these mandated goals is inextricably linked with decisions concerning noncompliance. For example, in an NPS unit where moderate levels

of noncompliance produce acceptable levels of resource damage[21], a deterrence technique that achieved such moderate levels would be preferable to a more effective technique that had greater negative impacts on visitor experiences.

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[21] The definition of acceptable levels of damage has been an ongoing topic of research in the national parks. Interaction with biologists and other researchers working in this area will be essential before and after implementing interventions to deter noncompliance.

VII. What Should Be Done to Better Deter Noncompliance in the National Parks?

Park managers currently have no accessible source of information concerning the best ways to limit noncompliance. This lack of information, and the pitfalls of intuitive assessment discussed in the previous chapter, make it unsurprising that the system-wide survey conducted in conjunction with this review found little consensus among park employees about the effectiveness of various methods to control noncompliance (Johnson, Vande Kamp, and Swearingen, 1994).

The principles discussed in Chapter 6 represent a considerable advance in the information available to NPS managers. We recommend that they be described in a document aimed at specifically at park managers and distributed in the national park system. Although the principles are supported by empirical evidence, and provide useful information that is currently unavailable, such a document would remain an inadequate guide for the control of noncompliance in the national parks. Future research can and should focus on the development of a comprehensive set of guidelines that would provide managers at all NPS units with strategies for deterring noncompliance. In this chapter we propose a future research program aimed at developing such a complete set of guidelines. The proposal is presented in the form of six basic characteristics of the research program.

Characteristics of a Proposed Future Research Program

The research program will test multi-pronged intervention programs incorporating multiple interventions that appeal to diverse visitors who break rules for diverse reasons. Because noncompliant behavior is very complex and because current theory and research concerning noncompliance are undeveloped, the research program will focus on testing multi-pronged intervention programs. Such intervention programs will deploy a variety of deterrence interventions designed to influence a broad spectrum of motivations for noncompliance. Although each of the interventions incorporated in such multi-pronged programs might have

only a small deterrent effect, the aggregate effect of the program will be more likely to reduce noncompliance to acceptable levels than would any single intervention.

Both effectiveness of deterrence and impact on visitor experiences will be measured and used in designing and evaluating interventions. Because the NPS dual mandate specifies that NPS managers must attempt to maximize both opportunities for visitor enjoyment and resource protection, it is critical that tests of proposed interventions consider both their deterrent effects and their effects on visitor experiences. The existing research provides a poor basis for predicting visitor reactions to specific deterrence interventions. Thus, investigation of the ways in which deterrence techniques may negatively impact visitor experiences will be a high research priority.

The research program's primary goal will be the development of two to four multi-pronged intervention programs that simultaneously vary in deterrence effectiveness and negative impact on visitor experiences. From such an assortment, NPS managers will be able to select the intervention program offering adequate resource protection with minimal negative impact on visitor experience. Even though it incorporates multiple deterrence techniques, a single multi-pronged intervention is unlikely to perform adequately in all NPS units because the units vary in too many ways. For example, the major resources of a unit such as Petrified Forest National Park are very sensitive to damage caused by noncompliance, while the major resources of a unit such as Arches National Park are considerably less sensitive. Thus, interventions producing some negative impacts on visitor experiences may be justified at Petrified Forest, but may be overkill at Arches, where visitor experiences should be given a higher priority. By developing several multi-pronged intervention programs that simultaneously vary in deterrence effectiveness and negative impact on visitor experiences, this research program will allow NPS managers to maximize the balance between resource preservation and provisions for visitor enjoyment.

The research program's secondary goal will be the development of a set of guidelines for designing evaluation research that can determine the effectiveness of an intervention

program in any specific application. The effectiveness of the interventions designed in this research program will vary across applications, and some form of assessment will be necessary to determine if an intervention is performing adequately. However, NPS managers are unlikely to have the knowledge or motivation necessary to perform such assessment. This problem will be minimized by developing simplified procedures for evaluating intervention effectiveness and communicating to NPS managers the importance of using the procedures to conduct evaluation research when implementing interventions.

The research program will be designed and monitored by a multi-disciplinary panel of scientists. A multi-disciplinary advisory panel will be assembled to oversee the research program thus far outlined. The panel will include members representing diverse approaches to the study of noncompliance so that the multi-pronged intervention programs initially tested will represent a broad spectrum of theories concerning noncompliance and will combine deterrence techniques so as to maximize their effectiveness. The panel will also include biologists and other natural scientists to provide input concerning the limits of acceptable damage for various natural resources. Such information is critical for maximizing the balance between resource preservation and visitor experiences.

Research will be conducted in a variety of NPS settings representing a wide range of visitor populations and park environments. In order to maximize the effectiveness of the intervention strategy developed by the research program, testing would be done in NPS units that represent the diversity of environments and visitor populations regulated by the NPS.

Summary. Several recommendations that are useful to NPS managers can be made based on the existing noncompliance research. However, increased knowledge about the control of noncompliance is critical for the preservation of NPS resources. A well-planned research program could provide knowledge that would simultaneously contribute to the preservation of the natural resources of the national parks, and contribute to the increased enjoyment of park visitors. Such a program would thus make a major contribution to the maintenance of the dual mandate of the NPS. Funding allowing, we at the University of Washington

CPSU hope to continue a leadership role in the investigation of visitor noncompliance and the techniques used to deter it.

Research concerning methods to control noncompliance should prove to be extremely cost-effective. Based on the survey results presented in the preceding article, research that developed means of deterring just 10% of current noncompliance in the NPS (a modest goal) could save about $8,000,000 in repair costs[22]. Even more important, any reduction in irreparable damage to natural and cultural resources yields benefits that are priceless.

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[22] The creation of the National Biological Survey creates even greater opportunities to apply knowledge related to the control of noncompliance to the management of resources on a variety of public lands. Distribution of knowledge to public land managers outside the NPS would entail minimal costs and would dramatically increase savings associated with decreases in noncompliance.

References

Ajzen, I. (1988). <u>Attitudes, personality and behavior</u>. Chicago, IL: The Dorsey Press.

Ajzen, I. (1992). Persuasive communication theory in social psychology: A historical perspective. In M. J. Manfredo (Ed.), <u>Influencing human behavior: Theory and applications in recreation, tourism, and natural resources management</u> (pp. 51-75). Champaign, Illinois: Sagamore Publishing Co. Inc.

Allred, L. J., & Cope, J. G. (1990). Personality and behavioral characteristics of handicapped parking violators. <u>Journal of Social Behavior and Personality</u>, <u>5</u>(6), 521-530.

Amsel, A. (1971). Partial reinforcement: Effects on vigor and persistence. In K. W. Spence, & J. T. Spence (Eds.), <u>The psychology of learning and motivation</u> (vol. 1), New York: Academic Press.

Bandura, A. (1979). The social learning perspective: Mechanisms of aggression. In H. Toch (Ed.), <u>Psychology of crime and criminal justice</u> (New York: Holt, Rinehart & Winston.

Bickman, L. (1972). Environmental attitudes and actions. <u>Journal of Social Psychology</u>, <u>87</u>, 323-324.

Bishop, D. M. (1984). Legal and extralegal barriers to delinquency: A panel analysis. <u>Criminology An Interdisciplinary Journal</u>, <u>22</u>(3), 403-419.

Boag, A. (1985). <u>Ranger-Visitor contact: Education or regulation?</u> Unpublished manuscript.

Bowers, W. J. (1968). Normative constraints on deviant behavior in the college context. <u>Sociometry</u>, <u>31</u>, 370-385.

Brehm, J. W. (1966). <u>A theory of social reactance</u>. New York: Academic Press.

Brown, D. W. (1974). Adolescent attitudes and lawful behavior. <u>Public Opinion Quarterly</u>, <u>38</u>(1), 98-106.

Bultena, G., Albrecht, D., & Womble, D. (1981). Freedom versus control: A study of backpackers' preferences for wilderness management. <u>Leisure Sciences</u>, <u>4</u>(3), 297-310.

Burgess, R., Clark, R., & Hendee, J. (1971). An experimental analysis of anti-litter procedures. <u>Journal of Applied Behavioral Analysis</u>, <u>4</u>, 71-75.

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Bushman, B. J. (1984). Perceived symbols of authority and their influence on compliance. Journal of Applied Social Psychology, 14(6), 501-506.

Bushman, B. J. (1988). The effects of apparel on compliance: A field experiment with a female authority figure. Personality and Social Psychology Bulletin, 14(3), 459-467.

Casey, S. M., & Lund, A. K. (1993). The effects of mobile roadside speedometers on traffic speeds. Accident Analysis and Prevention, 25(5), 627-634.

CBS (1992, March 8). Last of the Bluefin. CBS Evening News.

Christensen, H. H., & Davis, N. J. (1984). Evaluating user impacts and management controls: Implications for recreation choice behavior. Proceedings - Symposium on Recreation Choice Behavior (pp. 71-78). Missoula, Montana: U.S.D.A., Forest Service, Intermountain Research Station. (General technical report INT-184).

Christensen, H. H., & Dustin, D. L. (1989). Reaching recreationists at different levels of moral development. Journal of Park and Recreation Administration, 7(4), 72-80.

Cialdini, R. B. (1988). Influence: Science and practice (2 ed.). Glenview, Illinois: Scott, Foresman, and Company.

Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. Journal of Personality and Social Psychology, 58(6), 1015-1026.

Clark, R. N., Hendee, J. C., & Campbell, F. L. (1971). Depreciative behavior in forest campgrounds: An exploratory study. U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest Experiment Station. Research note PNW-161.

Clark, R. N., Hendee, J. C., & Burgess, R. L. (1972). The development of anti-litter behavior in a forest campground. Journal of Applied Behavior Analysis, 5(1), 1-5.

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

Crowe, B. L. (1969). The tragedy of the commons revisited. Science, 166, 1103-1107.

Deutsch, M., & Gerard, H. H. (1956). A study of normative and informational social influences upon individual judgment. Journal of Abnormal and Social Psychology, 51, 629-636.

Durdan, C. A., Reeder, G. D., & Hecht, P. R. (1985). Litter in a university cafeteria: Demographic data and the use of prompts as an intervention strategy. Environment and Behavior, 17(3), 387-404.

Dustin, D., & McAvoy, L. (1980). "Hardining" national parks. Environmental Ethics, 2(1), 39-44.

Dustin, D. L. (1985). To feed or not to feed the bears: The moral choices we make. Parks and Recreation, 10, 54-57.

Edney, J. J., & Harper, C. (1978). The commons dilemma: A review of contributions from psychology. Environmental Management, 2, 491-507.

Eisenberg, N. (1982). The development of reasoning regarding prosocial behavior. In N. Eisenberg (Ed.), The development of prosocial behavior (pp. 219-249). New York: Academic Press.

Fhaner, G., & Hane, M. (1979). Seat belts: Opinion effects of law induced use. Journal of Applied Psychology, 64, 205-212.

Finnie, W. C. (1973). Field experiments in litter control. Environment and Behavior, 5(2), 123-144.

Fishbein, M. & Manfredo, M. J. (1992). A theory of behavior change. In M. J. Manfredo (Ed.), Influencing human behavior: Theory and applications in recreation, tourism, and natural resources management (pp. 51-75). Champaign, Illinois: Sagamore Publishing Co. Inc.

Friedland, N., Thibaut, J., & Walker, L. (1973). Some determinants of the violation of rules. Journal of Applied Social Psychology, 3, 103-118.

Friedland, N. (1976). Social influence via threats. Journal of Experimental Social Psychology, 12, 552-563.

Friedland, N. (1990). The combined effect of the severity and the certainty of threatened penalties: Additive or interactive? Journal of Applied Social Psychology, 20, 1358-1368.

Galizio, M., Jackson, L. A., & Steele, F. O. (1979). Enforcement symbols and driving speed: The over-reaction effect. Journal of Applied Psychology, 64, 311-315.

Gilligan, C. (1982). In a different voice. Psychological theory and women's development. Cambridge: Harvard University Press.

Gramann, J. H., & Vander Stoep, G. A. (1986). Reducing depreciative behavior at Shiloh National Military Park. National Park Service Cooperative Park Studies Unit. College Station, Texas: Texas A&M University. Technical Report 2.

Gramann, J. H., & Vander Stoep, G. A. (1987). Prosocial behavior theory and natural resource protection. Journal of Environmental Management, 24, 247-257.

Gramann, J. H., Christensen, H. H., & Vander Stoep, G. A. (1992). Indirect management to protect cultural and natural resources: Research, ethics, and social policy. In H. H. Christensen, D. R. Johnson, & M. H. Brookes (Eds.), Vandalism: Research, prevention, and social policy (pp. 251-264). Portland, Oregon: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. General Technical Report PNW-GTR-293.

Grasmick, H. G., & McLaughlin, S. D. (1978). Deterrence and social control. American Sociological Review, 43(2), 272-278.

Grasmick, H. G., & Green, D. E. (1981). Deterrence and the morally committed. Sociological Quarterly, 22(1), 1-14.

Grasmick, H. G., Jacobs, D., & McCollom, C. B. (1983). Social class and social control: An application of deterrence theory. Social Forces, 62(2), 359-374.

Grasmick, H. G., Bursik, R. J., & Kinsey, K. A. (1991). Shame and embarrassment as deterrents to noncompliance with the law: The case of an antilittering campaign. Environment and Behavior, 23(2), 233-251.

Greenwald, A. G. (1980). The totalitarian ego: Fabrication and revision of personal history. American Psychologist, 35, 603-618.

Greenwald, A. G. (1989). Why are attitudes important? In A. R. Pratkanis, S. J. Breckler, & A. G. Greenwald (Eds.), Attitude structure and function (pp. 1-10). Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Hardin, G. (1968). The tragedy of the commons. Science, 162, 1243-48.

Harris, R. (1981). Evaluation of educational techniques to minimize visitor impacts on the wilderness environment .

Harry, J., Gale, R., & Hendee, J. (1969). Conservation: An upper-middle class social movement. Journal of Leisure Research, 1, 246-254.

Harvey, M. D., & Enzle, M. E. (1981). A cognitive model of social norms for understanding the transgression-helping effect. Journal of Personality and Social Psychology, 41, 866-875.

Hauer, E., Ahlin, F. J., & Bowser, J. S. (1982). Speed enforcement and speed choice. Accident Analysis and Prevention, 14(4), 262-278.

Hayes, S. C., & Cone, J. D. (1977). Decelerating environmentally destructive lawn-walking. Environment and Behavior, 9(4), 511-534.

Heberlein, T. A. (1971). Moral norms, threatened sanctions, and littering behavior. Ph.D. Dissertation, University of Wisconsin: Madison.

Heberlein, T. A. (1972). The land ethic realized: Some social psychological explanations for changing environmental attitudes. Journal of Social Issues, 28, 79-87.

Heberlein, T. A., & Black, J. S. (1976). Attitudinal specificity and the prediction of behavior in a field setting. Journal of Personality and Social Psychology, 33(4), 474-479.

Heilman, M. E., & Garner, K. (1975). Countering the boomerang: The effects of choice on compliance to threats and promises. Journal of Personality and Social Psychology, 31, 911-917.

Hendee, J. C., Catton, W. R., Jr., Marlow, L. D., & Brockman, F. (1968). Wilderness users in the Pacific Northwest: Their characteristics, values, and management preferences. Pacific Northwest Forest and Range Experiment Station, USDA Forest Service Research Paper PNW-61.

Hollinger, R. C., & Clark, J. P. (1982). Formal and informal social controls of employee deviance. Sociological Quarterly, 23(3), 333-343.

Howe, E. S., & Brandau, C. J. (1988). Additive effects of certainty, severity, and celerity of punishment on judgments of crime deterrence scale value. Journal of Applied Social Psychology, 18, 796-812.

Jason, L. A., & Jung, R. (1984). Stimulus control techniques applied to handicapped-designated parking spaces: Deterring unauthorized use by the nonhandicapped. Environment and Behavior, 16(6), 675-686.

Johnson, D. R., & Swearingen, T. C. (1988). Minor rule violators: A profile of off-trail hikers, Paradise Meadows, Mount Rainier National Park. National Park Service Cooperative Park Studies Unit, College of Forest Resources, University of Washington. Subagreement No. 10, Co-op Agreement No. CA-9000-3-0004.

Johnson, D. R., Vande Kamp, M. E., & Swearingen, T. C. (1994). <u>A survey of park managers' perceptions of noncompliant visitor behavior causing resource damage in the national park system</u>. National Park Service. Technical Report NPS/PNRUW/NRTR-92/07.

Jonah, B. A., & Dawson, N. E. (1982). Predicting reported seat belt use from attitudinal and normative factors. <u>Accident Analysis and Prevention,</u> <u>14</u>(4), 305-309.

Kahle, L. R., & Beatty, S. E. (1987). Cognitive consequences of legislating postpurchase behavior: Growing up with the bottle bill. <u>Journal of Applied Social Psychology,</u> <u>17</u>(9), 828-843.

Keep America Beautiful, Inc. (1968). <u>Who litters and why: Results of a survey of public awareness and concern about the problem of litter</u>. New York: KAB.

Kohlberg, L., Levine, C., & Hewer, A. (1983). Moral stages: A current formulation and response to critics. In J. A. Meacham (Ed.), <u>Contributions to human development</u> (vol. 10), New York: Karger.

Kohlenberg, R., & Phillips, T. (1973). Reinforcement and rate of litter depositing. <u>Journal of Applied Behavior Analysis,</u> <u>6</u>(3), 391-396.

Krauss, R. M., Freedman, J. L., & Whitcup, M. (1978). Field and laboratory studies of littering. <u>Journal of Experimental Social Psychology,</u> <u>14</u>, 109-122.

Krueger, J., & Clement, R. W. (1994). The truly false consensus effect: An ineradicable and egocentric bias in social perception. <u>Journal of Personality and Social Psychology,</u> <u>67</u>(4), 596-610.

Latane, B., & Darley, J. M. (1975). <u>Help in a crisis: Bystander response to an emergency</u>. Morristown, New Jersey: General Learning Press.

Latane, B. (1981). The psychology of social impact. <u>American Psychologist,</u> <u>36</u>(4), 343-356.

Leland, L. S., Jr., Hughes, P., Halder, S., & Rowan, M. (1986-87). An evaluation of the effectiveness, costs and benefits of laying a paved path to permit grass regeneration. <u>Journal of Environmental Systems,</u> <u>16</u>(1), 1-11.

Linder, D. (1982). Social trap analogs: The tragedy of the commons in the laboratory. In V. J. Derlega, & J. Grzelak (Eds.), <u>Cooperation and helping behavior</u>. New York: Academic Press.

Liswood, S. (1975). Operation "IT'S 55". <u>The Police Chief,</u> <u>32</u>, 62-63.

Lloyd, W. F. (1833). Two lectures on the checks to population. Oxford, England: Oxford University Press.

Lucas, R. C. (1979). Perceptions of non-motorized recreational impacts: A review of research findings. Recreational impact on wildlands (pp. 24-31). Seattle, Washington: U. S. Department of Agriculture, Forest Service. (Report R-6-001-1979).

Lucas, R. C. (1990). The wilderness experience and managing the factors that influence it. In J. C. Hendee, G. H. Stankey, & R. C. Lucas (Eds.), Wilderness Management (Washington, D.C.: U.S. Department of Agriculture, Forest Service (Miscellaneous Publication #1365).

Luyben, P. D. (1980). Effects of informational prompts on energy conservation in college classrooms. Journal of Applied Behavioral Analysis, 13(4), 611-617.

Luyben, P. D. (1984). Drop and tilt: A comparison of two procedures to increase the use of venetian blinds to conserve energy. Journal of Community Psychology, 12, 149-154.

Marion, J. L., & Lime, D. W. (1986). Recreation resource impacts: Visitor perceptions and management responses. In D. C. Kulhavy, & R. N. Conner (Eds.), Wilderness and natural areas in the eastern United States: A management challenge. Nacogdoches, TX: Center for Applied Studies, Austin State University.

Marler, L. (1971). A study of anti-litter messages. Journal of Environmental Education, 3(1), 51-53.

Mason, R., & Calvin, L. D. (1978). A study of admitted income tax evasion. Law and Society Review, 13(1), 74-89.

McAvoy, L. H., & Dustin, D. L. (1983). Indirect versus direct regulation of recreation behavior. Journal of Park and Recreation Administration, 1(4), 12-17.

McCool, S. F. & Braithwaite, A. M. (1992). Persuasive messages and safety hazards in dispersed and natural recreation settings. In M. J. Manfredo (Ed.), Influencing human behavior: Theory and applications in recreation, tourism, and natural resources management (pp. 51-75). Champaign, Illinois: Sagamore Publishing Co. Inc.

McGuire, W. J. (1985). Attitudes and attitude change. In G. Lindzey, & E. Aronson (Eds.), The handbook of social psychology (vol. 2, pp. 233-346). New York: Random House.

Miller, L. E., & Grush, J. E. (1986). Individual differences in attitudinal versus normative determination of behavior. Journal of Experimental Social Psychology, 22, 190-202.

Morgan, J. N. (1967). Who uses seat belts? Behavioral Science, 12, 463-465.

Muchmore, J. M. (1975). The uniform - its effect. The Police Chief, 42(1), 70-71.

Nisbett, R. E., & Wilson, T. D. (1977). Telling more than we can know: Verbal reports on mental process. Psychological Review, 84, 231-259.

Noe, F. P., Hull, R. B., & Wellman, J. D. (1982). Normative response and norm activation among ORV users within a seashore environment. Leisure Sciences, 5(2), 127-142.

Oliver, S. S., Roggenbuck, J. W., & Watson, A. E. (1985). Education to reduce impacts in forest campgrounds. Journal of Forestry, 83(4), 234-236.

Ostrom, V., & Ostrom, E. (1977). A theory for institutional analysis of common pool problems. In G. Hardin, & J. Baden (Eds.), Managing the Commons (pp. 173-182). San Francisco: W. H. Freeman and Company.

Palmer, J. and Bartlett, R. (1977). Understanding compliance and noncompliance with law: The contributions of utility theory -- A comment. Social Science Quarterly, 58(2), 332-335.

Paternoster, R., Saltzman, L. E., Waldo, G. P., & Chiricos, T. G. (1983). Estimating perceptual stability and deterrent effects: The role of perceived legal punishment in the inhibition of criminal involvement. Journal of Criminal Law and Criminology, 74(1), 270-297.

Paternoster, R. (1989). Decisions to participate in and desist from four types of common delinquency: Deterrence and the rational choice perspective. Law and Society Review, 23(1), 7-40.

Pennebaker, J. W., & Sanders, D. Y. (1976). American graffiti: Effects of authority and reactance arousal. Personality and Social Psychology Bulletin, 2, 264-267.

Pestello, H. F. (1983). Fear and misbehavior in a high school. Sociological Quarterly, 24(4), 561-573.

Pestello, F. G. (1984). Deterrence: A reconceptualization. Crime and Delinquency, 30(4), 593-609.

Petty, R. E., McMichael, S. & Brannon, L. (1992). The elaboration likelihood model of persuasion: Applications in recreation and tourism. In M. J. Manfredo (Ed.), Influencing human behavior: Theory and applications in recreation, tourism, and natural resources management (pp. 51-75). Champaign, Illinois: Sagamore Publishing Co. Inc.

Platt, J. (1973). Social traps. American Psychologist, 28(8), 641-651.

Rankin, J. H., & Walls, L. E. (1982). The social context of deterrence. Sociology and Social Research, 67(1), 18-39.

Reiter, S. M., & Samuel, W. (1980). Littering as a function of prior litter and the presence or absence of prohibitive signs. Journal of Applied Social Psychology, 10(1), 45-55.

Robinson, S. N. (1976). Littering behavior in public places. Environment and Behavior, 8, 363-384.

Rogers, R. W., & Mewborn, C. R. (1976). Fear appeals and attitude change: Effects of a threat's noxiousness, probability of occurance, and the efficacy of coping responses. Journal of Personality and Social Psychology, 41, 63-73.

Roque, G. M., & Roberts, M. C. (1989). A replication of the use of public posting in traffic speed control. Journal of Applied Behavioral Analysis, 22(3), 325-330.

Ross, T. L., & Moeller, G. H. (1974). Communicating rules in recreation areas. U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. Research paper NE-297.

Schank, R., & Abelson, R. (1977). Scripts, plans, goals, and understanding: An inquiry into human knowledge structures. Hillsdale, N.J.: Erlbaum.

Schwartz, S. (1970). Moral decision making and behavior. In J. Macauley, & L. Berkowitz (Eds.), Altruism and helping behavior. New York: Academic Press.

Schwarzkopf, S. K. (1984). Feeding of golden-mantled ground squirrels by park visitors at Crater Lake National Park. Doctoral Dissertation, Oregon State University.

Seligman, C., Becker, L. J., & Darley, J. M. (1981). Encouraging residential energy conservation through feedback. In A. Baum, & J. E. Singer (Eds.), Energy conservation: Psychological perspectives (vol. 3), Hillsdale, NJ: Erlbaum, Associates.

Shelby, B., Vaske, J. J., & Harris, R. (1988). User standards for ecological impacts at wilderness campsites. Journal of Leisure Research, 20(3), 245-256.

Sherer, M., Friedmann, R., Rolider, A., & Van Houten, R. (1984). The effects of a saturation enforcement campaign on speeding in Haifa, Israel. Journal of Police Science and Administration, 12(4), 425-430.

Sherif, M. (1935). A study of some social factors in perception. Archives of psychology, 187.

Simon, H. A. (1957). Models of man: Social and rational. New York: Wiley.

Sipprell, L. E. (1982). <u>Fear-arousal as a means of increasing park visitor awareness of hazards</u>. National Park Service.

Slater, M. D. (1992). Mass communication research: Lessons for persuasive communication. In M. J. Manfredo (Ed.), <u>Influencing human behavior: Theory and applications in recreation, tourism, and natural resources management</u> (pp. 51-75). Champaign, Illinois: Sagamore Publishing Co. Inc.

Smith, M. J. (1984). Contingency rules theory, context, and compliance behaviors. <u>Human Communication Research</u>, <u>10</u>(4), 489-512.

Stasson, M., & Fishbein, M. (1990). The relation between perceived risk and preventive action: A within-subject analysis of perceived driving risk and intentions to wear seatbelts. <u>Journal of Applied Social Psychology</u>, <u>20</u>(19), 1541-1557.

Suarez de Balcazar, Y., Fawcett, S. B., & Balcazar, F. E. (1988). Effects of environmental design and police enforcement on violations of a handicapped parking ordinance. <u>Journal of Applied Behavioral Analysis</u>, <u>21</u>(3), 291-298.

Swearingen, T. C., & Johnson, D. R. (1988). <u>An analysis of off-trail hiking in response to selected social control techniques at Paradise Meadows, Mount Rainier National Park</u>. National Park Service Cooperative Park Studies Unit, College of Forest Resources, University of Washington. Subagreement No. 10, Co-op Agreement No. CA-9000-3-0004.

Swearingen, T. C., & Johnson, D. R. (1988). <u>Day-hiker attitudes toward the presence of a uniformed park employee in a front-country area of Mount Rainier</u>. Unpublished manuscript.

Swearingen, T. C. (1989). <u>Moral development and environmental ethics</u>. Doctoral Dissertation, University of Washington.

Tenzel, J. G., Storms, L., & Sweetwood, H. (1976). Symbols and behavior - an experiment in altering the police role. <u>Journal of Police Science and Administration</u>, <u>4</u>(1), 21-27.

Thibaut, J., Friedland, N., & Walker, L. (1974). Compliance with rules: Some social determinants. <u>Journal of Personality and Social Psychology</u>, <u>30</u>(6), 792-801.

Van Houten, R., Nau, P., & Marini, Z. (1980). An analysis of public posting in reducing speeding behavior on an urban highway. <u>Journal of Applied Behavioral Analysis</u>, <u>13</u>, 383-395.

Van Houten, R., & Nau, P. A. (1983). Feedback interventions and driving speed: A parametric and comparative analysis. Journal of Applied Behavioral Analysis, 16(3), 253-281.

Van Houten, R. (1985). Large-scale reductions in speeding and acccidents in Canada and Israel: A behavioral ecological perspective. Journal of Applied Behavioral Analysis, 18(1), 87-93.

Van Liere, K., & Dunlap, R. (1978). Moral norms and environmental behavior: An application of Schwartz's norm-activation model to yard burning. Journal of Applied Social Psychology, 8, 174-188.

Vander Stoep, G. A., & Grammann, J. A. (1987). The effect of verbal appeals and incentives on depreciative behavior among youthful park visitors. Journal of Leisure Research, 19(2), 69-83.

Vincent, M. A., & Fazio, R. H. (1992). Attitude accessibility and its consequences for judgement and behavior. In M. J. Manfredo (Ed.), Influencing human behavior: Theory and applications in recreation, tourism, and natural resources management (pp. 51-75). Champaign, Illinois: Sagamore Publishing Co. Inc.

Weigel, R. H., Vernon, D. T. A., & Tognacci, L. N. (1974). Specificity of the attitude as a determinant of attitude-behavior congruence. Journal of Personality and Social Psychology, 30(6), 724-728.

Weinstein, N. D., Grubb, P. D., & Vautier, J. S. (1986). Increasing automobile seat belt use: An intervention emphasizing risk susceptibility. Journal of Applied Psychology, 71(2), 285-290.

Wellman, J. D., Roggenbuch, J. W., & Smith, A. C. (1982). Recreation specialization and norms of depreciative behavior among canoists. Journal of Leisure Research, 14(4), 323-340.

White, G. W., Jones, M. L., Ulicny, G. R., & Powell, L. K. (1988). Deterring unauthorized use of handicapped parking spaces. Rehabilitation Psychology, 33(4), 207-212.

Wicker, A. W. (1969). Attitudes versus actions: The relation of verbal and over behavioral responses to attitude objects. Journal of Social Issues, 25, 41-78.

Williams, D. R. (1988). Recreational specialization: A complex issue for visitor management. Western Wildlands, 14(3), 21-26.

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

Winett, R. A. (1977-78). Prompting turning-out lights in unoccupied rooms. <u>Journal of Environmental Systems</u>, <u>7</u>, 237-241.

As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural and cultural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interest of all our people. The department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.