SOCIAL AND ENVIRONMENTAL INFLUENCES ON LITTERING BEHAVIOR

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SOCIAL AND ENVIRONMENTAL INFLUENCES

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SUMMARY

The present study investigated the influence of anonymity and condition of the area on littering behavior. The relationship between values, attitudes, and selected biographical data to littering behavior was also assessed.

According to Zimbardo's theory of deindividuation, situations which engender a feeling of anonymity may lead to abdication of personal responsibility. Studies suggested that individuals are more likely to litter anonymously than when their name can be identified with their behavior.

Festinger's theory of social comparison argues that people conform partly out of a desire to be correct and what is correct is determined largely through social comparison. On the proposition that individuals seek consensual validation for their behavior from environmental cues, this study hypothesized that littering would be more likely in a dirty than in a clean area.

Rokeach theorizes that values, rather than attitudes, are stable determinants of behavior. The present study tested the proposition that attitudes toward littering are not consistent with observed littering behavior and that littering-related values are consistent with behavior.

The study consisted of two parts. Part 1, a field experiment,

was conducted in a post office at Georgia Institute of Technology. Students were observed as they checked their mailboxes under two experimental conditions: (1) clean (no notices on the floor) vs. dirty (the floor prelittered with notices), and (2) nonanonymous (individually addressed notices) vs. anonymous (notices not addressed to the individual).

Notices littered on the floor and disposed of in receptacles within the post office area were collected and counted for each of eight sessions. Notices found later or never disposed of in the experimental area were categorized as "unaccounted for."

Part 2 of the study, an analysis of individual characteristics, involved mail-questionnaires to over 3000 students identified as litterers and nonlitterers. The questionnaires consisted of scales constructed to measure individual values and attitudes toward littering. A brief biographical inventory was also included. These response data provided a descriptive profile of the littering and nonlittering college student.

Students littered more under anonymous and dirty conditions than under nonanonymous and clean conditions ($p < .05$). Also, fewer notices were disposed of under dirty conditions, but anonymous notices were disposed of as often as nonanonymous notices ($p < .05$). No significant interaction effect was found. Litterers and nonlitterers did not differ in the attitudes, values, or demographic characteristics measured.

These results add to the understanding of social behavior by demonstrating that deindividuation influences minor deviant behavior, such

as littering, that individuals look to environmental cues in deciding what is normative behavior, and that values and attitudes with respect to littering are inconsistent with littering behavior. The present findings contribute to the understanding of littering behavior by suggesting techniques on how to predict and control effectively the problem of littering.

CHAPTER I

LITTERING BEHAVIOR IN PUBLIC PLACES

Litter is trash, discarded or scattered about in disorder over a socially inappropriate area. It is ugly, expensive, widespread, and dangerous (Keep America Beautiful, Inc., 1968, 1970, 1974a, 1974b, 1974c).

Littering behavior has received relatively little research attention even with increased public concern for more stringent protection of "our environment." Considering the magnitude and costs of litter, it is surprising that the major variables of littering behavior have been neglected by the research community of social and behavioral scientists.

Chapter I reviews and organizes the research that has been performed and suggests areas of future study that would be of value. It categorizes the available studies according to the variables that influence littering--individual and environmental variables--and attempts to summarize the present state of knowledge concerning littering behavior.

Individual Characteristics

Demographic Variables

Surveys by the Keep America Beautiful (KAB) organization re-

ported that to some extent everyone litters. They revealed that age, sex, occupation, and residence are related to littering behavior.

Young people seem to litter the most. According to KAB (1968) adults aged 21-35 litter three times as much as people over 50 and nearly twice as much as those between 35 and 49. Finnie (1973) reported 18-year-olds and under litter at a rate "substantially greater" than people in the over-18 age bracket. Similar results are reported by Heberlein (1971). McCool and Merriam (1970), however, found age to be unrelated to compliance with litter regulations as indicated by canoers carrying nonburnable trash out of an overnight camping area.

Some variables such as residency, marital status, and race are weakly related to littering. Persons residing in rural rather than urban settings were more prone to litter (KAB, 1968); local residents complied less to littering regulations than did nonlocal visitors (McCool & Merriam, 1970); blacks have been observed to litter more often than whites (Finnie, 1973); and married people, less often than nonmarried people (Heberlein, 1971).

Other variables show inconsistent relationships to littering. Whereas KAB (1968) reported that males litter more than females, Finnie (1973) found no relationship based on sex. Similarly, Finnie observed that blue-collar workers littered as often as white-collar workers, but McCool and Merriam (1970) saw operatives, craftsmen, and salesmen litter more often than managers, professionals, and students. Further-

more, they found no relationship between littering behavior and level of education.

Finnie suggests that by identifying littering groups, organizations may design more effective antilitter campaigns. As an example, Finnie suggests that a city should have an adequate number of litter cans near junior and senior high schools because the litter rate for this age group is so high. The value of such information by itself is questionable. A categorization of demographic characteristics may accurately predict littering in one situation or environmental setting and be a valuable indicator of potential litterers; however, given a different situation or setting, the same characteristics may be useless as predictors. It might be that only when they are combined with cognitive and environmental influences, will demographic data contribute significantly to the understanding of littering behavior.

Cognitive Variables

The cognitive variables focus on levels of litter awareness, concern, and willingness to act against litter. A Harris survey (1970) interviewed over 3000 subjects and asked them to select two or three of the most serious problems facing the community in which they lived. Pollution was mentioned most often, followed by crime and drugs. Other survey findings showed that 9 per cent pointed to "clean-up of street-litter" as the most important problem, and 68 per cent considered visual pollution (including litter) to be a "serious" urban problem, with 16 per cent

believing that it should be "attacked first." In the area of pollution, the public was not only very willing to see government involved but also very willing to become personally involved in developing a solution. More specifically, however, people were more interested in having government develop solutions to urban problems than they were in becoming personally involved.

Gallup (1972) found similar but stronger attitudes toward pollution. Results showed education positively correlated with a continuing concern about the degradation of the environment. This concern was also greater among those in cities of one million or more than those in smaller cities and rural areas. In the KAB survey reported earlier, rural residents littered more than urban residents. Before concluding that the concern was the precursor of the behavior however, it should be emphasized that the Gallup survey also indicated that older people were less concerned than younger people. This inconsistency between cognitive characteristics and overt behavior is rampant throughout the literature on social behavior (Bem, 1968; Deutscher, 1966; Wicker, 1969). The attitude-behavior relationship with respect to littering is discussed in greater detail in a later section.

Most of the people interviewed in the Gallup survey were not informed about the damages resulting from pollution, and only about one-third of the public were aware that <u>they</u> were polluters. Other findings indicated that about three of every four adults are willing to pay ad-

ditional taxes to improve environmental quality. More people favored "living more simply," however, as an alternative to "paying the cost of cleaning up pollution." Those who were concerned showed a greater willingness to pay for cleanup than those who were not as concerned. When analyzed in more detail, the findings revealed that among college graduates 52 per cent said they would pay $50 to $100 or more. Among high school graduates 28 per cent would pay this much, and among those with a grade school education, one out of every ten would pay this much. Older people, people with lower family incomes, people in the smaller cities, and women preferred "living more simply." The investigators concluded that people are deeply concerned about pollution, and although about half of them would be willing to modify their life style to improve environmental quality, remarkable numbers of people are willing to pay for cleaning up the environment.

In a study reported by Dodge (1972), Hendee, Calton, Marlow, and Brockman demonstrated that campers' expressed negative attitudes toward littering were consistent with willingness (94 per cent of the respondents) to pack out trash left by other persons. McCool and Merriam (1970) observed that campers from local areas were less sensitive to litter around their campsites than campers from other regions, but both were equally knowledgeable of litter regulations. Method of travel showed no relationship to awareness of litter regulation but was related to the campers' sensitivity to the presence of litter. Paddle

canoers reported seeing more litter than did motor canoers or motor boaters. Similarly, occupation was unrelated to knowledge of litter regulations, but operatives, craftsmen, and salesmen were less sensitive to litter in the area than professionals, managers, and students. These results, in conjunction with those reported earlier, suggest that litter awareness and littering behavior are related in this setting.

On the other side of the coin, a study comparing litter awareness of campers with that of campsite managers reported interesting discrepancies (Clark, Hendee, & Campbell, 1971). Only 14.4 per cent of the campers believed that there was too much litter on campgrounds, but 30.5 per cent of the camp managers thought the sites were "heavily littered." According to the authors, campers were either responsive to a different standard or have had only limited contact with such problems and, therefore, were not as concerned as the managers. They also noted bystander indifference and apathy to observed littering acts even though awareness of the litter problem was high.

Whether people who report they are against litter actually litter less than those who report they do not care remains unknown. The results from Clark et al. on this point conflict with those from McCool and Merriam (1970) and Dodge (1972). The relationship between littering attitude and littering behavior is an issue to be pursued from a variety of points of view. And since it is so closely related to the broader, more timely issue of attitude-behavior inconsistency, it warrants more

detailed consideration.

Littering Attitudes vs. Littering Behavior

Most of the studies reported earlier have used a self-report measure of littering behavior. Such measures are liable to subject biases that may distort experimenter inferences.

Heberlein (1971) observed overt littering behavior. In one experiment over 7000 people were given handbills as they walked down a street in a resort community. As the potential subject walked down the sidewalk, he was unobtrusively observed by the interviewer at the other end. If a person who accepted a piece of paper was observed littering, an interview was solicited, during which demographic characteristics of litterers and nonlitterers were recorded, and "perceptions" of the situation as related by the subjects were evaluated. Knowledge, attitudes, and socioeconomic data were obtained from the questionnaire mailed to the subject one to three weeks after the interview. Fifty-eight litterers were observed, and 79.4 per cent agreed to be interviewed. Of those, 46.5 per cent returned the questionnaire. A control nonlitterer was selected for every litterer. Of the 58 control subjects, 88 per cent agreed to be interviewed, and 70 per cent returned the questionnaire. The data collected were well analyzed, and many findings can be discussed at length. The following summarizes some of them.

Only 50 per cent, or 18 of 36 litterers who were interviewed

recalled littering. Heberlein noted that this inconsistency in words and deed was due either to the inability of the subject to label his behavior as littering or the result of a defensive denial elicited by being caught. The data supported the first explanation. Of 18 variables considered to reflect defensive behaviors, only one was related to the incorrect labeling of littering. Those subjects who did not label their act spontaneously as littering took longer to return questionnaires, but they were no less likely to deny responsibility for or to accept the consequences of the behavior. The author concluded that those who failed to label correctly are no more likely to engage in different reaction behaviors.

It is one thing not to realize that one's actions constitute littering; it is another thing entirely to be aware of one's behavior and not care about or accept responsibility for its consequences. Of those interviewed, 40 per cent indicated a general awareness of consequences; 64 per cent indicated that a specific consequence of littering crossed their minds as they tried to decide what to do with the paper. More interesting, however, was that both ascription of responsibility and awareness of consequences were strongly related to littering. The correlation between awareness of consequences and littering was -.43 ($\underline{p} < .0005$). Subjects who were aware of the consequences were much less likely to litter than those who perceived no negative consequences. The correlation between ascription of responsibility to themselves and littering was -.31 ($\underline{p} < .015$). The joint effects of both variables yielded a multiple $\underline{R}$

of .49 ($p < .0001$). It seems that awareness of consequences and ascription of responsibility are important mediating variables for the activation of norms which promote antilittering behavior.

An analysis of the questionnaire data showed that sanctions did not contribute significantly to predicting littering behavior. Only 10 per cent of the respondents reported knowing anyone who had been formally sanctioned for littering, and they demonstrated no reduced tendency to litter. Neither did those who indicated an awareness of litter control signs, fines, or penalties. Respondents who correctly estimated fines for littering were no less likely to litter than those who under- and overestimated fines. Given the ubiquity of the behavior, the difficulties of detection, and the low rate of enforcement, Heberlein concluded that the failure of formal sanctions to effectively influence littering behavior is not surprising.

Informal sanctions were also ineffective. Although 56 per cent of the respondents reported that they would expect negative sanctioning behavior or evaluation from their best friend if they littered in his or her presence, expecting a negative sanction from one's best friend was not related to littering behavior. Heberlein was forced to conclude that fear of informal sanctions is not a motivating force for antilittering behavior. These findings are corroborated by the KAB survey (1968), which indicated that most people would not scold a person whom they caught littering nor would they inform a nearby policeman. Additional

support can be found in Clark et al. (1971) which also related litter apathy to bystander nonintervention. Such findings appear to be in conflict with those relating the antilittering influences of group membership (Heberlein, 1971; KAB, 1968; McCool & Merriam, 1970). If it is not fear of reprimand from peer or authority figures, what is it about membership that makes one less likely to litter in the presence of a group? The need for more research in this area is clearly indicated.

Assuming people have negative attitudes toward littering, Heberlein was interested in finding out how negative these attitudes were and what variables influenced them. The questionnaire also asked subjects to suggest fines for littering various materials in various locations. Presumably the size of the fine would reflect the intensity of the subject's attitude against littering. A factor analysis of the attitude items identified four underlying dimensions of litter attitudes representing littering in general, attitudes specific to biodegradable material, littering on a sidewalk, and littering cigarette butts.

The attitude measures were very revealing. Most people advocated relatively low fines for littering. Over 80 per cent of the 68 respondents thought that fines should be less than $150. Median values for four littering dimensions were all below $50 and proved to be a valid and reliable representation of people's negative attitudes toward littering. For example, the median fine for littering a cigarette butt was $50. It was only $8.33 for littering a biodegradable material. Many

must not have recognized butts as litter because about 10 per cent of the respondents recommended a fine of zero dollars. Similarly, many did not recognize biodegradables as litter since about 20 per cent of the subjects suggested no fines for these materials. It is interesting that the median fine for littering on the sidewalk was $23 whereas the fine for littering in general was $50.

More importantly, there was no relationship between antilittering attitudes of any strength or type and actual behavior. Actual littering behavior was not significantly related to general antilittering-on-the-sidewalk attitudes or to antilittering-cigarette-butt attitudes. Those respondents who suggested more extreme fines for littering were no less likely to litter than those who suggested low fines.

The second attitude measure was positively correlated with the first. A majority of the respondents rated littering the most serious from a list of deviant behaviors, second only to leaving a campfire burning. This measure was also negatively related to actual litter behavior, i.e., the greater the comparative seriousness rating, the more likely one was to litter. Heberlein concluded that "the actual population parameter of association between attitude and littering behavior is zero" (p. 46).

The fact that antilittering attitudes were unrelated to littering behavior is only of partial relevance to the understanding of why people litter. Indeed, the most conspicuous finding of this study was the infre-

quency of littering. Contrary to the edict that states "everyone litters," Heberlein observed that less than 2 per cent of those who had litterable material actually littered. "In terms of attitude-behavior consistency," he states, "assuming that everyone holds the anti-littering norm, over 98 per cent of the more than 7,000 subjects in the experimental situation acted consistently with their attitudes" (p. 38). It is very likely that the majority of those 2 per cent who behaved inconsistently with their attitudes would not have done so if they had been aware of what they were doing. The issue then does not seem to be one of attitude-behavior consistency but one of behavioral awareness. Heberlein found that awareness-of-consequences, ascription-of-responsibility, being-in-a-social-group, sex, and engaging-in-water-sports behaviors (see section on situational variables) accounted for over 55 per cent of the variance in littering behavior. From these findings, he hypothesizes that an individual's decision on whether or not to litter involves holding an antilittering norm. He suggests that people make their behavior consistent with their cognitive orientations when they (1) are aware of the negative interpersonal consequences of their action and (2) ascribe responsibility to themselves for these consequences. "People who perceived the situation in these terms and who had personality tendencies to be aware of consequences and take personal responsibility tended not to litter," Heberlein says, "because these perceptions and dispositions served to activate norms" (p. 63). A second way norms tended to be activated

was through the presence of "significant others." According to Heberlein, "being in a social group appears to activate social norms independent of either expected sanctions, situational perceptions, or personality traits" (p. 64). Finally, habit also leads to norm congruent or norm incongruent behavior. "Socialization into a traditional female role tends to teach a woman not to litter even when her perceptions and personality would lead to a prediction of norm violation" (p. 64).

The next logical step following this study would be to test Heberlein's ideas. After considering the findings and conclusions, Dodge (1972) organized an antilitter campaign in a small Alaskan town aimed at changing littering behavior through norm development and norm activation. The data demonstrated a marked reduction in the proportion of persons littering and the total amount of litter removed during the campaign as compared to that removed before the campaign. Of the 77 parties observed, 56 per cent left littered sites prior to the antilitter campaign; 35 per cent left sites in essentially the same condition as they were found; and 9 per cent actively cleaned their areas before they departed. During the campaign 5 per cent of the 55 parties observed left littered sites; 60 per cent left sites in the same condition; and 35 per cent actively cleaned their sites. During the baseline period 165 quarts of litter, or an average of 2.15 quarts per party, were removed. During the campaign only 10 quarts or .18 quarts per party were removed.

As Dodge recognizes, however, the "descriptive nature" of this pilot study places these findings in a highly untenable position. Most notable is the absence of control groups, crucial data on the reliability and validity of the dependent measures, sampling specifics, and direct manipulations of the independent variable with respect to the subjects. Dodge admits that "the question whether these changes resulted from the campaign is difficult to prove in a statistical sense as the experiment consists of a single experimental unit, and rigorous controls as well as replications are lacking" (p. 46). The study does represent one of the few examples of experimental research on littering present in the literature today, and its mere existence is a significant contribution to the understanding of littering behavior. It remains theoretically sound and logically valid and merits replication.

The Role of Environmental Variables

The question can be raised at this point whether such complex theoretical schema as that presented by Heberlein provides an efficient approach to understanding littering or a practical approach for litter control. What it may achieve in completeness, it may lack in parsimony, because the concepts that appear so natural are extremely difficult to define operationally. As for understanding behavior, "cognitive consequences" and "personality tendencies" may pass for the moment, but when it comes to predicting and controlling behavior, more obvious

variables must be manipulated. After considering the wealth of information contributed by Heberlein, it appears that now attention should be turned to environmental variables. It is likely that behavioral awareness can be better stimulated through subtle manipulations of environmental variables than lengthy educational, attitude-change approaches. Results already reported support this notion. For example, being in a group must provide cues to the potential litterer that he has litterable material at hand and a "litter decision" to make. By oneself, the same individual may be too preoccupied with his thoughts to be aware that he is littering. This fact might explain why people in groups litter less than people by themselves.

Environmental variables interact to a great extent with attitude change approaches since in order for antilittering messages to be effective, they must be distributed, read, and followed by the potential litterers. The difficulty of this is exemplified in a study by Marler (1971). In an attempt to determine the relative effectiveness of three different themes of antilitter material, leaflets were distributed with camper-fee validation cards. This procedure successfully reached only about 65 to 70 per cent of the campers. Of these, only about 60 per cent tended to read them. In other words, the leaflets were accepted and read by only one-third of the campers for which they were intended. Marler concluded, "Under the circumstances of this study, it would appear that the net gain in decreased litter and a more knowledgeable, perceptive public

is not sufficiently great to warrant the distribution of any type of leaflet" (p. 53).

The opposite of littering is cleaning. Bickman (1972) observed inconsistencies between antilittering attitudes and cleaning-up behavior. Over 500 subjects were interviewed just after they passed a large piece of litter that had been planted directly in their path and that was highly noticeable. Of the subjects, 94 per cent answered that it was everyone's responsibility to pick up litter. Only 8 subjects (1.4 per cent), however, picked up the litter. Bickman concluded that environmental problems will not be solved by simply influencing verbally expressed attitudes. With this in mind, the influences of environmental variables are considered next.

Specific Litter Situational Variables

Situational variables that have been investigated to date are the availability of litter receptacles, litterbags, and litter signs. After these findings are considered, the effectiveness of incentive procedures on littering is summarized.

In a series of experiments, Finnie (1973) not only demonstrated the effectiveness of litter receptacles but also established a sound methodology for the assessment of littering. Two experiments in Richmond, Virginia, measured the effect of the presence of litter cans on the rate of littering along a highway and in an urban area. An experiment in St. Louis, Missouri, compared the rate of littering with no

receptacles present to the rate in the presence of normal cans (55-gallon drums) and attractive cans ("Clean City Squares"). A third experiment in Philadelphia determined the rate of littering as a function of the individual's characteristics (reported earlier), the presence or absence of litter cans, and the condition of the area--clean or dirty.

In the Richmond experiments the presence of litter cans reduced litter along highways by an average of 28.6 per cent (i.e., to 71.4 per cent of the level without cans). This effectiveness was maintained for at least six miles along the highway. When signs preceded the litter cans, the reduction in litter was 25.2 per cent, and when signs were not used, 32 per cent--a result requiring more research to explain. The presence of litter cans obtained a 16.7 per cent reduction in litter along one block of a city street.

The experimenter also measured the effects of his independent variables on specific types of litter material. For example, beer packaging accounted for 31 per cent of all litter. Although litter in general was reduced by 28.6 per cent, littered beer packaging decreased by 35 per cent when cans were present. By implying litter-type specific effects, these results open a new area of exploration, yet unpursued.

The results from the Richmond experiments prompted Finnie to conclude that if litter cans were widely available, people would learn to hold their litter until they come to a can. "The effectiveness of litter cans would therefore tend to increase with time after placement and

with the number placed" (p. 136).

In the St. Louis experiment Finnie found that attractive litter cans reduced litter by 14.7 per cent whereas plain 55-gallon drums were only 3.15 per cent effective. From these results Finnie decided that the design of the litter receptacle can enhance its effectiveness in reducing litter.

Many people believe that clean areas tend to stay clean or that "litter begets litter." The Philadelphia experiment confirmed this hypothesis by showing that litter cans reduced litter by 56 per cent in a clean area and only 35 per cent in a dirty area. These results imply that a city can reduce the rate of littering by merely keeping streets and sidewalks clean. After considering these findings, it is obvious that litter awareness can be stimulated more easily and effectively throuth subtle manipulations of environmental variables such as the presence of receptacles, the appearance of receptacles, or the condition of the area than by attitude change approaches. It appears more efficient to modify littering responses by manipulating the stimuli to which they are directed than by attempting to change attitudes that may or may not determine the behavior.

The same environmental influences may be ineffective when improperly manipulated. Heberlein (1971) examined the effectiveness of litter signs and litter receptacles in decreasing litter along the highway in a number of states. He reported that there was no statistically sig-

nificant relationship found between either one of these variables and the amount of litter either along the highway sections or throughout the states. Heberlein noted that for a sign to be effective, it must be read and the message it states must be comprehended. In the earlier study by Heberlein, only 53 per cent of the subjects reported seeing litter control signs. Those who had reported seeing them were no more likely to recall the posted fine level correctly than those who did not.

Certainly the possession of a litterbag should decrease littering behavior by increasing an individual's litter awareness. This was the focus of an investigation by Clark, Hendee, and Washburne (1972). The results suggested that most litterbags at parks are not used. Only 3 per cent of over 2800 bags distributed were found in park garbage cans, and 96.1 per cent of 2382 cars stopped not only still had their bags with them but over half had not used them. Plastic bags were more likely to be retained and used than paper bags. Of the few bags discarded in the park, 96.8 per cent were paper; however, 10.6 per cent were thrown away empty. As for the litterbags remaining in the cars, 48 per cent of the plastic bags were being used as opposed to only 35.5 per cent of the paper ones. Clark, Hendee, and Washburne concluded that not only are "litterbags unlikely to be used but they may in fact have little or no effect on the level of litter already on the ground" (p. 5). In other words, litterbags alone do not stimulate the picking up of existing litter.

The previous studies suggest that the manipulation of specific environmental variables such as receptacles and signs can effectively reduce littering behavior, but a receptacle is not effective unless it is used; a sign is not effective unless it is followed. Incentives have been effective in motivating people to use receptacles and to follow signs.

The Effect of Incentives

Efforts to combat the litter problem include legal proscription, antilittering propaganda, posted messages, and plentiful garbage cans. These traditional techniques proved largely ineffective in a study of littering behavior in movie theaters--an environment where littering is both common and accepted (Burgess, Clark, & Hendee, 1971). It was found that the level of litter could be substantially reduced and almost eliminated in kiddie matinees by offering free movie tickets to children for picking up litter. The incentive procedures resulted in the removal of 90 per cent of all litter. Baseline data indicated that under no incentive control conditions, only 19 per cent of the total litter was properly disposed of. Litterbags with instructions provided a 57 per cent level of disposal. In a second theater the baseline level was 16 per cent. Doubling the number of trash cans in the theater produced no effect, where the antilitter film increased the amount of litter returned by only 5 per cent. It should be emphasized that in the incentive conditions, less than 66 per cent of the sample were offered rewards, where the traditional approaches were directed at the entire sample. Such find-

ings should help dispel the common myth that incentive procedures are expensive. When properly scheduled, reinforcement systems are cheaper and more efficient than traditional pay scales.

A series of experiments in campground areas demonstrated that incentives have a comparable effect in a natural environmental setting (Clark, Hendee, & Burgess, 1972). When children were offered their choice of a variety of inexpensive toys for picking up and properly disposing of litter, the appearance of the camping area was enhanced. When park rangers contacted children at a trailhead and offered arm patches for litter pickup, trash levels were reduced by 80 per cent over a 2-1/3-mile stretch of trail. In a more underdeveloped area, similar incentives reduced litter levels by 75 per cent. Litter reduction amounted to 1 per cent in matched areas where only litterbags were distributed.

Clark, Hendee, and Burgess concluded from these studies that "although appropriate disposal facilities, properly designed educational campaigns, and use of litterbags are certainly important to solving part of the litter problem, new approaches are obviously necessary for a reasonably complete solution. The incentive method, successfully used in these studies, in combination with traditional public relations approaches . . . offer promising approaches and should be seriously considered" (p. 27).

Although these results may appear specific to young subjects,

they are actually specific to the particular type of reinforcer used. Other experiments have demonstrated that incentives need not be restricted to children to be successful and are useful in controlling litter in underdeveloped, unsupervised areas. In a study with urban park visitors as subjects, free soft drink tickets as incentives increased the number of litter deposits by 300 per cent and 600 per cent in a single trash receptacle located in the park (Kohlenberg & Phillips, 1973). Every piece of litter deposited was not rewarded. Drink tickets were delivered on a variable ratio schedule; that is, the number of litter deposits required before any particular reward was delivered was variable, but the average number of deposits per reward was fixed at 20 (VR 20) and 10 (VR 10). The incentive conditions resulted in the highest rates of litter deposits with a total of 4577 and 6032 pieces for the VR 20 and VR 10 conditions as compared to 723 and 2403 pieces for the two baseline conditions. The authors noted that although every person depositing litter in the trashcan was not rewarded, the incentive procedure resulted in continuous litter control; there was less litter at any given moment during the day. Conventional approaches involve the use of litter-pickup crews, a system which results in a litter-free area immediately after the crew has finished and a gradual accumulation of litter on the ground thereafter.

Although they were offered to the general public, the reinforcements appeared to affect a younger group of subjects. The contingency

increased the percentage of children who deposited litter and decreased the percentage of adults. Persons judged older than 30 years declined from 34.38 per cent to 6.62 per cent. Those between 10 and 20 years increased from 15.93 per cent to 43.8 per cent. Children under 10 years appeared unaffected. The investigators concluded that the specificity of the incentive effects was due to the type of reinforcement used--soft drink tickets.

In a study by Powers, Osborn, and Anderson (1972), incentives successfully encouraged a broad spectrum of the public to remove a substantial quantity of litter from a secluded area of a state park. During experimental conditions, payoffs for collecting litter were either 25 cents or a chance for $20 in a weekly lottery. Over a 15-week period, 92 bags of litter totaling 732 pounds were removed by the general public. The average amount of litter turned in during the first 1-week experimental period was ten times that turned in during the initial baseline period.

Incentives again proved to be an inexpensive and efficient way to control litter. Those participating chose the lottery over the 25-cent payment at a ratio of 2.5 to 1. The total incentive cost was $145, which provided a clean area for at least 7 weeks. More importantly, this experiment shows that incentives were successful not only over a long period of time but with individuals of many ages, when litter pickup was unsupervised, when reinforcement was considerably delayed, and

in the absence of authority figures.

After considering the effects of incentives on littering, Clark, Hendee, and Burgess (1972) offered the following explanation for littering behavior. The fact that people litter indicates that something is gained through disposal. "Carrying waste material is probably inconvenient for most people," they state, "hence, a motive exists for its quick disposal by dropping it on the floor or ground or by throwing it out the car window" (p. 27). The aversive consequences such as defacement of the environment with litter are considered too remote to exercise control over the behavior. Similarly, legal sanctions such as fines are probably ineffective because they are enforced so infrequently. "The probability of being detected, arrested, and fined is simply too remote and intermittent to control such behavior" (p. 27). These conclusions received added support from Heberlein (1971). "Once dropped, litter is unlikely to be picked up by someone else unless he has something to gain by so doing" (p. 27). In support of their point of view, Clark, Hendee, and Burgess refer to the era prior to the "nonreturnables" when a major source of income for many was collecting bottles. "These observations suggest that the level of littering might be reduced if immediate positive consequences contingent on antilitter behavior could be scheduled" (Burgess et al., 1971, p. 75).

At this point the advantages of viewing the litterer within the context of the litter situation should be obvious. The modification of litter-

ing behavior is much more efficient when specific situational variables are also considered than when limited only to individual demographic and cognitive characteristics. Individuals not only litter in a variety of situations but litter situations appear in a variety of environmental contexts. Littering behavior will not be completely understood until the effects of these environmental contexts are identified.

General Environmental Variables

Heberlein (1971) demonstrated that the condition of the environment influenced littering. Students were handed a small piece of paper with an advertising message as they walked out of a classroom. The condition of the hallway through which they passed was either "prelittered" with scrap paper or clean. Of those subjects who accepted the handout, 16 per cent littered in the messy environment whereas only 3.6 per cent littered in the clean area. Heberlein hypothesizes that a messy area possesses cues that suggest it is an appropriate place to litter, and in turn, more littering is elicited as others conclude that it is acceptable to litter. Finnie (1973) provided support for this notion when more people littered in a messy area than in a clean area, regardless of the presence of litter receptacles. No doubt, littering in some public places such as movie theaters and sports coliseums is more socially acceptable than in others such as parks and streets. For instance, commercial areas are reported to have twice as much litter as residential areas (Continental Can Company, 1970).

The activity in which a person is engaged also appears to affect his littering behavior. Heberlein (1971) observed a relationship between littering and participation in various outdoor recreational behaviors. He reported that participation in water sports activities, especially water-skiing and power boating, is positively related to littering behavior as are hunting, fishing, and camping behavior, whereas birdwatching and nature-walking were negatively related. Golfers, picnickers, sightseers, and pleasure autoriders are just as likely to litter as not to litter. When paddle canoers were found more likely to comply with antilitter regulations than were motor canoers or motor boaters, the investigators hypothesized that the closer interaction with others and the more visible their acts, the more likely an individual is to comply with antilitter regulations or norms (McCool & Merriam, 1970). Furthermore, the composition of litter might relate to the activity of the litterer. One study assessed highway litter at 50 per cent paper, 20 per cent paper packages, 12 per cent beer and soft drink cans, and the remainder bottles and broken glass (Continental Can Company, 1970). Other types of material would be expected in other areas.

The time of day appears to be related to littering behavior as well as the day of the week. For example, Kohlenberg and Phillips (1973) reported that littering increased in the late afternoon hours. They suggested that in order to reduce costs and still maintain the benefits of the reinforcement procedures, the contingency could be in effect only during

periods with high littering rates. Many investigators have reported that litter increases most heavily throughout the weekend in parks and urban areas (Clark et al., 1971; Dodge, 1972; Finnie, 1973; Kohlenberg & Phillips, 1973). Clark et al. (1971) reported increases in littering as the day for departure from a campsite approaches. These relationships can be interpreted as a function of traffic through the area. In the Kohlenberg and Phillips study, litter rates correlated positively with parking lot receipts.

Tasks for the Future

These studies suggest a variety of approaches to understanding litter behavior. Dodge, Heberlein, and KAB consider littering behavior as a reflection of an inactive social norm. They suggest that littering will be reduced if individuals become more aware of the consequences of littering and accept personal responsibility for their behavior. According to McCool and Merriam, the chance of being caught in the act determines whether or not an individual will litter. When individuals perceive their judgments and/or actions to be observed or discovered, conformity to litter regulations will follow. Bickman says that environmental problems will not be solved by simply influencing verbally expressed attitudes. According to Finnie this means that litter cans should be more available and areas should be kept clean. Clark, Burgess, Hendee, Kohlenberg, Phillips, Powers, Osborn, Anderson,

and others suggest that the level of littering might be reduced if immediate positive reinforcements contingent on antilitter behavior could be scheduled.

On what do all the theorists agree? All promote the point of view that environment and behavior are closely intertwined, almost to the point of being inseparable. This involves more than the accepted dictum, "environment affects behavior." It also implies that behavior cannot be wholly understood independently of its intrinsic relationship to the physical environment and that the very definition of behavior must be within an environmental context.

For years trait theorists have studied man separately from his physical environment. They have all too often assumed that the studied behavior portrays permanent and enduring qualities that transcend environmental contexts. Prediction of behavior has been all too often attempted regardless of setting. These assumptions remain pervasive in spite of much evidence showing that properties of the environment may account for more of the variance in behavior than do demographic and cognitive individual characteristics (Insel & Moos, 1974).

The analysis of littering behavior requires more emphasis on environmental influence. The new unit of study must be a behavior-environment relationship. The influences of environmental variables and individual variables must be represented as interactions as well as isolated effects. For example, the relationships between attitudes on

perceptions of littering to specific environments must be identified. Littering behavior must be observed across a variety of specific environments and types of individuals.

The emerging discipline of "social ecology" grows out of this interaction of man with his environment (Insel & Moos, 1974). Others call it "ecological psychology" (Barker, 1968) and "environmental psychology" (Ittelson, 1973; Wohlwill, 1970). The analysis, prediction, and control of littering is directly amenable to this area as well as to social psychology, perception, learning, behavior modification, industrial psychology, human engineering, sociology, forestry, city planning, etc. Nowhere is the plea of M. Brewster Smith more appropriate than in the study of littering behavior.

> If man is to regain a liveable world in the finite time that remains before present trends in his aggregate behavior ruin the planet for him and for many other forms of life, we need to focus our efforts not only in terms of a fresh appraisal of the desirable and possible among human goals, but also in terms of a view of ourselves as political actors capable of giving shape to our destiny. (1973, pp. 230-231)

CHAPTER II

THEORY

Investigation of the situational and individual influences on littering behavior must conceptualize the unit of study as a behavior-environment relationship so that the environmental and individual influences are represented as interactions as well as isolated effects. The individual contextual interactions most relevant to influencing littering behavior are found in the social influence literature. This chapter elaborates the role of some of these variables by relating their influence on littering to existing social psychological theory. It concludes by specifying objectives and hypotheses for two studies that would examine the effects of some specific individual environmental variables on littering behavior.

The Need for Social Comparison

People often feel a need to evaluate their behavior (reactions, opinions, and abilities) against those of other persons when no objective standards are available. The need for social comparison is at least one motivating force behind a wide range of behavior, including affiliating with others, participating in discussions, playing competitive games, taking examinations in school, and answering popular quizzes.

Festinger's (1954) theory of social comparison processes pro-

poses that people conform partly out of a desire to be correct and what is correct is largely determined through social comparison. He believes that scientists and laymen prefer objective tests when objective standards are available. But in the absence of unambiguous standards, people will seek to evaluate the correctness of their opinions, attitudes, and behaviors by comparing them to the opinions, attitudes, and behaviors of others. Festinger hypothesizes that given three conditions--the drive to evaluate one's behavior, the tendency to evaluate them by comparison with others when objective standards are unavailable, and the tendency to select similar others for comparison--people try to reduce discrepancies of opinion and action between themselves and those they choose as points of comparison.

For example, this social comparison theory accounts for the social-influence process found in Sherif's study of the autokinetic phenomenon. Viewing a stationary pinpoint of light in an entirely darkened room, subjects report seeing the light move. This is called the autokinetic effect. Sherif (1935, 1936) used this procedure to investigate the effects of social influence. After repeated exposures, subject's judgments of how far the light had moved stabilized; each person reported a small, fixed range within which the light moved. Sherif concluded that individuals in situations without norms quickly construct their own. He then asked what would happen if two conflicting norms clashed. Placing two or three subjects who had already established

dissimilar norms in a darkened room and having them announce their judgments one after the other over a series of trials, Sherif found them influencing one another. Their norms converged eventually to a common norm somewhere in between. Festinger suggests that subjects wanted to be correct in their opinions about the movement of the light, but lacking an objective test, they were influenced and in turn influenced the judgments of the others in the group.

Other support for this theoretical orientation comes from research on bystander intervention which concerns the willingness, in emergencies, of people to break out of their roles as bystanders and to come to another's assistance.

In one study, Latané and Darley (1970) presented to subjects, who thought they were waiting for the experiment to begin, a variety of noises that sounded like someone falling and being injured in an adjoining room. The experimenters were watching to see whether responses to this possible emergency differed according to whether the subject was waiting alone, with a stranger, or with a friend. The situation was ambiguous about exactly what had happened. It was predicted that a desire for social comparison would prompt a subject to use the other's reactions to interpret the ambiguous cues. The assumption was that people do not wish to commit themselves until reasonably sure that a particular course of action is appropriate. When alone, each person has only himself on whom to rely in defining a situation. The presence

of others adds complexity to the definition process, and when the others are not responding with alarm, the individual may assume that no emergency exists. The results supported Festinger. In the company of a passive, unconcerned stranger, individuals were substantially less helpful than were subjects who waited with a friend. The most helpful of all were those subjects who waited alone.

In summary, the theory of social comparison proposes that in ambiguous situations individuals turn to others to evaluate what is "correct" behavior. And the more ambiguous the situation is, the more likely such a social comparison process is. Furthermore, once individuals in a group begin comparing themselves with others, there are strong pressures toward uniformity. This process is called consensual validation.

At this point, it can be asked how consensual validation can take place if no other individuals are nearby with whom a social comparison can be made. In this situation there is no individual to model or to imitate. It is of considerable interest to investigate whether environmental cues will direct an individual's consensual validation in the absence of overt behavior or whether the process will break down. Assuming that people seek out consensual validation for their behavior from situational cues, it can be hypothesized that littering will be more likely in a dirty area than in a clean area. Observing litter strewn over an area may lead an individual to believe that such behavior is either un-

likely to be punished or is socially acceptable or lead to some other conclusion that increases the likelihood of that individual littering.

Confronted with an ambiguous situation in which an individual is tempted to litter--behave in a manner considered inappropriate and antinormative--he looks to the immediate environment for clarification. Trash on the ground provides the cues indicating that the area is acceptable to be littered, thus providing consensual validation for littering behavior.

It has been demonstrated that people are more likely to litter in an area that has already been littered than in a clean area. For example, prelittered hallways attracted more litter than clean hallways (Heberlein, 1971), and litter receptacles are used more often in clean areas than in dirty areas (Finnie, 1973). Littering rate as well as the amount of material littered has been observed to increase with density and crowding of an area (Kohlenberg & Phillips, 1973).

Results from one of the same studies, however, implied that littering should occur less in a dirty area than in a clean one. Heberlein (1971) concluded that not only behavioral awareness but also awareness of the consequences of littering is related to the occurrence of behavior. The presence of litter, then, might serve to increase these awarenesses and thereby decrease littering. It is evident that more research concerning the condition of the environment is necessary.

Anonymity and Deindividuation

Festinger, Pepitone, and Newcombe (1952) noted that situations engendering feelings of anonymity may lead to abdications of personal responsibility. They labeled this phenomenon "deindividuation." The bursting of the bonds of self and separateness allows the "reduction of inner restraints" (Festinger, Pepitone, & Newcomb, 1952). Once the individual has been "submerged in a group," or "deindividuated," his restraints are lifted, and he is freer to do what he wants. According to this formulation, being an anonymous member of a crowd should lead to more antisocial behavior as well as to very pleasant feelings. Riots, lynchings, and other instances of mass violence represent situations in which individuals are more likely to commit antinormative acts that they ordinarily would not engage in.

Recent research and theory on anonymity has been performed and proposed by Zimbardo (1969), who believes that anonymity strongly promotes deindividuation. Deindividuation is a complex, hypothesized process in which a series of antecedent social conditions lead to changes in perception of self and others, and thereby to a lowered threshold of normally restrained behavior (1969, p. 251). Zimbardo feels that the prerequisite conditions for this phenomenon include personal anonymity and diffuse responsibility as major components. He hypothesized that these conditions result in the weakening of social controls that are based on guilt and shame. Hence, no concern for social evaluation exists if

others cannot identify you or single you out (i.e., they cannot evaluate, criticize, judge, or punish). He demonstrated this in a number of experiments and in a variety of natural settings. For example, subjects deindividualized by wearing hoods over their heads, who were otherwise sweet, normally mild-mannered college girls, shocked other girls almost every time they had an opportunity to do so, sometimes for as long as they were allowed. It did not matter whether or not the fellow student was a nice girl who did not deserve to be hurt. In more natural settings, Zimbardo repeatedly observed the transformation of a typical car into a pile of scrap metal by well-dressed, clean-cut citizens who would, under other circumstances, be demanding more law and order. He concluded that to initiate such acts of destructive vandalism, the necessary ingredients are the acquired feelings of anonymity provided by the life in a crowded city.

Gergen, Gergen, and Barton (1973) have also observed that anonymity will reduce another form of restraint. Students between the ages of 18 and 25 developed immediate and close sexual relations while in a dark room as opposed to in a light room. In the anonymity of darkness, 90 per cent of the subjects touched each other, 50 per cent hugged another person, whereas none did either in the light. Of those in the dark, 80 per cent said that they felt sexually excited, and only 30 per cent of the subjects in the lighted room indicated feelings of excitement. As Gergen et al. noted, "by simply subtracting light, a group of perfect

strangers can be moved within approximately 30 minutes to a stage of intimacy not often attained in years of normal "acquaintanceship" (Gergen, 1974, p. 15).

Such studies on antinormative behavior suggest that individuals are more likely to behave in a manner that is deviant when they can do so anonymously. But these studies have never considered minor deviant behaviors. It is of considerable interest to investigate whether or nor the individuation affects behaviors of little consequence as well as those behaviors which have more reason to be influenced by a fear of social sanctioning. If littering is considered deviant, antinormative behavior, all of the foregoing suggest that anonymity should increase the likelihood of its occurrence. It can be hypothesized, then, that people should be more likely to litter anonymously than when their names can be identified with their actions.

The results of some studies already reviewed have suggested that littering either occurs when the litterer remains anonymous or does not occur when the offenses can be related to the offender. Litterers were less willing to accept responsibility for their actions than nonlitterers (Heberlein, 1971), and the success of an antilittering campaign aimed at changing littering behavior by increasing personal sense of responsibility for adhering to nonlittering alternatives has been demonstrated (Dodge, 1972). The observation that people litter less often when in groups than when by themselves (Heberlein, 1971; McCool & Merriam,

1970) may be due to the decrease in anonymity that occurs with group membership. A person is more likely to be observed littering or identified as a litterer when in a group than when alone. The effectiveness of incentive procedures in controlling littering as well as the ineffectiveness of formal sanctioning may both be related to anonymity, since the litterer must be identified before being punished or rewarded (Burgess et al., 1971; Clark et al, 1971; Clark, Hendee, & Burgess, 1972; Clark, Hendee, & Washburne, 1972). Large crowd situations, such as in movie theaters, sports events, etc., may foster littering more so than smaller crowd situations such as in small streets and hallways (Clark et al., 1971; Heberlein, 1971) due to the increase in anonymity provided the litterer. Heberlein (1971) has suggested that "unawareness" of littering accounts for a large portion of the behavior observed. Behavioral awareness might be directly stimulated by a variety of subtle environmental manipulations, one of which is decreasing subject anonymity. Finally, the observation that many litterers report that they did not fear informal sanctioning from their friends might suggest that anonymity effects are weak (Heberlein, 1971).

In addition, social comparison effects may interact with social sanctioning effects. In situations where the fear of social sanctioning is low, condition of the area may have little influence. With respect to littering, the social consequences of littering in a clean area may be perceived as greater than those of littering in a dirty area. Thus,

anonymous litterers may not litter more than nonanonymous litterers in a dirty environment where the consequences for littering may be perceived as low. In a clean environment where the consequences of littering may be considered more serious, anonymous litterers might litter much more than nonanonymous litterers.

Attitudes among Individuals

The concept of attitude may be viewed as an overall, learned, core disposition that guides a person's thoughts, feelings, and actions toward specific others and objects. Another perspective is to think of an attitude as a general predisposition to respond to an object in either a favorable or unfavorable way. Each of these definitions provides insight into the nature of attitudes, but a more fruitful approach refers to three components common to all attitudes: (1) cognitive, (2) emotional, and (3) behavioral (as proposed by Krech and Crutchfield, 1948). The cognitive component of an attitude includes an individual's beliefs about the attitudinal object; the emotional component includes feelings about the attitudinal object; the behavioral component refers to an individual's actions toward the attitudinal object.

With respect to littering then, an individual may have specific beliefs about a specific type of littering, and these are probably based on past experiences and knowledge. An example may be a belief that littering on a highway causes traffic accidents. A negative feeling

against littering on a highway would represent the emotional component, and a restraint from littering on a highway would represent the behavioral component.

This conceptual approach implies that the behavioral component of an attitude is consistent with the cognitive and emotional component. The relationship between beliefs, emotions, and behavior is not always clear. In situations in which an individual is free to do as he pleases and is not afraid of sanctions, his behavior may be consistent with the other components of his attitude. In many situations, however, behavior is dictated more by the demands of the situation than by the individual's belief and emotional reactions. An individual refusing to litter may mean either that he is against littering or concerned about the consequences of littering in that specific situation.

The problem is to determine the circumstances under which the three components are consistent. The research results suggest that whether beliefs and emotions are translated into consistent behaviors depends on a number of variables, including the accuracy with which a person's beliefs are measured, his attitudes about other aspects of the situation, his fear of punishment, and the extent to which he feels he is able to act on his attitudes and is personally involved with the issue (Wicker, 1969). For instance, in a college setting in which a norm of racial tolerance prevails, students may not feel free to express bigoted opinions. Thus, in one recent study in which the racial attitudes of

white college students were measured by a questionnaire and then their behavior toward a black coworker was unobtrusively measured, there was a negative relationship. The students who indicated that they were the least prejudiced engaged in the most covert rejection of their black partner (Weitz, 1972).

This theoretical orientation suggests that littering behavior will be inconsistent with littering beliefs and feelings especially in a college setting in which a norm of antilittering prevails. Some support for this hypothesis has been demonstrated by the Gallup and Harris polls reviewed earlier indicating that public concern for the environment was not related to public willingness to make pro-environment sacrifices. Heberlein (1971) has provided more direct support by showing that self-report littering attitudes were not related to observed littering behavior. If this inconsistency between littering attitude and behavior is the rule rather than the exception, then littering attitudes should serve as poor predictions of littering behavior.

Values among Individuals

Milton Rokeach (1968) has proposed an alternative to the three-component concept of attitudes which may account for observed attitude-behavior inconsistency. He makes a clear distinction between attitudes and values. He defines attitude as an organization of interrelated thoughts and feelings directed toward a specific object or situation. A

value, according to Rokeach, is either a desirable state of existence or a desirable way of acting. An individual's values concerned with a specific mode of conduct are called instrumental values and those directed toward end states of existence are terminal values.

Rokeach believes that values are organized into a hierarchy according to importance (i.e., ordered within a system). Choice of two alternative actions in the environment would depend on this order. Values thus act as standards for guiding action, for developing attitudes toward relevant objects, and for influencing the values, attitudes, and actions of others. A person's many attitudes are founded on a few basic values that transcend situation-specific considerations.

If the Rokeach premise is valid, attitudes may be inconsistent with behavior whereas values should be consistent. Studies have demonstrated that Rokeach's values have predicted educational choice (Feather, 1970, 1971), honesty and cheating behavior (Homant & Rokeach, 1970; Shotland & Berger, 1970), and religiousness and bigotry (Rokeach, 1970). A direct comparison of the behavioral validity of an attitude scale with a Rokeach value scale is not available as yet.

If, as Rokeach theorized, values are more closely related to overt behavior than are attitudes, attitudes toward littering should not necessarily be consistent with overt littering behavior, although values relating to littering should. Heberlein (1971) demonstrated that people who were more aware of the consequences of their actions and more

willing to ascribe responsibility to themselves were less likely to litter. In turn, people who give more importance to specific values that relate to littering might be less likely to litter than others who do not. For example, an individual who gives "a world of beauty," a terminal value, or "clean," an instrumental value, a higher ranking of importance than he gives to other values, might not be likely to litter because littering will not achieve a world of beauty and is a dirty habit. An individual who considers these values as unimportant with respect to other values might be more likely to litter. It should be noted, however, that values have been traditionally considered as general concepts and, in many respects, any relationship demonstrated between an attitude and a specific behavior might be the exception rather than the rule.

Demographic Characteristics

The assessment of situational influences on littering would be greatly enhanced by the addition of information describing the litterer. Very little has been reported on the demographic characteristics of the litterer. Although Keep America Beautiful's slogan, "Everyone litters," finds some support in the psychological literature, much more information is needed before this conclusion can be accepted with any confidence. Age, residency, marital status, race, and socioeconomic status are among the variables the effects of which on littering behavior should be investigated in greater depth. Although age is repeatedly associated

with littering behavior in that young adults from 18 to 25 years seem to litter most often, the fact remains that only small percentages of this population appear to be guilty of violating the antilitter norm. Therefore, what discriminable characteristics do these young litterers have? An individual's socioeconomic status may be a reliable predictor of littering behavior. Data from heterogeneous samples suggest that reliable prediction may be obtained with more homogeneous samples even though the socioeconomic range is more restricted. For example, only 5 per cent of a sample of students may actually litter, but most of those who do may also rank among the lower 10 per cent socioeconomic levels. Similarly, students who had the strictest parents, who were born and reared in the country, who came from small families, or who like camping may also be less likely to litter. Finally, demographic variables such as sex and marital status may serve more as moderator variables than direct predictors of behavior, in which case any combination of characteristics may possibly predict littering in numerous samples.

Objectives of the Present Study

The preceding theoretical analysis suggested that knowledge of four variables would contribute to the understanding of littering behavior. These were condition of the area, anonymity, values, and attitudes. Two studies were proposed to investigate the influence of these variables.

The thrust of these studies was to investigate the situational and individual influences on littering behavior. The unit of study was a behavior-environment relationship wherein the influences of environmental variables and individual variables can be represented as interactions as well as isolated effects.

Study 1 Objective:

To investigate the effect of anonymity and condition of the area on littering behavior in a natural setting.

Study 2 Objective:

To investigate the relationship between demographic characteristics, values, and attitudes of individual subjects and their littering behavior.

Hypotheses of the Present Study

The two studies investigated the following hypotheses:

1. Littering is more likely when an individual's anonymity is maintained than when a person's name can be identified with his or her actions.
2. Littering is more likely in a dirty area than in a clean area.
3. An interaction is observed between anonymity and the condition of the area in effects on littering.
4. An individual's attitude toward littering is not related to his or her littering behavior.

5. An individual's values toward littering is related to his or her littering behavior.

CHAPTER III

METHOD

After describing a number of studies that investigated either individual or environmental influences on littering behavior, Chapter I concluded by specifying a need for studies that observed both types of influences together. Chapter II provided the conceptual framework necessary to make this approach meaningful and suggested specific objectives and hypotheses to investigate. This chapter presents the methodology for two studies that were addressed to these objectives and hypotheses. The first was a field experiment in that the experimental conditions were planned and introduced by the experimenter, but the setting was a real-life one for the subjects. It manipulated two independent variables--condition of the area and address of the notices--and observed three levels of one dependent variable--littering, disposing, and unaccounted-for behavior. The second study was a field study in that it focused on the naturally occurring differences between individuals who littered and those who did not (in the specific situation). A relationship was sought between the occurrence of littering behavior and the magnitude of self-reported attitudes or values. In addition, Study 2 also explored the possibility that some individual background characteristics

were related to their behavior.

Study 1

Purpose

The purpose of Study 1 was to demonstrate the effects of address of the notice and the condition of the post office area on littering behavior.

Subjects

The subjects were 5552 students enrolled at Georgia Institute of Technology. This sample was biased with respect to the typical university population in that it consisted predominently of male students from the southern region of the country. Also, most were in technological fields.

Procedure

Study 1 was a field experiment. It was conducted in a post office located in the Student Center Building, a floor plan of which is shown in Figure 1. Each experimental session lasted from 8 a.m. to 8 p.m. and occurred on Mondays and Fridays for four weeks from September 24, 1974, to October 18, 1974. A sample of 694 students per session, selected randomly and without replacement, received a notice encouraging each individual to vote in the upcoming state and national elections. Students were observed as they checked their mailboxes under two experimental conditions: (1) the post office was either clean (no notices

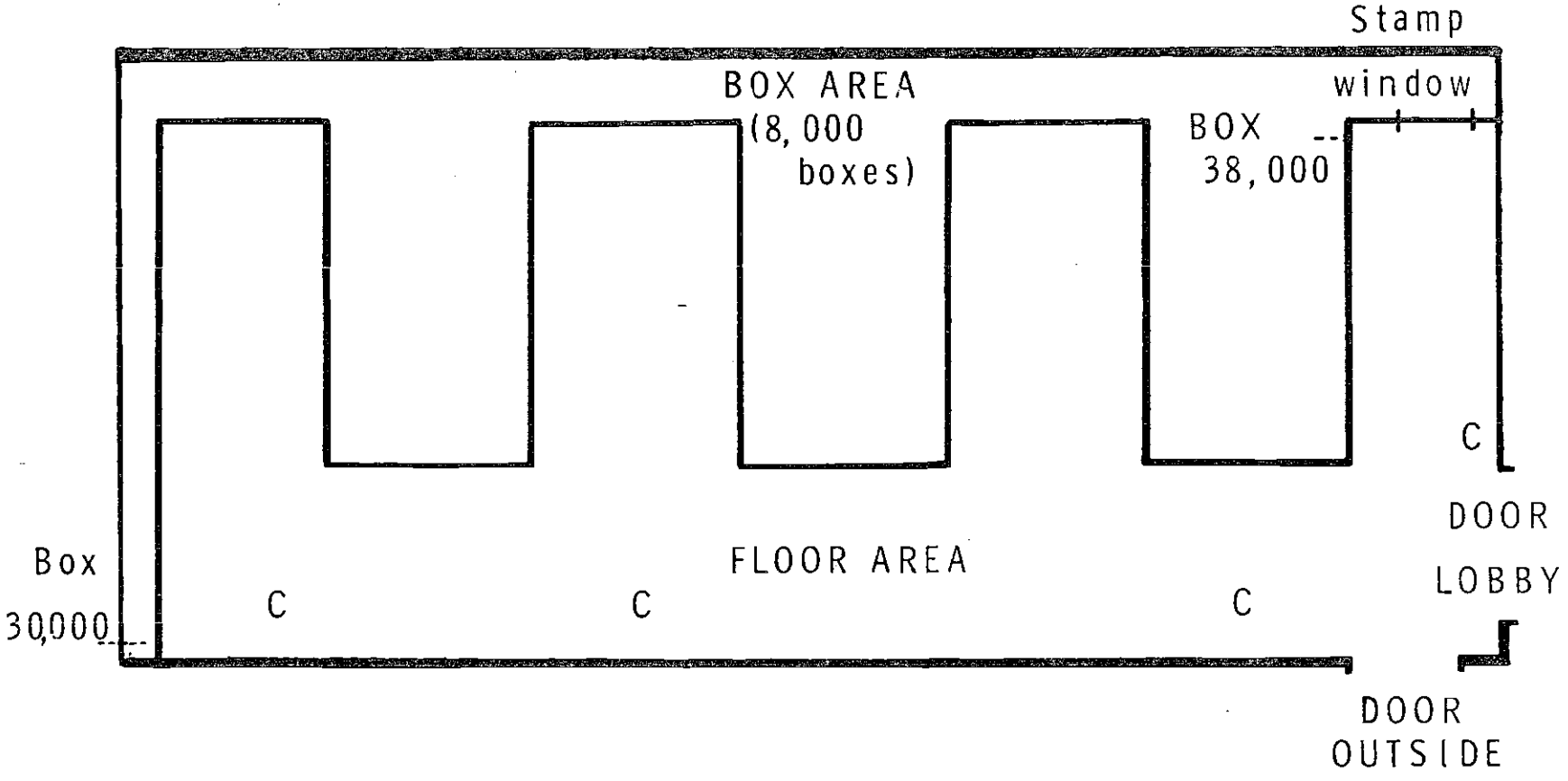

Figure 1. Floor Diagram of Post Office Area.

(Trash receptacles are marked "C").

were on the floor) or dirty (the floor was prelittered with notices), and (2) the notices were either addressed to the individual (nonanonymous) or not addressed to the individual (anonymous) and placed in selected mailboxes. In the latter case, box numbers were written on the backs of the notices in invisible ink. At no time was an individual's name associated with his or her behavior.

The four levels were combined so that each level of one condition appeared with each level of the other condition. This simple 2 x 2 factorial design is shown in Table 1. Each cell represents one of four combinations: Clean area-Anonymous notice (C-A), Clean area-Nonanonymous notice (C-NA), Dirty area-Anonymous notice (D-A), Dirty area-Nonanonymous notice (D-NA). Each combination was replicated four times. Finally, each session consisted of an anonymous and nonanonymous sample with the four clean and four dirty sessions being presented in counterbalanced order.

Dependent Variables. Notices littered on the floor and disposed of in receptacles within the post office area were collected and counted for each of the eight sessions. The number of notices never found, disposed of, or littered was determined by adding the number of littered to the number disposed of and subtracting the total from the number of notices distributed for each session. These were categorized as "unaccounted for."

Table 1

The Design of Study 1

Condition of the Area	Address of the Notices		
	Anonymous	Nonanonymous	
Clean	C-A	C-NA	
	Session 3	Session 3	Monday
	Session 4	Session 4	Friday
	Session 5	Session 5	Monday
	Session 6	Session 6	Friday
Dirty	D-A	D-NA	
	Session 1	Session 1	Monday
	Session 2	Session 2	Friday
	Session 7	Session 7	Monday
	Session 8	Session 8	Friday
	Total of 8 sessions	Total of 8 sessions	Total of 4 weeks

Method of Data Analysis

Two-way analysis of variance procedures were used to compare treatment means in order to decide whether a statistical relation existed between the experimental and dependent variables of Study 1. If subjects participating in later sessions discovered that their behavior was being observed, the number of notices littered in these sessions might be different from those of earlier sessions. Counterbalancing the treatments attempted to control this possible confounding. Since the analysis of variance is based on the assumption of equal variance, an F-max test (Kirk, 1968) provided a measure for the effectiveness of this control procedure by serving as a preliminary test of homogeneity of variance.

Study 2

Purpose

The purpose of Study 2 was to investigate the relationship between an individual's values, attitudes, and demographic characteristics and his littering behavior.

Subjects

The subjects were 3071 students. The sample consisted of all of the litterers and disposers identified in Study 1.

Instruments

The instruments used in Study 2 are presented in Table 2 through

Table 6.

Rokeach's Terminal and Instrumental Values. Relevant discussions concerning the distinction between attitudes and values were presented earlier and need not be repeated here except to say that an attitude represents an organization of interrelated beliefs that are all focused on a specific object or situation whereas a value refers to a desirable end state of existence (terminal value) or a desirable mode of behavior (instrumental value). Terminal and instrumental values are generalized standards of the means and ends of human existence that transcend attitudes toward specific objects and situations. Thus defined, a person is conceived to have many thousands of attitudes but only several dozens of values. Thus values are conceived as more stable determinants of an individual's behavior than attitudes.

Previous research has suggested that these scales do relate to educational choice (Feather, 1970, 1971), honesty and cheating behavior (Homand & Rokeach, 1970; Shotland & Berger, 1970), religiousness and bigotry (Rokeach, 1970). Most of these studies related the rank-ordering of one value alone with a specific behavior. For example, Rokeach reported that the rank-ordering of the terminal value "salvation" predicts church attendance. College students who go to church "once a week or more" ranked salvation first on the average among 12 terminal values, but other groups--those who attend church "once a month," "once a year," or "never"--typically rank salvation last

among 12 terminal values.

Two values, "world of beauty" and "clean," were of particular concern to this study. Of all 18 terminal values and 18 instrumental values, these two are most likely to be related to littering behavior. Those individuals who care most for the protection of the environment might be most likely to give high ranking to either value. The same individual might also be expected to litter infrequently. This assumption is severely limited in that it has only face validity. To date, there are no reported studies relating either value to behavior oriented toward environmental protection. Until such results are reported, there is little justification for assuming that a relationship exists. Indeed, the general nature of each value item justifies the opposite assumption, that no relationship exists between a value ranking and specific behavior. Such a situation deserves more study.

Heberlein's Attitude Scales. Heberlein (1971) has assessed individuals' attitudes toward littering using two different scales. Scale 1 asked subjects to indicate fines for littering five different materials in three different locations. The materials were an apple core, an aluminum can, a paper cup, a cigarette butt, and a gum wrapper. The locations were from a car window, the woods, and a downtown sidewalk. These 15 items may have a validity problem as indexes of attitudes since it is possible that some people who think littering is very bad may not feel that formal sanctions (i.e., fines) are the appro-

priate means of social control and hence, respond by suggesting low fines.

Because this means of measuring antilittering attitudes may be contaminated by the format of making subjects suggest fines, Heberlein measured attitudes toward littering in another way. Subjects were asked to rate the seriousness of littering compared to four other minor deviant acts. This scale is limited, however, in that only five items are used. Nevertheless, it has correlated .28 ($p < .05$) with the suggested fine scale (Heberlein, 1971). Thus, one scale deals with suggested fines, and the other with the seriousness of the act compared to other behaviors, and both have room for improvement.

Heberlein demonstrated that attitudes, as measured by these scales, showed no relationship to littering behavior (1971). These results are appended (see page 98). Such results suggest that either the scales were invalid or that attitude and behavior are inconsistent with respect to littering.

Modified Attitude Scale. In an attempt to improve upon Heberlein's attitude scales, the author of the present study devised another scale incorporating aspects from both of the Heberlein scales. Like the ranking scale, the modified scale considered the seriousness of littering with respect to other deviant behaviors, but the new version compared three specific littering situations to ten minor deviant acts. Unlike Heberlein's fine scale, the modified version utilized a ranking

Table 2

Rokeach's Terminal Value Scale

Below is a list of 18 values arranged in alphabetical order. Your task is to arrange them in order of their importance to you, as guiding principles in your life. Study the list carefully. Then place a 1 next to the value that is most important for you; place a 2 in the next important, etc. The least important value should be ranked 18. Work slowly and think carefully. Feel free to change your answers. The end result should truly represent how you feel.

____ A COMFORTABLE LIFE
(a prosperous life)
____ AN EXCITING LIFE
(a stimulating active life)
____ A SENSE OF ACCOMPLISHMENT
(lasting contribution)
____ A WORLD AT PEACE
(free of war and conflict)
____ A WORLD OF BEAUTY
(beauty of nature and the arts)
____ EQUALITY
(brotherhood, equal opportunity for all)
____ FAMILY SECURITY
(taking care of loved ones)
____ FREEDOM
(independence, free choice)
____ HAPPINESS
(contentedness)
____ INNER HARMONY
(freedom from inner conflict)
____ MATURE LOVE
(sexual and spiritual intimacy)
____ NATIONAL SECURITY
(protection from attack)
____ PLEASURE
(an enjoyable, leisurely life)
____ SALVATION
(saved, eternal life)
____ SELF-RESPECT
(self-esteem)
____ SOCIAL RECOGNITION
(respect, admiration)

Table 2 (continued)

____ TRUE FRIENDSHIP
(close companionship)
____ WISDOM
(a mature understanding of life)

Table 3

Rokeach's Instrumental Value Scale

Below is a list of another 18 values. Rank these in order of importance in the same way you ranked the first list.

____ AMBITIOUS
(hard-working, aspiring)
____ BROADMINDED
(open-minded)
____ CAPABLE
(competent, effective)
____ CHEERFUL
(lighthearted, joyful)
____ CLEAN
(neat and tidy)
____ COURAGEOUS
(standing up for beliefs)
____ FORGIVING
(willing to pardon others)
____ HELPFUL
(working for welfare of others)
____ HONEST
(sincere, truthful)
____ IMAGINATIVE
(daring, creative)
____ INDEPENDENT
(self-reliant, self-sufficient)
____ INTELLECTUAL
(intelligent, reflective)
____ LOGICAL
(consistent, rational)
____ LOVING
(affectionate, tender)
____ OBEDIENT
(dutiful, respectful)
____ POLITE
(courteous, well-mannered)
____ RESPONSIBLE
(dependable, reliable)
____ SELF-CONTROLLED
(restrained, self-disciplined)

Table 4

Heberlein's Attitude Scales 1 and 2

Scale 1

The list below is of things that are usually considered bad by most people. Put a 1 in front of the item that you think is the worst. Put a 2 by the item that you think is the next worst, etc. The item that you think is the least worst should be ranked 5.

_____ parking your car illegally
_____ neglecting to fully put out a campfire
_____ swimming less than one-half hour after eating
_____ jaywalking
_____ littering

Scale 2

Please suggest fines for the following offenses.

Littering an apple core from a car window. _____
in the woods. _____
on the sidewalk. _____

Littering a cigarette butt from a car window. _____
in the woods. _____
on the sidewalk. _____

Littering an aluminum can from a car window. _____
in the woods. _____
on the sidewalk. _____

Littering a gum wrapper from a car window. _____
in the woods. _____
on the sidewalk. _____

Littering a paper cup from a car window. _____
in the woods. _____
on the sidewalk. _____

Table 5

Modified Attitude Scale

The following is a list of minor offenses many of which we have committed. Rank them in order of their seriousness as you view it. Give the offense that you think is the least serious a rank of 1. Give the offense that you think the next least serious a rank of 2, etc. The most serious offense should have a rank of 13. Please rank all the offenses, and then circle the ranks of those offenses you have committed within the past few months.

_____ Parking in a no parking zone
_____ Jaywalking
_____ Littering on a city street
_____ Defacing public property
_____ Hitting a telephone pole in an auto accident
_____ Placing a false fire alarm
_____ Littering in a public building with trash cans near
_____ Breaking a window in a public building
_____ Vandalism involving damages below $100
_____ Vandalism involving damages above $100
_____ Parking your car in a tow-away zone
_____ Neglecting to fully put out a campfire
_____ Littering in a public building without trash cans near

Table 6

Biographical Information Form

CHECK THE CORRECT RESPONSE

1. ___Male ___ Female 2. ___ Married ___ Not Married
3. My religious preference is: ___ Protestant ___ Catholic
___ Jewish ___ Other
4. I attend church or temple: ___ Once or more a week
___ Once a month ___ Once every 6 months ___ Once a year
___ Less than once a year
5. I grew up or spent most of my early childhood in:
___ a very small town ___ a small town ___ a moderately-sized town or city ___ a large city ___ a very large city
6. My father was:
___ very strict ___ strict ___ lenient ___ very lenient
7. My mother was:
___ very strict ___ strict ___ lenient ___ very lenient
8. The room where I sleep is usually kept:
___ very clean ___ clean ___ dirty ___ very dirty
9. My personal neatness habits are generally:
___ very clean ___ clean ___ dirty ___ very dirty
10. My father's highest level of education was: (CIRCLE #)
1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 or more
grade school high school college
11. My mother's highest level of education was: (CIRCLE #)
1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 or more
grade school high school college

FILL IN THE BLANKS

12. Age: ___ years ___ months
13. Number of brothers _____
14. Number of sisters _____
15. Father's occupation _____ (be very specific)
16. Mother's occupation _____ (be very specific)
17. Major subject at Tech _____ Year _____ GPA____
18. Where did you go on your last vacation and what did you do?

_____

system, thus allowing for data analysis similar to Rokeach's value scales.

Biographical Information Form. Some self-report items were amended requiring the subject to report and judge on his personal littering behavior, neatness habits, demographic characteristics, family background, and early childhood experiences.

Procedure

Each notice distributed in Study 1 had either a box number printed on the front (nonanonymous notice) or a box number written on the back in invisible ink (anonymous notice). The box numbers identified 1547 students as litterers and 1524 students as disposers. Subjects who had either littered or disposed of their notices in Study 1 were sent questionnaire packets. Each packet contained two 18-item value scales (terminal and instrumental) and an 18-item biographical inventory. In addition, 75 per cent of the packets contained a 13-item attitude scale devised by the author of this study. The remaining 25 per cent of the packets contained two attitude scales by Heberlein (1971), one of 5 items and the other of 15, each scale instructing the subjects to rank each value or attitude item in order of their importance or seriousness. The biographical inventory was a checklist. The completed packet thus consisted of either three or four rank-orderings and a checklist of biographical information.

Raffling returned questionnaire numbers for two tickets to a

local professional sporting event encouraged response to the questionnaires. The experimenter received 25 per cent of the completed questionnaires within four weeks of their distribution. Of the packets containing the modified attitude scale, 278 were returned by litterers and 312 by disposers. Of those containing the Heberlein items, 68 were returned by litterers and 90 by disposers.

Method of Data Analysis

The most common type of analysis of data from rank-orderings involves the question of group differences. In this study the concern was to determine what the differences (and similarities) between litterers and disposers were in terms of attitude and value rankings. One way of approaching this problem is to perform tests of significance of the difference between the groups' rankings for each item individually. The question can be rephrased in these terms: Do litterers rank "clean" significantly higher (or lower) than disposers do? . . . and so on, for each of the value and attitude items.

The experimenter calculated group means and group medians of rankings for both litterers and disposers for each of the attitude and value items. In this respect littering behavior was the independent variable, and each of the value and attitude items were dependent variables. The significance of the difference in median or mean rankings between these two groups was determined using the Median Test for K Independent Groups (Guilford and Fruchter, 1973) and a t-test (Kirk, 1968).

Method of Reliability Analysis for Attitude and Value Scales

The experiment used two different samples for calculating test-retest reliabilities. Sample 1 consisted of 40 students from two social psychology classes at Georgia Institute of Technology with one month between administrations. Sample 2 consisted of 60 students from three introductory psychology classes with three weeks between administrations.

The question arose whether or not these two smaller samples were representative of the larger sample used in Study 2. Kendall's tau correlation coefficients demonstrated the relationship between both Sample 1 and Sample 2 with the original sample used in Study 2. The mean or median rank-orderings of the smaller samples were correlated with those of the overall mean and median rank-orderings of the original sample for each of the five scales. The ten correlation coefficients ranged from .81 to .88, thereby suggesting that these samples were representative of the major sample.

Test-retest correlation procedures were used to determine reliability coefficients for each scale used in Study 2. Spearman's rho and Kendall's tau correlation coefficients related rank-orderings of the test questionnaires with rank-orderings of the retest questionnaires for each subject. Median coefficients were then chosen as representative reliability coefficients for each scale for each sample.

CHAPTER IV

RESULTS

Study 1

The experimenter distributed a total of 5552 notices during Study 1, 347 notices for each of the eight sessions under both anonymous and nonanonymous address conditions. The number of notices littered or disposed of were recorded at the end of each session. From these tallies the number of notices unaccounted for was determined.

Table 7 shows the number of notices littered during each session of all the conditions. Subjects littered notices at an average rate of 28 per cent. With over 1500 notices littered, the sample size proved adequate for testing the statistical hypotheses.

Both the address of the notices and the condition of the post office affected the number of notices littered. Confronted with an area strewn with notices, approximately 43 per cent of the students littered. In a clean post office, however, the litter rate dropped to 12 per cent. Similarly, 23 per cent of the students littered when the notices were specifically addressed to them (nonanonymous), but 32 per cent littered anonymously. Littering was greatest (49 per cent) in the Dirty-Anonymous condition and least in the Clean-Nonanonymous condition (9 per cent),

with the Dirty-Nonanonymous and Clean-Anonymous conditions (38 per cent and 15 per cent, respectively) falling in between.

An F-max test on these data showed that the variance was homogeneous (F-max 3,4; .05 = 22.35). A two-way analysis of variance procedure demonstrated the significance of the effects. Table 8 presents the results of the analysis of variance. Both main effects were significant ($p < .05$).

Table 9 shows the number of notices disposed of during each session of all the conditions. Subjects disposed of their notices at an average rate of 28 per cent. Frequencies of notices properly disposed of in receptacles reflected the trends of the littered notices. In a clean environment, 37 per cent of the students properly disposed of their notices, but only 18 per cent used the trash cans in a dirty post office. Also, the order of magnitude for the four conditions was reversed: 39 per cent disposal rate for Clean-Nonanonymous, 35 per cent for Clean-Anonymous, 22 per cent for Dirty-Nonanonymous, and 14 per cent for Dirty-Anonymous. An F-max test on these data showed that the variance was homogeneous (F-max 3,4; .05 = 5.70). A two-way analysis of variance procedure demonstrated the significance of the effects. Results of the analysis of variance reported in Table 10, however, demonstrated that only the effect of the condition of the area was significant at the .05 level.

Table 11 lists the number of notices unaccounted for in all the

Table 7

Number of Notices Littered

Condition of the Area	Address of the Notice		
	Anonymous	Nonanonymous	Totals
Clean			
Session 1	55	32	87
Session 2	54	27	81
Session 3	56	25	81
Session 4	48	36	84
Subtotals	213	120	333
Dirty			
Session 1	160	140	300
Session 2	160	108	268
Session 3	185	133	318
Session 4	181	147	328
Subtotals	686	528	1214
Totals	899	648	1547

Table 8

Sources of Variance for Littered Notices

Sources of Variance	df	Ss	MS	F
Address of the Notice	1	3937.56	3937.56	31.17*
Condition of the Area	1	48510.06	48510.06	384.05*
Interaction:				
Address x Condition	1	264.07	264.07	2.09
Within Group	12	1515.75	126.31	
Total	15	54227.44		

*$p < .05$

Table 9

Number of Notices Disposed of

Condition of the Area	Address of the Notice		
	Anonymous	Nonanonymous	Totals
Clean			
Session 1	161	130	291
Session 2	102	147	249
Session 3	126	152	278
Session 4	99	109	208
Subtotals	488	538	1026
Dirty			
Session 1	63	83	146
Session 2	60	87	147
Session 3	39	63	102
Session 4	37	66	103
Subtotals	199	299	498
Totals	687	837	1524

Table 10

Sources of Variance for Disposed of Notices

Sources of Variance	df	Ss	MS	F
Address of the Notice	1	1406.24	1406.24	3.67
Condition of the Area	1	17424.00	17424.00	45.54*
Interaction:				
Address x Condition	1	156.26	156.26	.40
Within Group	12	4590.5	4590.5	
Total	15	23577.00		

*$p < .05$

Table 11

Number of Notices Unaccounted for

Condition of the Area	Address of the Notice		
	Anonymous	Nonanonymous	Totals
Clean			
Session 1	131	185	316
Session 2	191	173	364
Session 3	165	170	335
Session 4	200	202	402
Subtotals	687	730	1417
Dirty			
Session 1	124	124	248
Session 2	127	152	279
Session 3	123	151	274
Session 4	129	134	260
Subtotals	503	561	1064
Totals	1190	1291	2481

Table 12

Sources of Variance for Notices Unaccounted for

Sources of Variance	df	Ss	MS	F
Address of the Notice	1	638	638	1.87
Condition of the Area	1	7789	7789	22.87*
Interaction:				
Address x Condition	1	13	13	.38
Within Group	12	4087	340.583	
Total	15	12527		

*$p < .05$

conditions, and Table 12 reveals the analysis of variance for these data. In that the same trends are manifested, the effects of not littering or not disposing of the notices seem to be evenly distributed over the four main conditions for both of the other behaviors. Although the effect of the unaccounted-for notices cannot be adequately assessed, the results imply that if an effect was indeed present, it influenced littering and disposing behavior to about the same degree.

Finally, graphical analysis showed no evidence of trends in the data across sessions.

Study 2

Tables 13 and 14 show the mean and median ranks for litterers and disposers. For each value and attitude item, they show that there was very little, if any, difference between the measured values or attitudes of litterers and those of disposers. Student *t*-tests (Kirk, 1968) and median tests (Guilford & Fruchter, 1973) demonstrated that none of the differences in the rankings were significant ($p < .05$).

As can be seen in Table 15, there was also very little, if any, difference between the measured demographic characteristics of litterers and disposers. Both groups showed the same trends and percentages for each item.

Reliability of Attitude and Value Scales

Table 16 reports the reliability coefficients computed for each

Table 13

Mean Ranks and Median Ranks of the Value Items for Litterers and Disposers

Item	Mean Rank		Median Rank	
	Litterers	Disposers	Litterers	Disposers
Terminal Values				
1. Comfortable Life	10.076	10.522	10.763	11.200
2. Exciting Life	9.629	10.231	10.033	10.674
3. Sense of Accomplishment	7.885	7.891	7.357	7.500
4. World of Peace	11.194	10.804	12.100	11.500
5. World of Beauty	12.004	11.875	12.389	12.364
6. Equality	11.365	10.635	11.750	10.879
7. Family Security	8.795	8.317	8.820	8.237
8. Freedom	6.824	7.054	6.370	6.431
9. Happiness	6.209	6.907	5.700	6.346
10. Inner Harmony	7.176	7.199	6.466	6.417
11. Mature Love	6.820	7.519	6.441	7.020
12. National Security	14.617	14.054	15.857	15.187
13. Pleasure	11.658	11.535	12.106	12.260
14. Salvation	11.119	10.760	13.600	13.870
15. Self-Respect	7.529	7.385	6.500	7.250
16. Social Recognition	13.802	13.516	14.850	14.650
17. True Friendship	6.637	7.115	6.000	6.534
18. Wisdom	7.612	7.304	7.227	6.346

Scale Range: 1 - most important
18 - least important

Table 13 (continued)

Item	Mean Rank		Median Rank	
	Litter-ers	Dispos-ers	Litter-ers	Dispos-ers
Instrumental Values				
1. Ambitious	9.424	9.513	9.690	9.100
2. Broadminded	7.759	8.096	7.200	7.550
3. Capable	9.392	9.385	9.500	9.667
4. Cheerful	9.514	10.455	10.071	11.019
5. Clean	13.331	13.353	14.620	14.500
6. Courageous	9.795	9.821	10.045	9.912
7. Forgiving	8.964	8.471	8.735	8.071
8. Helpful	9.971	9.740	10.455	9.971
9. Honest	5.194	4.904	3.786	3.500
10. Imaginative	10.712	10.744	11.143	11.630
11. Independent	8.147	9.080	7.605	8.667
12. Intellectual	10.712	9.878	10.767	10.000
13. Logical	10.183	9.550	10.761	9.781
14. Loving	6.899	7.304	5.431	6.038
15. Obedient	14.342	14.080	15.845	15.767
16. Polite	11.633	11.359	12.650	11.420
17. Responsible	6.507	6.526	5.767	6.048
18. Self-controlled	8.912	8.385	7.955	8.042

Scale Range: 1 - most important
18 - least important

Table 14

Mean Ranks and Median Ranks of the Attitude Items for Litterers and Disposers

Item	Mean Rank		Median Rank	
	Litterers	Disposers	Litterers	Disposers
Attitudes (modified)				
Parking in a no-parking zone	3.89	3.544	2.789	2.757
Jaywalking	2.390	2.278	2.0	2.0
Littering on a city street	5.632	5.738	5.560	5.464
Defacing public property	8.390	8.575	8.500	8.650
Hitting a telephone pole in an auto accident	5.581	5.121	4.929	4.476
Placing a false fire alarm	10.059	10.062	10.716	10.579
Littering in a public building with trash cans near	6.353	6.544	6.240	6.366
Breaking a window in a public building	8.452	8.454	8.746	8.595
Vandalism involving damages below $100	9.871	9.931	10.438	10.372
Vandalism involving damages above $100	11.154	11.288	11.923	12.038
Parking your car in a tow-away zone	4.897	4.572	4.231	3.850
Neglecting to fully put out a campfire	9.838	9.856	10.758	10.607
Littering in a public building	4.61	4.43	4.42	4.12

Scale Range: 1 - most important
13 - least important

Table 14 (continued)

Item	Mean Rank		Median Rank	
	Litter-ers	Dispos-ers	Litter-ers	Dispos-ers
Attitudes (Heberlein Scale 1)				
Littering	1.971	2.078	1.939	2.000
Parking your car illegally	3.279	3.356	3.235	3.245
Neglecting to fully put out a campfire	1.324	1.322	1.160	1.385
Swimming less than one-half hour after eating	4.191	4.078	4.000	4.250
Jaywalking	4.015	4.167	4.140	3.900

Scale Range: 1 - most serious
5 - least serious

Item	Mean Fines		Median Fines	
	Litter-ers	Dispos-ers	Litter-ers	Dispos-ers
Attitudes (Heberlein Scale 2)				
Littering an apple core				
from a car window	17.441	25.222	7.500	9.167
in the woods	9.706	16.067	10.090	10.321
on the sidewalk	16.544	28.511	7.500	11.167
Littering a cigarette butt				
from a car window	22.897	31.800	10.278	23.676
in the woods	48.088	48.789	33.214	45.000
on the sidewalk	18.191	29.878	7.500	15.000
Littering an aluminum can				
from a car window	39.309	43.889	25.257	26.667
in the woods	46.956	50.111	47.500	47.174
on the sidewalk	34.044	44.056	24.700	26.071

Table 14 (continued)

Item	Mean Fines		Median Fines	
	Litter-ers	Dispos-ers	Litter-ers	Dispos-ers
Littering a gum wrapper				
from a car window	22.176	27.144	10.357	11.750
in the woods	26.000	29.178	10.833	12.500
on the sidewalk	20.676	27.222	9.722	11.300
Littering a paper cup				
from a car window	28.279	34.367	15.000	20.625
in the woods	33.456	35.044	19.833	23.269
on the sidewalk	24.926	35.511	12.000	22.500
Mean of means and Mean of medians	27.2462	33.7859	15.9529	20.3911

Table 15

Demographic Profiles of Litterers and Disposers

Item	Percentages	
	Litterers	Disposers
1. Littering on a city street		
admitted	37.4	37.2
not admitted	62.6	62.5
2. Littering in a public building w/trash cans near		
admitted	16.5	9.6
not admitted	83.5	90.4
3. Littering in a public building w/o trash cans near		
admitted	34.2	25.3
not admitted	65.8	74.7
4. Sex		
male	91.0	88.7
female	9.0	11.3
5. Marital Status		
married	10.6	11.6
not married	89.4	88.4
6. Religion		
Protestant	55.6	57.8
Catholic	18.4	15.6
Jewish	5.3	4.0
Other	20.7	22.6
7. Attend church or temple		
once or more a week	33.8	36.9
once a month	25.3	17.3
once every 6 months	19.7	15.3
once a year	7.1	12.0
less than once a year	14.1	18.6
8. Early childhood spent in		
a very small town	6.9	8.4
a small town	19.6	18.5
a moderately sized town	42.5	43.2
a large city	21.8	19.8
a very large city	9.1	10.1

Table 15 (continued)

Item	Percentages	
	Litterers	Disposers
9. My father was		
very strict	7.6	6.2
strict	54.5	55.1
lenient	34.9	36.7
very lenient	2.9	2.0
10. My mother was		
very strict	3.3	5.2
strict	47.6	45.3
lenient	46.2	46.3
very lenient	2.9	3.2
11. The room where I sleep is		
very clean	13.4	14.8
clean	73.2	70.3
dirty	12.3	13.9
very dirty	1.1	1.0
12. My personal neatness habits are		
very clean	14.8	16.2
clean	78.3	79.0
dirty	6.1	4.5
very dirty	0.7	0.3

	Means	
	Litterers	Disposers
13. Father's education	3 years college	3 years college
14. Mother's education	2 years college	2 years college
15. Number of brothers	1.1	1.1
16. Number of sisters	1.1	1.1
17. Year at Georgia Tech	2.6	2.8
18. Reported GPA	2.7	2.8

Table 16

Median Test-Retest Reliability Coefficients
for Value and Attitude Scales

Scale	Sample 1		Sample 2		Related Samples*	
	4 weeks		3 weeks		3 weeks	4.5 weeks
	Spearman rho	Kendall's tau	Spearman rho	Kendall's tau	Pearson r	Pearson r
Terminal Values	.70	.63	.72	.70	.78	.80
Instrumental Values	.66	.65	.66	.67	.72	.70
Attitudes (modified)	.85	.80	.88	.82		
Attitudes (Heberlein Scale 1)	.98	1.00	.98	1.00		
Attitudes (Heberlein Scale 2)	.62	.49	.65	.50		

*Rokeach (1968)

scale. It shows median correlation coefficients chosen as representative reliability coefficients for both samples used in Study 2 and some from other studies with students. All of the scales show high reliability except Heberlein's Scale 2. Heberlein's Scale 1 was the most reliable at around 1.00. This high reliability was probably due to the brevity of the questionnaire. The subjects easily could have remembered their first answers. Ranging from .49 to .88, the other scales showed more typical reliability coefficients.

CHAPTER V

IMPLICATIONS OF RESULTS

Chapter I reviewed the available research on littering. After relating this material to social psychological theory, Chapter II elaborated the role of four specific influences on littering behavior and specified objectives and hypotheses for two studies that would examine the effects of some specific individual/environmental variables. The methodology of these studies was described in Chapter III, and the results were presented in Chapter IV. The next section discusses the implications of these results with respect to the theory described in Chapter II, the methodology presented in Chapter III, and the problem of littering revealed in Chapter I.

Theoretical Implications of the Results

The results of these studies generally support the theoretical views presented earlier. Both Festinger's theory of social comparison and Zimbardo's theory of antinormative behavior correctly predicted littering behavior under the experimental conditions. As expected, individual attitudes toward littering were observed to be inconsistent with behavior, but values showed none of the stability hypothesized by Rokeach.

As hypothesized, littering was more likely in a dirty area than in a clean area. Festinger's theory of social comparison proposed that when placed in ambiguous situations, individuals turn to environmental cues to evaluate what is "correct" behavior. It is possible that consensual validation influenced students to litter in a dirty post office and not to litter in a clean one. Besides being well supported by the large numbers of notices littered in both Dirty-Anonymous and Dirty-Nonanonymous conditions, this explanation received much face validity from the casual remarks made by the subjects during the experiment. When approached by the experimenter and asked why they littered, many litterers often commented on the acceptability of littering in the post office. Comments like, "Everyone litters in the post office," or, "The place is messy already; a little more won't be noticed," were typical. If the situation was somewhat ambiguous as suggested by the low levels of litter during the clean conditions, the presence of litter on the floor in the post office quite possibly convinced the norm-conscious students that littering was socially acceptable.

As defined in the beginning of this paper, litter is trash discarded or scattered about in disorder over a socially inappropriate area. It appears that the likelihood of an area being littered is determined somewhat by the social acceptability of littering in that area. The results suggest that this norm is indicated, among other things, by the present condition of the area.

This assumption receives further support from the questionnaire data. Both litterers and disposers suggested higher fines for littering in the woods than from a car window or on the sidewalk. Acceptability seems to be related to location. Further support for this concept can be construed from the biographical item about the subjects' bedroom. Over 80 per cent of both litterers and disposers consider the room where they sleep to be clean. More study is necessary, however, to verify these assumptions.

Another hypothesis was supported. Littering was more likely when an individual's anonymity was maintained than when an individual's name was identified with his actions. Zimbardo's theory predicted this behavior and suggested that it is a result of the weakening social controls that are based on guilt and shame. According to Zimbardo, if others cannot identify you or single you out, they cannot evaluate, criticize, judge, or punish you.

Many aspects of the data, besides the limited occurrence of litter during nonanonymous conditions, supported this point of view. A sample of students who ranked "self-respect," "true friendship," and "honesty" as highly as did this group are likely to be concerned about social evaluation and punishment. Although the fines suggested by disposers were not significantly different than those suggested by litterers, a sign test (Guilford & Fruchter, 1973) revealed that disposers did suggest significantly higher fines than litterers did on each item of Heber-

lein's scale ($p < .05$). This might imply that disposers were more concerned about the consequences of their actions than litterers and therefore littered less often. Indeed, Heberlein (1971) found that, in general, nonlitterers were people who were more aware of the consequences of their behavior and more willing to accept responsibility for their actions. Although 27 per cent of the students were observed littering, only 16.5 per cent of the questionnaire sample admitted to littering in a public building with trash cans near. Also, more people admitted to littering without receptacles nearby than when cans were present. Are litterers, then, less likely to admit their normative deviations? Assuming that they see the receptacles, does littering with cans nearby elicit greater concern for social evaluation than littering with no alternatives present?

Other aspects of the data, not systematically recorded, suggest that anonymous litterers were less concerned about littering than were nonanonymous litterers. Take, for example, the questionnaire return rate. About 7 per cent more disposers returned questionnaires than litterers. Of the 346 litterers who returned their questionnaires, 41 per cent had littered nonanonymously and 59 per cent had littered anonymously. Although this difference was not significant ($p < .05$), it appears that not only might litterers be more concerned about social evaluation than disposers, but nonanonymous litterers might be more concerned than anonymous litterers because they were more reluctant to send in their questionnaires.

These assumptions are supported further by student comments recorded by the experimenter during the sessions. When asked how they felt about littering, more nonanonymous students expressed concern about being discovered and sanctioned than anonymous students. One student who carried his notice out of the post office area said he did so simply because it had his name on it.

Finally, the failure to demonstrate that the address of the notice affected disposing behavior is of great importance to Zimbardo's deindividuation theory. If the occurrence of deviations from normative behavior are augmented by anonymity because of a weakening of the social controls based on guilt and shame, and if it is assumed that this fear of social evaluation is what increased anonymous littering behavior over nonanonymous littering behavior, then how would Zimbardo's theory account for the absence of an anonymity effect with disposing behavior? The apparent discrepancy can be dealt with very logically. Littering trash on the floor is an action very susceptible to social evaluation since it would be somewhat embarrassing for a litterer to be caught littering by an antilittering peer. On the other hand, throwing a piece of trash in a trash can is accompanied by no social consequences whatsoever. No one is going to approach a disposer and commend or admonish his behavior. It appears that there is no fear, guilt, or shame involved in disposing of notices and, therefore, the same number of people disposed of anonymous notices as nonanonymous notices. Such

information is far from conclusive evidence for Zimbardo's ideas, but the relationships revealed so far are interesting, to say the least.

A third hypothesis also received considerable support from these results. An individual's attitude toward littering was not related to his littering behavior. The theoretical discussion in Chapter II suggested that littering behavior would be inconsistent with littering beliefs and feelings in a college setting in which a norm of antilittering prevails.

According to Wicker (1969) such inconsistency could have resulted from a number of variables. First, the accuracy with which a person's beliefs are measured can be questioned. Even though the attitude scales used were observed to be very reliable and considerably discriminative of specific attitudes toward littering, they might be completely invalid. Indeed, they received no behavioral validation from these studies or those by Heberlein (1971). They did, however, compare littering attitudes with attitudes toward other minor offenses and assess littering numerous materials in a variety of specific situations, and this breadth and specificity should be considered before questioning their validity.

A second set of variables that may influence the occurrence of littering attitude-littering behavior inconsistency may be the situational variables involved. Attitudes about other aspects of the situation, fears of punishment, and the extent to which a student feels he is able to act on his attitudes and is personally involved with the issue, all may influ-

ence consistency. Attitudes toward littering were given moderate importance with respect to other minor deviant behaviors by the entire sample. Littering ranked second in importance superseded by only "failing to put out a campfire" on Heberlein's scale--a result that replicated an earlier finding (Heberlein, 1971). Also, littering items were given moderate importance on the modified scale. These responses suggest the existence of general antilittering norms on campus, a prevailing attitude which certainly could account for the failure of a general questionnaire to discriminate among litterers and disposers. When placed in the specific situation of the post office, surrounded by littering peers, the more general antilittering norm is likely to change into a specific pro-littering norm.

Values, on the other hand, did not predict littering behavior as hypothesized. It was believed that an individual's values toward littering would be related to his littering behavior. The results, however, showed essentially no difference between the value hierarchy of litterers as compared with disposers. Both litterers and disposers ranked a "world of beauty" about 12 and "clean" about 13 (18 = least important). Values, then, were not shown to be stable determinants of behavior in this situation with these techniques and procedures.

A possible explanation of these results may be found in the standard deviations of the value items. They ranged from about 3.8 to 7.9 for both scales, much larger than any of the items on the other scales.

Also the range of the average value rankings was limited from 5 to 14. These statistics suggest the possibility that the value scales did not discriminate adequately between the values as they have in previous studies.

A second explanation for the failure of the data to support the hypothesis is that the hypothesis was wrong. If the key values--"world of beauty" and "clean"--were as unimportant to this sample of students as indicated by their high ranking, it is surprising that some subjects did not litter at all. Maybe what should be explained is why, in a sample which does not value a world of beauty or being clean, do some students still not litter.

A third explanation was suggested earlier in Chapter II and Chapter III. Value-behavior consistency may be the exception rather than the rule. Values, as described in Chapter II, traditionally have been considered as general concepts in that clusters of attitudes compose a value. The proposed relationship between a world of beauty with a specific behavior like littering in a post office may appear to be somewhat extended. Nevertheless, previous research demonstrated the behavioral validity of some values. This study, however, failed to demonstrate the behavioral validity of "world of beauty" and "clean." It is apparent that more studies comparing the behavioral validity of attitude and value scales are necessary.

Methodological Implications of the Results

Granting the fact that judgments such as these are made more easily after a study than before, it can be suggested that some aspects of the procedure might have been unnecessary. For example, eight observations were unnecessary for a variable with as strong an effect as condition of the area. Four would have been adequate. Eight sessions were necessary, however, to demonstrate the weaker effects of address of the notice. Also, two value scales and two attitude scales might not have been necessary. Possibly the same information could have been obtained from one each.

On the other hand, the sample size was not too large. Five-thousand subjects revealed 1500 litterers, 300 of whom returned questionnaires. The 20 per cent return rate, however, does suggest the possibility of response bias. It is conceivable that people who care little about littering also might not consider filling out and returning a questionnaire very important. They might even have littered the questionnaire forms in the post office. Since about 7 per cent more disposers than litterers returned their questionnaires, the possibility remains that litterers are more sensitive to social evaluation than are disposers.

Finally, the homogeneity of the sample severely limits the generalizations that can be made from the results. The circumstances limited the study not only to the college campus but to the Georgia Institute of Technology campus. In so doing, the study not only investigated

southern college student behavior but specifically engineering college student behavior. Because the students in the sample were predominantly southern male engineering and applied science vocational students, the results cannot be generalized easily to the typical American college student. Suth a situation serves to emphasize the need of replication with a more heterogeneous sample.

Practical Implications of the Results

These results suggest techniques on how to predict and control the problem of littering. First, manipulating the condition of the area or anonymity of the individual can result in lower litter levels. Indeed, clean areas should remain clean longer and nonanonymous individuals should litter less often than anonymous. Such information could be applied to janatorial schedules and mass-mailing policies. It is common policy for custodian staffs to clean at the end of the day, whereas cleaning in the beginning might prove more effective. Also, the additional costs of labeling mass mailings might be less than the costs in manpower to pick up littered letters. Besides this factor, the message communicated might be more effective in a personally addressed letter than in one addressed "occupant."

The litterers in this study showed no differences in the demographic characteristics measured. Although the sample was very homogeneous, and any differences would have been surprising to say the least, it is of considerable importance to recognize the fact that among

college students, littering occurred regardless of age, early residency, childhood, family size, parental traits, marital status, religion, religiousness, and socioeconomic status. Those interested in preventing areas from being littered should realize the possibility that when college students are involved, situational manipulations might be more effective than identifying the litterers. Another alternative would be to consider different demographic variables.

Finally, the lack of consistency in individual attitudes and values with regard to littering behavior explains the ineffectiveness of present attitude-change approaches to preventing littering. Keep America Beautiful and similar organizations insist on spending millions of dollars on "Madison Avenue"-type approaches to environmental protection. In light of these results and those from studies by Burgess, Clark, Finnie, and Heberlein reported in Chapter I, it should be obvious that littering and other forms of pollution are behaviors that can be modified by first determining what is influencing these behaviors and then by using these influences to reduce the occurrence of the undesirable behaviors and to increase the occurrence of the desirable behaviors. Such direct behavioral-change approaches would be more efficient and more effective than most indirect approaches that attempt to change attitudes first in hopes that the behavior will follow.

Suggestions for Further Research

The results suggest that additional information on littering behavior would be of interest. For example, additional levels of condition of the area or anonymity would provide more detailed information on the power of these variables. Previous pilot work has demonstrated that large numbers of small-sized litter material are necessary if an area is to be perceived as littered. If environmental cues are important in indicating the acceptability of an area to be littered in or not, then certainly the perception of a littered area is related to the effectiveness of these environmental cues. This study could be replicated varying the degree of litter present in the area or varying the likelihood of the subject's name being associated with his actions. Either approach would provide additional support for Festinger and Zimbardo's theory.

To investigate the effect of the material to be littered on the likelihood of littering would be interesting as well as beneficial. If environmental cues are as strong as they appeared to be in this study, then litter characteristics might be a significant influence. Also, if individual characteristics play a more important role in determining littering behavior than was demonstrated in this study, the type of litter material might reflect an individual's attitudes and values. This study could be replicated then by varying the type of potential litter material or information on the notice.

Scales such as social desirability or anxiety or need for social

approval would provide additional strength to the theoretical explanations for the effects of the variables discussed earlier. If social acceptability and evaluation are concerns of the litterer, litterers should value social acceptance less than nonlitterers or be less prone to anxiety in the litter situation. Although the self-report data in these studies did not indicate this, these other scales might. This study could be replicated using a social desirability scale instead of the scales used.

Finally, it would be of great interest to determine whether and how a littered environment affects behaviors other than littering. If a littered environment loosens self-restraint, might other forms of minor deviant behavior be encouraged as well as littering? Are people more prone to double park on a littered street, to be mugged on a littered sidewalk, or to ignore the pleas of an accident victim in a littered parking lot?

Contributions of the Present Study

It is hoped that the results of this study contribute to a better understanding of social behavior and the litter problem by demonstrating that:

1. Environmental cues help determine normative behavior.
2. Deindividuation influences minor types of deviant behavior like littering as well as major types.
3. Attitudes are not always consistent with behavior in that littering attitudes are not consistent with littering behavior.

4. Values are not always consistent with behavior in that values related to littering are not consistent with littering behavior.
5. Social and environmental influences can predict and control the problem of littering and probably do so more effectively than attitude-change approaches.

APPENDIX A

HEBERLEIN'S SCALE 2

Heberlein's Scale 2[c]

Intercorrelations between Attitude Measures and Littering Behavior

Variables[b]						
General Anti-Littering	(.98)[a]					
Anti-Biodegradable Littering	.56*	(.94)				
Anti-Littering on the Sidewalk	.88*	.72*	(.99)			
Anti-Littering Cigarette Butts	.61*	.69*	.65*	(.86)		
Comparative Seriousness of Littering	.12	-.08	.11	-.04	(---)	
Actual Littering Behavior	-.08	-.15	-.09	-.14	.14	(---)

*Significant at at least the .05 probability level, N = 68.

[a]Coefficient ϕ, internal consistency.

[b]Littering attitudes transformed using a log transformation to discount the effect of several outlines lining over 8 standard deviations from the mean.

[c]Taken from Heberlein, 1971.

APPENDIX B

NOTICES

NONANONYMOUS NOTICE

Suzy Sorority A E 1A 37469

IF YOU DON'T VOTE... YOU DESERVE WHAT YOU GET.

ANONYMOUS NOTICE

IF YOU DON'T VOTE... YOU DESERVE WHAT YOU GET.

APPENDIX C

QUESTIONNAIRE COVER LETTER

Questionnaire Cover Letter

Give yourself a chance to win two tickets to an ATLANTA HAWKS BASKETBALL or ATLANTA FLAMES HOCKEY game. At the same time the information that you provide will be used not only to better understand human behavior but to help a fellow student beat the system and get a degree.

Please take five minutes and complete the attached questionnaire. In order to assure your anonymity, first throw away this cover letter containing your name. Then fold and mail the completed pages to Stuart Robinson (address printed on the back). Collection boxes are also available in the post office.

On December 2, 1974, at 12 noon, in the courtyard of the Skiles Classroom Building, a box number will be picked from all of the surveys returned to determine the winner of the tickets. You do not have to be present to win.

Thank you very much.

Stuart N. Robinson, M.S.

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