

**UNDERSTANDING PAPER RECYCLING IN
AN INSTITUTIONALLY SUPPORTIVE SETTING:
AN APPLICATION OF THE THEORY OF
REASONED ACTION**

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ABSTRACT

The Ajzen and Fishbein theory of reasoned action is employed to predict levels of paper recycling and to identify the socio-psychological factors which influence performance of this action. The faculty of a medium-sized northwestern public university where recycling opportunities are institutionally supported and convenient served as the survey population. The results lend strong support overall to the theory and demonstrate its utility for predicting and understanding individual actions such as source separation-recycling which could reduce environmental pollution and natural resource depletion.

**SOCIAL AND ECOLOGICAL DIMENSIONS
OF THE PROBLEM**

The problems of resource depletion, pollution, paper consumption, and paper waste are serious and inseparable. While world waste paper consumption doubled between 1965 and 1982, recycling rates increased by only 4 percent, from 20 percent in 1965 to 24 percent in 1982 [1]. On the national level, during an average seventy-year lifetime, an average American will use directly or indirectly more than 19 tons of paper or approximately 600 pounds of paper per year [2, 3]. This rate of paper consumption is about nine times the world's average, and about forty-six times the rate in less developed nations—and results in millions of trees being cut down annually to satisfy the demand for paper products in the United States [2]. Yet the United States has one of the lowest recovery rates for paper

(27%) in the industrialized nations [4]. This low rate of paper recovery also explains why paper and paper products makes up between one-third to one-half of the estimated 150 million tons of “garbage” being produced by Americans each year [3, 5].

The cost of placing this waste in urban landfills and dumps in the United States has increased substantially. More than half of the cities in the United States will exhaust their current landfills by 1990 [4]. No where was the urgency of this crisis made evident to the American public than by the 27-month Odyssey of 14,000 tons of Philadelphia’s municipal waste aboard the infamous “garbage barge,” *Khian Sea*.

Chandler estimates that if half the paper used in the world today were recycled it could meet almost 75 percent of the demand for new paper and would preserve 20 million acres of forestland—an area equivalent to 10 percent of Europe’s forest [1]. It has been estimated that if a 50 percent recycling rate were realized within the United States it could save a 150 million trees and conserve enough energy to provide 10 million people with a year of residential electricity [2].

In addition to saving land, trees, energy and money, paper recycling ultimately reduces air and water pollution, conserves water, decreases carbon dioxide buildup in the atmosphere (and thus may help delay climatic changes), preserves habitats and genetic diversity, decreases soil erosion and flooding and reduces health hazards due to pollution compared to the health hazards from making paper products from virgin timber (4-7).

There have been encouraging signs. A study by National Analysts, Inc. conducted for the Environmental Protection Agency as early as 1972 found that over 90 percent of the housewives surveyed averred that they were willing to separate their disposal material voluntarily [8]. In fact, almost all Americans claim to favor recycling [9]. The Resource Conservation and Recovery Act of 1976 and its amendments have also required federal agencies to buy products composed of the highest percentages of recycled materials practicable [4]. And the total recovery of paper products from the solid waste stream has increased from 18 million tons in 1980 to 24 million tons by 1987, an increase of 33 percent [10].

Many municipalities have started recycling programs as landfills reach capacity and community opposition to new dumps increase [4, 11]. In Seattle, by 1989 55 percent of eligible households were recycling 28 percent of their entire waste stream [12]; (see [9] for a review of selected recycling programs within the U.S.)

Paper recycling is being strongly promoted in several countries. Recovery rates have increased worldwide [11]. Japan recycles some 50 percent of its wastes (and incinerates 34%) [13], although some questions have arisen as to what materials are or are not counted in these figures. Perhaps most encouraging is the growing awareness within industry that it is profitable to recycle waste that otherwise would have been released into the environment.

Nevertheless, the fact remains that the great majority of Americans still do not recycle. High rates of consumption and waste generation place severe demands

upon natural [14] and human systems [4], and, if continued, may push ecological systems beyond key thresholds and in time threaten the continued sustainability of human systems [15, 16]. As Pollack has warned, "We are literally throwing our future away" [4, p. 102].

Economically sustainable recycling programs can only be achieved by overcoming both institutional and social barriers [1, 4] to broad public participation in institutionally supported waste paper separation and recycling efforts. Social science research can assist in this process by identifying and studying institutional, social, and individual factors which can hinder or encourage recycling. I shall review the current state of social science research on paper recycling and then apply the Ajzen-Fishbein "theory of reasoned action" to a study of paper recycling at a university.

PREVIOUS RESEARCH ON PAPER RECYCLING

Some studies try directly to stimulate increased public participation in recycling programs; others try to identify the social and psychological factors which encourage or hinder recycling. In both cases, research has concentrated upon pilot or experimental recycling programs [e.g., 17, 18], mostly in academic settings [e.g., 19, 20], and occasionally in the general community [e.g., 21, 22].

A common research approach is to offer people rewards (e.g., money, prizes, raffles, lotteries) for recycling their paper [23-25]. These studies generally suggest that such inducements increase the quantity of paper recycled [26, 27] and the rate of public participation [28, 29] compared to control groups or baseline conditions. Moreover, rewards that target the individual rather than the group have been found to be more effective in increasing paper recycling [24, 28].

Yet it appears that (extrinsic) incentives by themselves promote only modest increases in participation. When the incentives are removed, the participation rates generally return to original conditions [18, 19, 26, 27]. For that matter, McClelland and Canter [30] concluded from their review of available studies that the effects of extrinsic rewards are generally short-lived at promoting conservation behaviors in general (see also [31]).

Informational approaches such as prompts, posters, verbal and written appeals, or feedback messages have also been used in concert with incentives to foster paper recycling. Results suggest that participation rates and the amount of paper recycled are raised significantly more than with information alone [26, 27, 32].

Research bears out that, as one might expect, participation rises when recycling is institutionally supported by providing readily accessible and convenient recycling opportunities along with written appeals [18, 29]. Apparently, an "Integrative Approach" [31] combining institutional supports, information, and incentives is more successful in promoting paper recycling than any single strategy ([29], [33], [18]; see [25] for a review).

While evidence has been rather limited, some socio-demographic characteristics appear to be associated with paper recycling. Persons with higher levels of education, income and socio-economic status seemed more likely to participate in recycling programs in the United States, at least prior to the recent national emphasis on recycling [34-36]. Age, though generally found to be significantly inversely associated with ecological "concern" [37] and "ecologically responsible" behaviors [25], apparently is not associated with paper recycling. It appears that recycling appeals not only to young, ecologically-conscious individuals but also to older individuals who recycle because of traditional values such as frugality [34].

Humphrey et al. [20] examined the conditions under which university personnel, at least in the mid-1970s, would be receptive to taking part in a pilot paper recycling program, and found that more employees (95.5%) expressed a willingness to participate if provided with two wastebaskets than said they would if provided with a divided wastebasket (88.5%) or a centrally located container (53%). Employees who were encouraged to recycle in a letter from their department supervisors separated their paper more accurately (92.5%) than those who received only a "generic" letter (88%). Finally, those who were sent a written letter from their supervisor and provided with two wastebaskets had the highest quality of paper separation (95.7%). Humphrey et al. found that those who expressed a willingness to cooperate did in fact participate and also indicated a willingness to continue their efforts after the pilot program was over (see also [38]).

Conditions that influence recycling within the general community have also been studied. For example, those with less space to store their recyclables have been found to be less likely to continue to participate in a recycling program. Unsurprisingly, limited space has been a greater problem among apartment dwellers than among homeowners [8]. More paper is recycled in the community when collection services are provided on the same day as regular garbage pick-up [24, 33], at least until the recent dramatic expansion in recycling programs, and in stable communities with an actively supporting citizenry [9].

The relationship between ecological attitudes and paper recycling has also been examined, as noted, but here too the number of studies is very limited. Borden et al. [39] and Steinger and Voegtlin [40] found in early studies that those who had higher levels of general ecological concern were significantly more likely to recycle. De Young reported a moderately strong positive relationship existed between general recycling activities and intrinsic motivations related to recycling [41]. Arbuthnot and Linn [35] reported that ecological attitudes were significantly correlated with recycling among Americans, but not among the French, while Arbuthnot [42] found no significant differences in pro-ecological attitudes among general recyclers and non-recyclers. However, general attitudes toward environment [17, 20] specific attitudes toward paper recycling [17, 20] and

intentions to recycle have been found to be significantly related to paper recycling at least in early studies.

Other socio-psychological variables positively related to general recycling have included social responsibility [34], "self-efficacy" [34, 42, 43], and certain attitudes toward frugality and involvement [44]. In addition, those who reuse their materials [22] and perform other ecologically related behaviors [25] are more likely to recycle. Although general knowledge about ecological issues has not been found to be associated with recycling [17, 42], more specific knowledge about the consequences of recycling has [17]. Finally, inverse relationships have been found to exist between recycling and extrinsic incentives and satisfaction with prosperity [22].

From this review of the literature, it appears that in general people are more likely to recycle their paper when they have convenient recycling opportunities, more formal education, greater incomes, and greater knowledge about recycling. Furthermore, people who hold positive attitudes toward the environment in general and recycling in particular and perform other ecologically responsible behaviors are also more likely to recycle their paper. Those given monetary incentives are more likely to recycle paper, provided that such incentives are maintained and adequate facilities and service are supplied. All in all, a greater level of participation by the public in paper recycling programs can be expected if such individual, social and institutional factors conducive to paper recycling operate in concert.

AJZEN-FISHBEIN THEORY OF REASONED ACTION

The central premise of the theory of reasoned action is that people consider the implications of their actions before deciding to engage or not engage in a given behavior; hence, the authors call their model a "theory of reasoned action" [45]. The central tenet of their theory is that a person's "*behavioral intention*" to perform a specific act should be highly predictive of his or her subsequent performance of the action [46]. Several factors can moderate the relationship between behavioral intention and behavior [45]. A stronger relationship should occur when the intention is specific with regard to behaviors, performance of the behavior is temporally close to the measurement of intention, and the behavior is under the individual's volitional control [45, 47-49].

The theory postulates that behavioral intentions are in turn a function of a person's "*attitude toward the action*", which measures a person's overall evaluation of performing a specific behavior and a "*person's subjective norm*" which measures the respondent's perceived social pressure to perform or not perform the specific behavior by generalized "significant others." These two components are each given an empirically determined weight which indicates their relative strength in influencing the behavioral intention; each is assumed to vary across different behaviors [45].

Ajzen and Fishbein further suggest [45, p. 62] that acquiring a deeper understanding of the factors influencing behavioral intentions, and thus the behavior, requires the identification of the determinants of one's subjective norm and of one's attitude toward performing the action in question. Attitudes toward a specific behavior are a function of a person's beliefs about the behavior and are known as "*behavioral beliefs*". Behavioral beliefs have two subcomponents. "Outcome evaluations" measure how a person evaluates the salient outcomes associated with performing the behavior and "belief strength" measures the degree to which each salient outcome is perceived to be linked to performance of the specific action. Behavioral beliefs are thus the products of these two factors, and are assumed to be the underlying determinants of the overall attitude toward the action.

The second predictor of behavioral intentions, the subjective norm component, is a function of "*normative beliefs*" or the respondent's perceptions of the attitude held by specific significant others (e.g., "my spouse," "my best friends") toward the specific action. Each normative belief is weighted according to the degree to which the person is generally motivated to comply with each specific reference person or group.

According to the Ajzen and Fishbein [45, p. 91]:

. . . on the basis of different experiences, people may form different beliefs to behavior and different normative beliefs. These beliefs in turn determine attitudes and subjective norms which then determine intention and the corresponding behavior. We gain understanding of the behavior by tracing its determinants back to the underlying beliefs, and we can influence the behavior by changing a sufficient number of these beliefs.

Other variables not included in the theory such as demographic characteristics, party identification, personal differences and global attitudes have been demonstrated to have only an indirect influence on specific behavior through beliefs, norms and intentions [46, 50]. See [51, 52] for a discussion of variables not contained in Ajzen-Fishbein model.

Figure 1 outlines the theory reasoned action.

METHODS AND MATERIALS

First, a pilot survey was administered to a small random sample (35) of faculty members of a medium-sized northwestern university to obtain their salient beliefs about paper recycling. Second, these salient beliefs were then used to construct an in-depth questionnaire which measured beliefs, norms, attitudes and intentions regarding paper recycling. All of the items used in the questionnaire were designed to ensure proper correspondence with the behavioral criterion of paper recycling (see [53]). This instrument was then sent to a larger sample (100) of randomly selected faculty members from the same university.

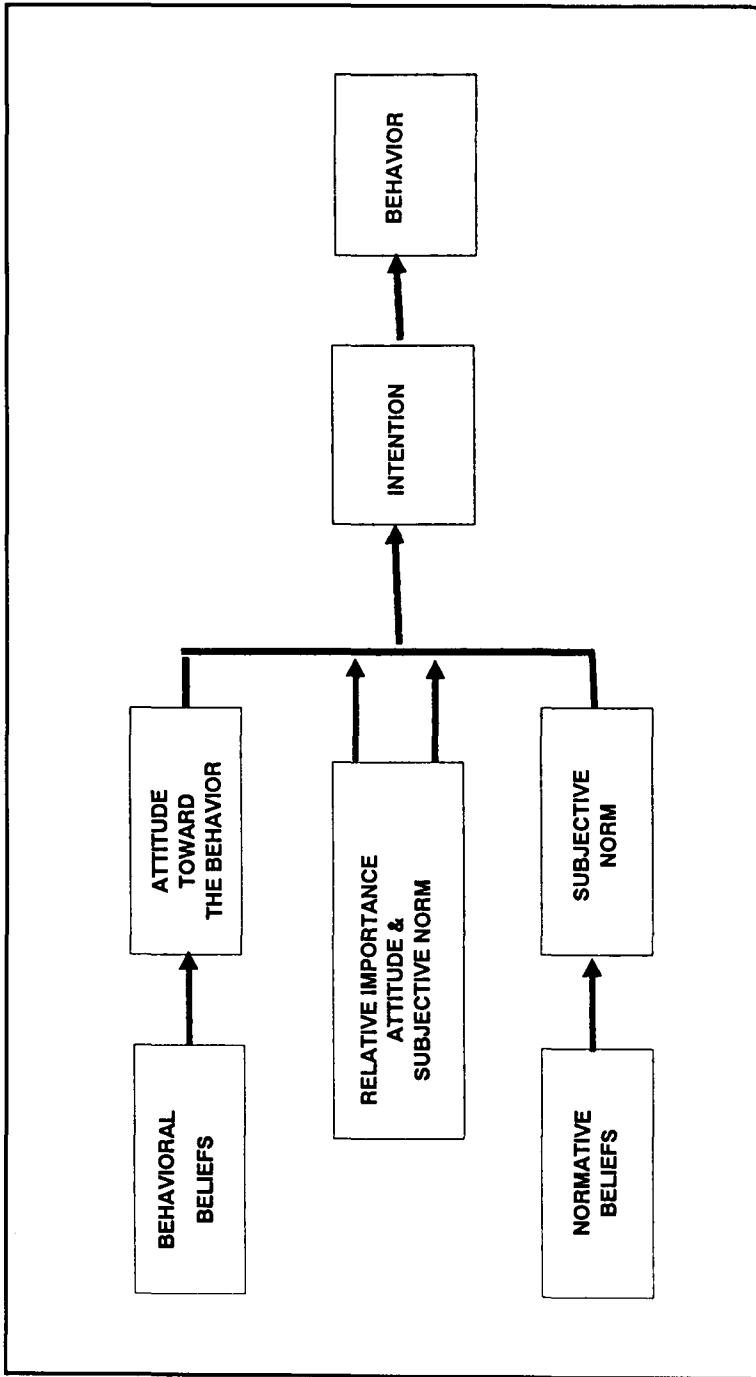


Figure 1. The theory of reasoned action: Factors influencing a person's behavior. **Note:** Arrows indicate direction of influence. (Adapted from Ajzen and Fishbein [45].)

Seventy-eight faculty members returned their questionnaire. Of these, fifty-two of these were contacted over the phone two weeks later to help assess the percent of paper each had recycled.

In the first place of the research, a pilot survey based on a "free-elicitation response format" was used to identify the salient beliefs the faculty had regarding paper recycling. The first set of questions asked each respondent to identify the advantages and disadvantages of paper recycling. These beliefs were that paper recycling conserved energy, saved natural resources, saved money and created additional work. A second set of free-elicitation response questions asked each respondent to identify the salient referents who they thought would approve or disapprove of their paper recycling. The referents identified included: "my family," "best friends," "faculty colleagues," "department chair," "university administration," and "students."

These beliefs were then used to design a questionnaire. The subjective norm component ("Most people who are important to me think I should-should not recycle my paper") and the attitude component, composed of three single items (Recycling my paper is: good-bad; meaningful-meaningless; complex-simple) were subjected to a multiple regression analysis with the single item behavioral intention component (What percentage of paper do you intend to recycle). All other components of the theory were tested for their degree of association.

Direct behavioral observations would have been preferable to the use rather than self-reports for measuring behavior but were difficult to obtain within this particular setting. Van Liere and Dunlap [54] have pointed out that self-reports may contain certain biases and that relationships are likely to be higher when behavior is measured via actual observation [54]. Indeed, in her recent review of research on ecologically responsible behaviors, Hines found that studies which used directly observed behaviors were more likely to report stronger relationship with attitudinal measures than those using behavioral self-reports [25].

The setting where the research was conducted appeared to be highly conducive to recycling. The university has supported recycling efforts as early as 1975. Paper, glass, and aluminum can recycling receptacles are provided throughout the university, while numerous large, conveniently placed paper recycling receptacles can be found throughout all of the buildings. Smaller paper recycling containers are available to faculty and office personnel. Their recyclables are picked-up weekly. A large campus recycling center provides drop-off services for most recyclables. Recycling is voluntary and free; no monetary incentives are provided to the individual recycler.

RESULTS

I shall report results for each hypothesized link of Ajzen and Fishbein theory starting with the link between recycling actions and intentions and working back

to beliefs about paper recycling. The results strongly support Ajzen and Fishbein's approach to predicting behavior.

The hypothesis that behavior is a function of behavioral intentions was supported in that the percentage of paper faculty had intended to recycle was strongly related ($r = .69, p < .01$) to the percentage of paper they subsequently reported being recycled.

The two key predictors of behavioral intention are the attitude toward the behavior and the subjective norm component. The single item subjective norm measure was rather strongly related ($r = .41, p < .01$) to the percentage of paper the faculty intended to recycle as were attitudes toward paper recycling ($r = .50, p < .01$). When these two parameters were used jointly to predict intentions a strong ($r = .55, p < .01$) multiple correlation coefficient was obtained. Multiple regression analysis also determined that attitudes were stronger predictors of intentions (Beta = .39, $p < .01$) than were subjective norms (Beta = .25, $p < .01$). It is no surprise that faculty members who intended to recycle more of their paper evaluated paper recycling more favorably and felt a stronger generalized social pressure to recycle their paper.

According to Ajzen and Fishbein, a deeper understanding of the factors influencing behavior can be achieved by further examining the individual determinants of attitudes and subjective norms. In the case of attitudes, the theory asserts that people's overall evaluations or performing a behavior are a function of behavioral beliefs. Table 1 indicates a strong and significant relationship ($r = .60, p < .01$) between behavioral beliefs about recycling and attitudes toward recycling.

The last link in the theory of reasoned action is that the subjective norm component is a function of normative beliefs. The findings reveal a strong relationship ($r = .62, p < .01$) between subjective norm and normative belief components of the theory (see Table 2). That is, faculty who perceived a greater

Table 1. Correlations between Behavioral Beliefs and Attitude toward Paper Recycling

<i>Behavioral Belief</i>	<i>Attitude toward Paper Recycling</i>
1. Conserves Energy	.53
2. Saves Resources	.52
3. Saves Money	.32
4. Doesn't Create Added Work	.30
BEHAVIORAL BELIEFS (#1-4)	.60

Note: All correlations were found significant ($p < .01$).

Table 2. Correlations between Normative Beliefs and Subjective Norm

<i>Normative Belief</i>	<i>Subjective Norm</i>
1. Best Friends	.53
2. Faculty Colleagues	.42
3. University Administration	.40
4. Students	.40
5. Family	.38
6. Department Chair	.38
NORMATIVE BELIEFS (#1-6)	.62

Note: All correlations were found significant ($p < .01$).

generalized social pressure to recycle their paper did so because they believed that their family, best friends, faculty colleagues, department chair and students thought that they should recycle paper and because they were motivated to comply with these significant others.

The behavioral beliefs of the faculty concerning paper recycling were found to be strongly linked to their attitudes toward recycling, and their normative beliefs of the faculty were found to be strongly linked to their subjective norms, which measured perceived social pressure from generalized important others. Attitudes and subjective norms in turn were strongly linked to faculty intentions to recycle paper and intentions themselves seemed strongly linked to paper recycling, judging from faculty reports. These results are summarized in Figure 2.

DISCUSSION

The results are very encouraging in light of prior findings concerning behavioral prediction within this substantive area [54]. The study demonstrates that faculty use the information in their environment (social or otherwise) available to them in the form of beliefs and these beliefs eventually influenced their decisions to recycle their paper. Specifically, those who believed that recycling their paper saved money, energy, conserved natural resources and believed it did not take any additional time to perform had an overall positive attitude toward recycling their paper. Second, those who believed that their family, best friends, faculty colleagues, department supervisors and students thought they should recycle paper felt a generalized social pressure to conform to these expectations. In turn, those who evaluated recycling more positively and felt greater social

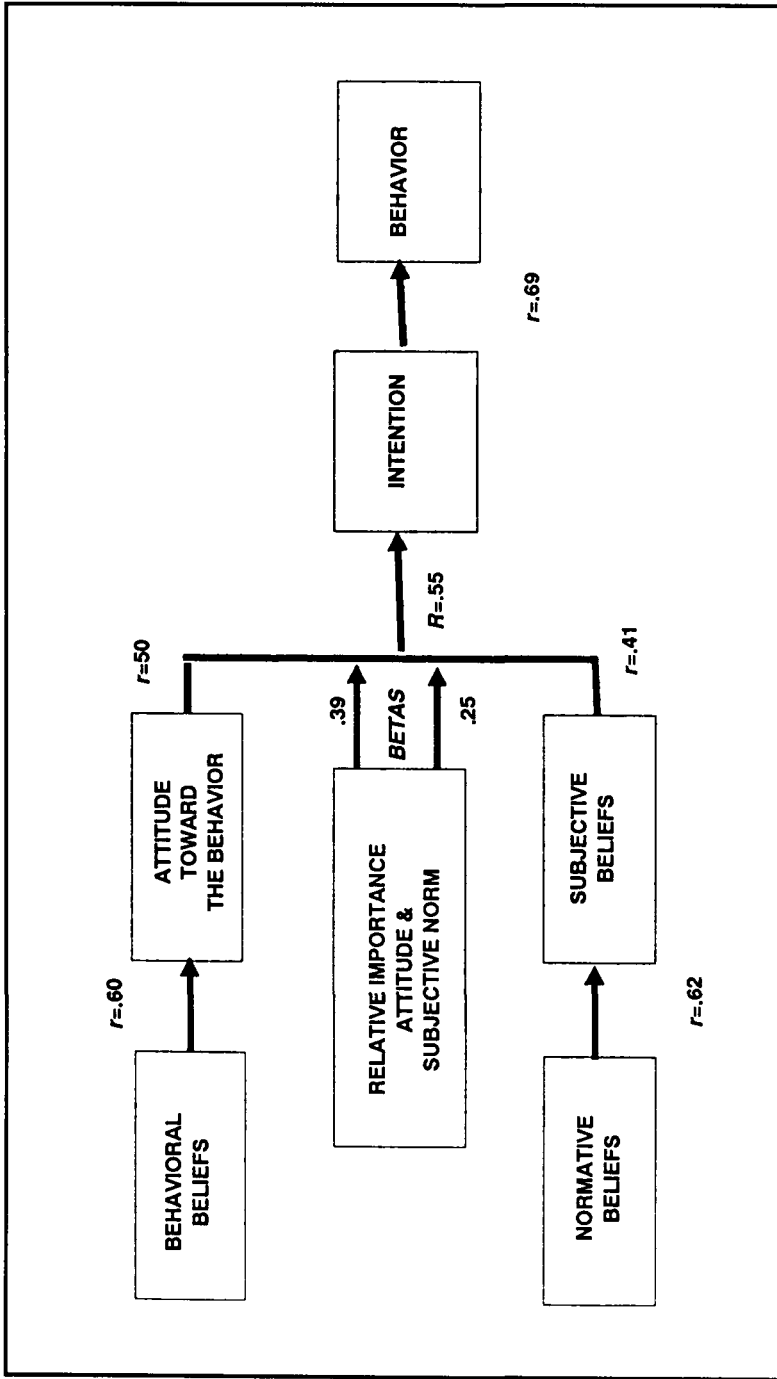


Figure 2. Factors influencing paper recycling. Note: Arrows indicate direction of influence. (Adapted from Ajzen and Fishbein [45].)

pressure to recycle their paper planned to recycle more of their paper and subsequently reported doing so.

The results indicate that it is possible to influence paper recycling actions by influencing beliefs about the consequences of performing recycling and about the expectations of specific referents with regard to paper recycling. Knowledge of these beliefs can be an essential guide in developing an intervention strategy for promoting paper recycling. The impact of the current newspaper recycling glut on such beliefs needs to be studied for this reason.

While the study suggests that the Ajzen-Fishbein theory of reasoned action provides a fairly clear blueprint for predicting and understanding individual behavior impacting the environment, it is important that each investigator take precautions to tailor the theory to the behavior(s) in question [55]. For example, it must be understood that there were no apparent socio-institutional constraints impeding faculty paper recycling in this study and that if recycling facilities and services had not been provided to all of the faculty then the ability to accurately predict paper recycling would no doubt have been weakened [45].

Further tests of this theory, using direct behavioral observations with other ecological behaviors, such as those related to conservation, pollution and population, are needed to continue assessing the value of the theory in environmental applications. Improved understanding of the institutional, social and socio-psychological factors affecting environmental behavior may help ensure continued sustainability of living systems, including human social systems.

ACKNOWLEDGMENTS

The author would like to thank Terrence J. Flanagan of Loyola University; Myron Lathan of DePaul University; E. R. Mahoney, John G. Richardson and Carl S. Simpson of Western Washington University; Lynn A. Robbins of Huxley College of Environmental Studies; William R. Catton Jr., Professor Emeritus of Washington State University; Riley E. Dunlap, Peter Burke, Viktor Gecas and Rodney K. Baxter of Washington State University for their helpful comments on earlier drafts of this paper.

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