

SOCIOLOGICAL ASPECTS OF WASTE PAPER RECOVERY

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ABSTRACT

Environmental managers in the business of designing solid waste management systems have a great need for sociological information about those who discard waste. This paper summarizes the literature on attitudinal and behavioral aspects of waste paper recovery, specifically looking for conditions under which attitudes and behavior were congruent. Attitude-behavior congruence is a pertinent sociological concern for the environmental manager, because conservation-oriented attitudes do not necessarily lead to conservation-oriented behavior. Only one study was uncovered about waste paper recovery where the relationship between attitudes and behavior was directly observed; it suggested that anti-litter attitudes and behavior were consistent. Other research has suggested hypothetical conditions which may contribute to a high congruence between attitudes and behavior. These conditions include personal cost, knowledge, and adequate storage space for separated categories of waste paper. Studies on behavioral prompting and reinforcement of waste paper recovery have indicated that without individual or group incentives, conservation-oriented behavior is relatively unlikely to be prevalent in American society, regardless of attitudes toward this kind of activity.

Knowledge about human attitudes and behavior as these relate to waste paper recovery has considerable importance to the environmental manager. The financial costs of constructing and maintaining resource recovery facilities, collecting solid waste, and disposing unwanted residuals have increased substantially. An important contribution to these costs is the expense for separating recoverable from nonrecoverable materials. Gravity and mechanical separators are available, but capital and operating costs of this equipment may jeopardize an otherwise favorable benefit to cost ratio for resource recovery systems. Residual separation can be accomplished by manual sorting, but this alternative is labor intensive and also very costly.

In the case of waste paper recovery, manual sorting is required because mechanical technology is not available to separate unwanted paper goods into various quality grades. Separation at the point of waste discard, such as the home or office, would alleviate many economic and technical problems. The environmental manager can enhance prospects for a successful waste paper recovery program by soliciting public participation in waste paper sorting at the time of disposal. The degree to which public participation can be expected depends on human attitudes and behavior, therefore making this area of environmental sociology especially important to environmental managers.

Environmental sociology as an area of academic study, has developed a body of knowledge that focuses on people's general attitudes toward environmental problems. General environmental attitudes are considered as these relate to specific attitudes about crime, drug addiction, and other social problems [1], to various socio-economic characteristics [2-7], and to environmental concerns as a social movement [8, 9]. Considerably less is known about attitudes toward specific environmental problems, such as waste paper recovery, and the relationship between these attitudes and concrete behavior that will actually reduce the environmental problem. A number of recently published studies deal with people's willingness to separate waste paper from other waste products in their homes or offices for the purpose of resource recovery.

This paper will discuss four sociological aspects of the waste paper recovery problem:

1. attitudes toward waste paper recovery;
2. prompting and waste paper recovery;
3. reinforcement and waste paper recovery; and
4. attitudes, sanctions, and waste paper recovery.

Each sub-section will review the relevant published literature. Although many of these studies are novel and have often been rigorously conducted, questions can be raised about the adequacy of much of this research. One major problem is a conspicuous absence of a common theoretical framework that is refined from one study to the next. It is our opinion that this weakness, which is common in many areas of research, reflects the diversity of social scientists who are researching the problem of waste paper recovery as well as the absence of any published overviews of the sociological literature on waste paper recovery. Environmental managers have a great stake in this subject, since a common theoretical framework on the sociology of waste paper recycling will suggest important considerations in planning resource recovery systems.

One of the most salient sociological aspects of the waste paper separation issue is an understanding of the specific conditions under which attitudes and behavior have congruence. The relationship between attitudes and behavior has been a recurrent problem in sociological research ever since Richard Lapiere traveled throughout the United States with a Chinese couple [10]. Lapiere and his companions were customers in more than 100 restaurants, hotels, auto camps, and tourist homes with only one refusal. Lapiere later contacted the proprietors in these establishments and asked them if they would “. . . accept members of the Chinese race as guests . . .” [10, p. 234] More than 90 per cent of the proprietors replied that they would not do so. This finding sparked a voluminous body of literature about the relationship between attitudes and behavior.

Schuman and Johnson recently summarized the general relationship between attitudes and behavior in a comprehensive review of the literature [11]. Some studies have suggested that one cannot necessarily expect consistency between attitudes and behavior [12], or that there is no simple, direct relationship between them [13]. Another study identified three conditions under which attitudes and behavior tend to be consistent [14]:

1. the behavior in question is simple and concrete;
2. the questions used to measure an attitude are highly descriptive of the specific behavior; and
3. the behavior occurs infrequently over a given interval of time.

This paper will examine how these conditions and others can contribute to a high congruence between attitudes and behavior in the area of waste paper recovery.

Attitudes Toward Waste Paper Recovery

In a 1972 speech at the Public Works Congress and Equipment Show, Lois Sharpe of the League of Women Voters discussed public opinion of solid waste management [15]. Although they were not based on an empirical survey, Sharpe's comments ostensibly reflected the opinions expressed to her by citizens throughout the country. Sharpe reported that most people recognized the growing problems associated with all kinds of solid waste and were enthusiastic about waste paper recovery and the idea of recycling. Nevertheless, Sharpe expressed confidence that people would be unwilling to separate waste paper and other waste items into categories before collection.

Survey research has not supported Sharpe's skeptical viewpoint. At about the same time as the 1972 Public Works Congress and Equipment Show, a survey of metropolitan housewives' attitudes toward solid waste was conducted for the Environmental Protection Agency by National Analysts of Philadelphia. This study demonstrated that housewives thought it was their responsibility, with the assistance of government, to reduce the solid waste problems such as waste paper disposal [16]. Participation in waste paper recovery programs was cited by the housewives as one of the major ways that they could help to abate problems of solid waste disposal. Over 90 per cent of the housewives surveyed expressed a willingness to separate their refuse voluntarily for the purposes of resource recovery. Only 4 per cent stated categorically that they would not voluntarily attempt in any way to facilitate recycling through manual separation of household waste. It was also found that most housewives would prefer to separate their waste in their own home rather than have the municipality do it for them at a minimal fee of one dollar per year.

Reinforcing Sharpe's notion that most people will not separate refuse voluntarily, a majority of the women surveyed by the National Analysts thought that legal authority would be necessary to force public participation in resource recovery programs. In other words, these people thought that waste separation could not be expected voluntarily. It is curious how people say they will participate in manual waste separation, but very few people think that anyone else will also cooperate voluntarily.

Several other empirical studies support the findings of the survey conducted by National Analysts. One experiment was conducted with U. S. Forest Service employees at the Forest Products Laboratory in Madison, Wisconsin. Volunteers were asked to separate their own household solid waste for fourteen consecutive

days [17]. Thirty-five per cent (129) of the employees volunteered, and all but three of them continued participating until the experiment ended. The participants using a minimum of instructions, sorted their household waste paper into four grades:

1. newspaper,
2. magazines,
3. containers and bags, and
4. mixed paper.

The sorted waste was transported to the laboratory where it was checked for contamination. Twenty-one per cent of the mixed paper was erroneously classified. Seventy-five per cent of the program participants expressed a willingness to continue in a similar program requiring people to separate waste paper into fewer than four categories. Thirteen per cent of the volunteers said they would not continue this waste paper separation program because they did not have sufficient space to store the various grades of waste paper.

The problem of storage space as it affects behavioral compliance with waste paper separation has been noted in other research. The Illinois Institute for Environmental Quality concluded that a lack of storage space caused apartment dwellers to desire more frequent collection service than residents in single family dwelling units [18]. Moreover, apartment dwellers expressed a willingness to pay for more frequent refuse collection. While similar findings were also uncovered in the survey of metropolitan housewives, the problem of storage was not as pronounced as it appeared in either the Illinois or Forest Service study. The National Analysts' survey found "barely discernible patterns of increasing reluctance for voluntary action depending upon decreasing living space available, with residents in detached houses most willing to comply and apartment dwellers least willing to do so." [16, p. 22]

Another study of the manual separation of waste paper involved office workers in a major eastern university. In a random sample of 243 employees, 53 per cent said they would separate waste paper in their offices and take nonsalvageable items to a container in a nearby hallway. Eighty-eight per cent of these employees were willing to sort their waste paper if a divided wastebasket were provided in their offices for salvageable and nonsalvageable waste. Ninety-six per cent of the sample said they were willing to sort paper when two wastebaskets were provided in the offices [19, p. 23]. Receptivity was strongly correlated with office workers' attitudes toward conservation and concern for environmental quality [14].

Prompting and Waste Paper Recovery

Neutrally worded handbills, encouragement, mildly threatening messages, films, and conveniently located waste cans have been introduced into situations as "prompts" to induce waste paper recovery. An early example in the literature reported the effects of waste cans, placed along limited access highways, on roadside litter [20]. Three highways were subject to the following experimental conditions:

1. the presence of waste cans on either side of the road with a "waste container ahead" sign one-quarter mile before the container;
2. the presence of waste cans on either side of the road without a sign; and
3. a baseline condition without containers or signs.

Roadside litter was measured for six miles beyond the waste cans over a three month interval. The study found that the litter cans reduced waste paper and other materials by 28.6 per cent in comparison with the baseline period. The presence or absence of a sign announcing the litter can made no substantial difference in litter reduction [20, p. 131].

Related experiments with litter control on city streets with pedestrian traffic found that prompting with litter cans reduced the amount of waste paper and other litter on the street. The amount of litter was daily measured on a sixteen block area of Richmond, Virginia for several weeks of "baseline" observations before prompting. When litter cans were placed every four blocks, the amount of litter was reduced by 6.8 per cent. Litter cans on every block reduced waste paper and other debris by 16.7 per cent in comparison with the baseline observations. Comparable findings were reported for St. Louis where a more elaborate prompt was used in the form of an attractive waste can with a graphic art design and corporate (beer) sponsorship colorfully covering the container [20, pp. 133-135]. The physical presence of the waste cans as well as the convenience of their location apparently have independent effects as prompts for waste paper recovery.

The convenience of containers for waste paper also served as an effective prompt in the previously discussed research on office workers in a university [14]. The accuracy of waste paper separation among the office workers was measured weekly for 2.5 months. About 10 per cent of the material in the waste cans marked for recycled paper was not salvageable paper, even though the workers

were given a list of salvageable paper items. The "contamination" equalled 8 per cent in the offices with a divided waste can and 16 per cent in offices where the workers were asked to deposit non-salvageable waste in containers outside their offices. As with research among pedestrians in Richmond and St. Louis, this research in a university suggested that conveniently located waste cans prompted waste paper recovery among office workers with presumably different degrees of receptivity to this conservation-oriented behavior.

Verbal prompting and conveniently located containers have also increased waste paper recovery among residents of apartment complexes. Reid et al. took baseline measurements of the amount (pounds) of newspaper deposited in specifically designated containers for recycling [21]. Then residents in three of the four complexes were notified by door-to-door interviewers that the number of specifically designated containers for recycling newspapers would be increased. The amount of newspaper recovery increased after the verbal prompting and increased convenience of the containers in comparison with baseline measurements and the measurements in the complex which received neither verbal prompting nor more containers for recovering newspapers [21, p. 479]. The complexes were apparently comparable in rental costs as well as their location with regard to other recycling centers in the community.

Another set of experiments observed littering among children attending afternoon movies on fourteen separate occasions [22]. Prompts in one theater included a baseline condition, the distribution of litter bags, the distribution of litter bags with instructions to deposit the bags in containers at the exits from the theater, and finally a ten cent reward for using and returning the litter bags. Experiments used prompts in a second movie theater which included doubling the number of waste cans, a Walt Disney film about litter, and free tickets to a movie for returning litter bags at least partially filled with litter.

The experiments in both theaters indicated that prompts substantially increased the proportion of waste materials deposited in a waste can. Nineteen per cent (by weight) of the waste paper and other materials was deposited in waste cans of one theater during the baseline condition. The distribution of litter bags increased the proportion of recovered waste to more than 30 per cent. Instructions for using and discarding the litter bags increased waste recovery to a point where 51 per cent of the waste was found in the cans. The 10 per cent incentive eliminated all but 6 per cent of the litter from the theater.

Prompts also reduced littering in the second theater, though not as

noticeably. Sixteen per cent of the waste left in the theater was deposited in waste cans during the baseline measurement. Increasing the number of litter cans in the theater had no noticeable effect in the recovery of waste in comparison with the baseline condition. The anti-litter film increased waste recovery to 21 per cent. The incentive of a free movie ticket increased waste recovery to 95 per cent of the waste materials such as paper containers were deposited in the litter cans.

The effects of different written prompts about littering were observed among adult patrons of grocery stores [23] and users of a national forest campground [24]. These studies under relatively controlled conditions found that anti-litter messages can substantially reduce littering. The wording of messages also influenced the effectiveness of the communication process. Geller, et al., found that the prompt, "Please help us recycle. . . . Please dispose for recycling in (the) green trash can located at the rear of store," produced more waste paper recovery than a general prompt, "Please don't litter . . ." or a so-called "DEMAND" prompt, "You must not litter . . ." [23] Marler found that a "punishment-oriented" anti-litter message, "Litter can cause fatal Tetanus," was followed by substantially less littering than a "reward-oriented" message, "Help keep your child safe," or a "neutral" message, "Litter is dangerous." [24] These studies in communication about waste paper recovery also found anti-litter messages were not totally successful in eliminating litter.

While requests not to litter effectively increased waste paper recovery, the effectiveness was not widespread among the subjects of these experiments. Twenty to 30 per cent of the patrons of grocery stores in Geller et al.'s research complied with the requests in the anti-litter messages [23, p. 437]. Marler estimated that only about one-third of the campers who received anti-litter messages read them [24, p. 53].

Reinforcement and Waste Paper Recovery

Published experiments with methods of reinforcing desired waste paper recovery have taken the form of a monetary incentive [25], gimmicks such as Smokey the Bear patches [26], previously discussed free movie tickets [22], coupons exchangeable for desirable commodities [27], or some combination of these [22, 28]. The studies have primarily focused on techniques for eliminating actual or potential litter, though several experiments have also observed the effects of reinforcers on waste paper recovery for the purpose of paper recycling.

The main published behavioral analysis exclusively concerned with different kinds of reinforcement for waste paper separation was conducted at the Virginia Polytechnic Institute and State University (VPI and SU). Individual and behavioral reinforcements were employed in this study to increase the amount of waste paper recovered from student dormitory complexes [29]. Raffle tickets were used as individual reinforcement tokens (raffle condition); monetary contributions to dormitory treasuries were used as group reinforcements (contest condition). Group rewards were made to the dormitory whose residents recovered the most total paper, relative to other dormitories, during a weekly period. Posted announcements were utilized to alert dormitory students to both the raffle and contest conditions. It was hoped that such posters would "prompt" students to separate their waste paper and transport it to the recycling collection center located in each dormitory.

Geller, Chaffee, and Ingram concluded that the greatest amount of paper was collected during the "individual reinforcement" or raffle condition, although the "group reinforcement" also generated a greater quantity of paper than the baseline conditions without reinforcement [29]. A closer inspection of the data, however, suggested that the effects of the reinforcers were overstated in the analysis. During the six week study, Geller, Chaffee, and Ingram reinforced behavior on either a group or individual basis for paper delivered to recycling centers at *only specified times* [29]. Consequently, ". . . the total pounds of paper delivered Monday through Saturday from 5 to 7 p.m. was 845 during the Baseline, 1420 during the Contest, and 1515 during the Raffle; while the total pounds of paper brought to a collection room at other times was 1050 during the Baseline, 765 during the Contest, and 605 during the Raffle." [29, p. 49] If the total amount of paper delivered *at all times* to the recycling centers is examined, the differences between the control and experimental groups are considerably reduced. One thousand eight hundred ninety-five pounds were delivered during the Baseline, 2185 pounds during the Contest, and 2120 pounds in the Raffle condition. Examined in this way, the data suggest that students in the Raffle and Contest were saving waste paper until the experimental hours in order to capitalize on the available rewards.

This alternative interpretation of the data does not challenge the alleged ability of reinforcement to alter or modify their behavior. People were induced to transport their waste paper to a recycling center at specific times. However, we have to question the inferred ability of such reinforcement to make the lasting behavioral changes

necessary to insure a steady supply of waste paper, especially with the known concern which people have for storage space in their residences.

Supporting our skeptical view of the meaning of the VPI and SU experiment is the finding that several students, under the raffle condition, made many more than one visit per day to the recycling center in order to collect a large number of rewards. A raffle ticket was rewarded for as little as one sheet of paper, and more than forty students made more than eighty visits to the recycling center during a single day; few students made more than one visit per day during the baseline and contest conditions [29, p. 51].

A subsequently published study also supported our skeptical view of the meaning of the above experiment. In a follow-up study to the VPI and SU experiment, Witmer and Geller conducted a comparable set of controlled observations at the same university [30]. This follow-up study noted that Geller, Chaffee, and Ingram's experimental design [29] ". . . resulted in individuals making numerous, repeated deliveries each day with small amounts of paper." [30, p. 316]

To circumvent this problem, Witmer and Geller required participants to deposit one pound of paper to receive a raffle coupon [30, p. 316]. They also tried to improve awareness of the recycling program and the rewards by presenting announcements to every room in the dormitories rather than posting notices on bulletin boards.

While the follow-up study again found that reinforcement increased participation in the recycling program and that reinforcements such as raffle coupons encouraged more waste paper recovery than a prompt (the announcement), the population of dorm residents participating in the recycling program remained relatively low. No more than about 14 per cent of the residents in a dormitory brought waste paper to a recycling center in a single week of the experiment [30, p. 320]. Witmer and Geller concluded that ". . . low participation in the paper drive was not due to a lack of contingency awareness as speculated by Geller et al. [29], but rather to a lack of contingency effectiveness." [30, p. 321]

Attitudes, Sanctions, and Littering

Although the reasons for participation in paper recycling programs have not been documented, the literature does have information about people's adherence to anti-littering norms. During the summer of 1970, a sociologist conducted a study on littering among

pedestrians in a mid-western tourist town [31]. More than 7,400 pedestrians received handbills over a fourteen day interval. Fifty-eight pedestrians were observed littering the handbills. Another fifty-eight pedestrians who did not litter were randomly selected as a control group. The litterers and nonlitterers were interviewed on the day they received the handbills and later completed a mail questionnaire measuring attitudes (personal norms) about littering as well as relevant personality characteristics. These data suggested that the litterers were more likely than the nonlitterers to have personalities tending to deny personal responsibility for actions and to be less aware of consequences of actions for others. Heberlein also found that the litterers, in comparison with nonlitterers, were less likely to have thought about the consequences of littering immediately after they received the handbill, and they were more likely to have thought about common rationalizations for littering. The study suggested that personality and "situational" factors independently contributed to the probability of littering, but 68 per cent of the observed variation in littering behavior remained unexplained by the investigator [31, p. 6].

The literature also suggested that bystanders in the presence of someone littering rarely invoke negative sanctions to control such behavior. In a study of a national forest campground, a national park, and one state park, sociologists made regular observations of "depreciative acts," including littering committed by campers during a summer season [32]. Though there was no detectable pattern to these acts by the age of the offender or the kinds of camping equipment used by the park visitors, more than 80 per cent of the littering and other "depreciative acts" occurred in the presence of other campers beside the participant observers, and corrective action rarely was taken. Apparently, a norm of "noninvolvement" operated in the campgrounds, as it has been known to occur in other public places, or people simply did not know how to sanction the deviant behavior which they witnessed.

Summary and Discussion of Implications for Environmental Management

Heberlein's research is one of the few examples in the literature where attitudes and behavior were linked on an individual basis. Less than one per cent of approximately 7,400 recipients of handbills in his quasi-experimental research were observed littering. Those recipients of handbills who did litter had personalities predisposed to rationalization and were unaware of the consequences of their

actions. The observed littering in this case can be interpreted as deviant because of its observed infrequency and its unacceptability in the minds of the respondents. On the basis of this study and related work, Heberlein argued that a new "ethic" may be emerging in American society where people are concerned about behavior which may affect others and the quality of the human environment [33].

Very few other published studies of waste paper recovery directly add to the research on attitude-behavior congruency. Research by Humphrey et al. showed that the vast majority of office workers in a major American university favored the idea of separating waste paper from other discarded materials [14]. This research also showed that actual cooperation in a waste paper recovery program was less enthusiastic than attitudes would have suggested. Contaminants in waste cans marked "for paper only" were common both in cases where people had to exert relatively high levels of effort in the waste recovery program and in most cases when people had been involved with the program for more than two or three weeks. If this research had linked the attitude of each office worker with the accuracy of individual waste paper separation over the ten week experiment, a better understanding of the relationship between attitudes and actual behavior might have been obtained. Relevant research needs to be conducted at this individual level of analysis. An analysis of the aggregate data has suggested that actual cooperation in a waste paper recovery program is inversely related to the personal effort required to participate in this kind of activity, even when attitudinal receptivity to such an environmental program is very favorable.

Personal knowledge of how to participate effectively in a waste paper recovery program may be another condition necessary to achieve a high congruence between attitudes and behavior. Many people are favorably oriented toward resource conservation, willing to cooperate in a waste paper recovery program, and actively involved with such an effort. If they consistently fail to separate waste paper correctly by mixing carbon paper with other recoverable waste paper, however, their attitudes and behavior are not entirely consistent. Inadequate personal knowledge about what is salvageable waste paper may have been a reason for errors in the accuracy of waste paper separation among the office workers in the study by Humphrey et al. Myers concluded that it was a problem in the fourteen day experiment with household waste paper separation among employees at the Forest Products Laboratory in Wisconsin. He recommended that paper companies should water mark salvageable paper for the benefit of people who want to recover their waste paper.

Environmental constraints can serve as another condition for congruence between attitudes and behavior. The volunteers in the Forest Products Laboratory who engaged in a household waste paper recovery experiment were somewhat unenthusiastic about continuing the program at some future date. Their unwillingness to continue this kind of conservation was provoked by inadequate storage space for the various grades of waste paper. It is possible that people who voiced negative attitudes of this kind may have reluctantly volunteered for the experiment in the first place. Overlooking this problem, it may be that attitudes and behavior relevant to waste paper recovery could shift from a high to a low degree of congruence once people found that they did not have adequate space for cooperation in a resource conservation program which they personally favored.

The studies of prompting and the reinforcement of waste paper recovery do not present any direct evidence about the conditions for congruence between attitudes and behavior, but they do provide some indirect insights into the degree of "environmental concern" which people have toward waste paper recovery. The research has specifically compared the relative effects of prompting and reinforcement on waste paper recovery. The experimental study of anti-litter behavior among children in movie theaters suggested that reinforcements can produce far more anti-litter behavior than the most effective kind of prompt. Research on paper recycling among college students in dormitories also found that raffles and coupons provoked more waste paper recovery than announcements that recycling centers were open at specified hours in the dorms. Apparently, direct incentives are necessary to get relatively large volumes of waste paper in resource recovery programs.

Polls among various sectors of the American population, such as office workers and housewives, suggest that the idea of waste paper recycling has received considerable support through the years. When the proportion of people who actually recover waste paper is carefully examined, however, it is clear that people have not been jumping at this kind of conservation experience. Only one-third of the campers in one study read the anti-litter messages distributed to their groups. Only 30 per cent of the shoppers in a grocery store complied with litter messages at the bottom of handbills. About 14 per cent of college residents brought at least one sheet of paper to a recycling collection center in those dormitories when a raffle was operating; and only as much as five per cent of the residents participated in those dormitories receiving only a notice about the program. It is unfortunate that the literature has not offered a comprehensive

survey where individual's attitudes as well as their waste paper recovery behavior have been measured over time. Such a study should be conducted for a sample of residents in a community to provide a representative sample of the country. This straightforward task would help to clarify the actual amount of slippage between environmental attitudes and waste paper recovery.

Waste paper recovery is an important environmental activity. In designing resource recovery systems, environmental managers should be aware of conditions that enhance congruence between attitudes and behavior. These possible conditions include the cost of effort involved, personal knowledge about recoverable waste paper items, and environmental constraints such as available space for storing recovered waste paper.

Beyond these possible conditions for attitude-behavior congruence, the investigators generally question the extent to which environmental concern in the recent past has been carried over into behavior that can substantially reduce the environmental problems associated with waste paper disposal. People have reported willingness to recover waste paper, but they have reservations about other people's willingness to do so. We share this skepticism in view of the low rates of participation in observed waste paper recovery, the tendency for cooperative behavior in waste paper recovery programs to deteriorate over time, the need to use reinforcements in the form of positive rewards to obtain very modest rates of participation, and people's reluctance to sanction negatively the littering behavior of campers. The current literature does not necessarily convince us that environmental concern will substantially reduce the problem of waste paper in the near future.

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