WHY PEOPLE RECYCLE:

AN APPLICATION AND TEST OF THE THEORY

OF REASONED ACTION AND IDENTITY THEORY

A Thesis

BY

YEONGI SON

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the
degree of

MASTER OF SCIENCE

May 1992

Major Subject: Sociology

WHY PEOPLE RECYCLE:

AN APPLICATION AND TEST OF THE THEORY

OF REASONED ACTION AND IDENTITY THEORY

A Thesis

BY

YEONGI SON

Approved as to style and content by:

Jane Sell (Chair of Committee)	Olga Pendleton (Member)
Alex McIntosh (Member)	Ben Crouch (Head of Department)

May 1992

ABSTRACT

Why People Recycle:
An Application and Test of The Theory
of Reasoned Action and Identity Theory. (May 1992)
Yeongi Son, B.A., Korea University;
B.S., Utah State University
Chair of Advisory Committee: Dr. Jane Sell

This study seeks to replicate the work of previous researchers (Charng et al. 1988) which compares predictions of intended and actual recycling behavior based on theories of reasoned action and identity theory. A stratified, random sample of 50 recyclers was taken from the study population. Using least squares regression in a preliminary analysis of the data, it was found that the addition of identity theory variables such as role-person merger, habit, and social relations did not consistently improve the explanation of intended and actual recycling behavior, as found by Charng et al. (1988) over the more parsimonious Fishbein-Ajzen model. A logistic regression of the Fishbein-Ajzen and Augmented models on intended and actual behavior for two developmental stages indicated that the Augmented model was significant in predicting both intended and actual recycling behavior across all stages. The parsimonious Fishbein-Ajzen model was significant in predicting only actual recycling

behavior for stage 1 and stage 2 recyclers. After applying the likelihood ratio test statistic (G) comparing the two models, it was concluded that there is an advantage to including identity theory variables in the Augmented model.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

STATEMENT OF PROBLEM

The ever increasing depletion of natural resources in the U.S and throughout the world has received growing attention from a variety of academic disciplines such as economics, sociology, psychology, political science, and environmental researchers, as well as concerned citizens. In this research I intend to examine the issue of recycling using both the Fishbein-Ajzen theory of reasoned action and identity theory. I propose, as did Charng et al. (1988) that both theories aid in understanding recycling behavior. Specifically, this study will augment the Fishbein-Ajzen model by incorporating variables from identity theory, as did Charng et al. (1988), except for two major differences: 1) the behavior under study, and 2) a different setting. By testing this model under a different situation and on a different behavior, this research will test the validity and generalizability of the Charng et al. (1988) model as a means of theory development. The Hypotheses underpinning this research will be similar to those posited in Charng et al. (1988, p. 306).

Awareness of the problem of exhausting vital resources was heightened during the fuel shortages of the early to mid-seventies (Reid et al. 1976). Since then, the concern

---

Journal model is Social Psychology Quarterly.

for this ecological crisis has been demonstrated by the establishment of a number of local, national, and international organizations for dealing with the problem (Sewell and Foster 1971). One option proposed by policy makers and environmental researchers for dealing with these problems is at-source separations and recycling of household waste. Implicit in this proposition is the idea that personal behaviors can make a difference, since it would require individuals working independently at the household level to effectively reduce waste accumulations on a local, regional, or even global scale.

The rate at which paper, plastic, aluminum and other recyclable materials are produced and wasted constitutes one component of the environmental problem, but another equally important component of the problem is the relatively little amount of pro-ecological behavior required to effectively reduce the amount of waste accumulating in the environment through recycling. Americans throw away on a daily basis about three to five pounds of trash, amounting to nearly three tons per year for an average household. Since the 1920s the rate of solid waste generation has increased about five times as rapidly as the population (Melosi 1981).

In 1970 the consumption of paper products in the U.S totaled nearly 60 million tons (Reid et al. 1976). By 1971 over 125 million tons of solid waste was generated. The amount of newsprint consumption per capita increased from 80

pounds in 1962 to 99 pounds in 1972 (Reid et al. 1976). In addition to the increasing usage of newsprint the eventual depletion of timber resources adds considerably to ecological problems. Newsprint comprises about 20% of solid waste in some urban areas, and the amount of newsprint consumed in 1972 translated to an annual cut of approximately 155 million trees (Millier 1974). Solid waste generated in 1980 reached nearly 150 million tons; and projections made in the mid-eighties indicated that it would top 200 million tons by 1990 (De Young 1986).

Predicted shortages of fuel and paper products, as well as food and other natural resources have caused a great deal of concern for finding ways to conserve our natural resources. To address this concern many urban areas have spent enormous amounts of money on solid waste management, which represents a considerable tax burden on citizens. In 1960 Americans spent one billion dollars to collect and dispose waste. By 1980 this figure rose to over four billion dollars, and was expected to reach six million dollars by 1985 (Purcell 1980). These data reflect a pressing need to find a viable solution for this problem. This topic is important for studying and developing appropriate behavior theory (Humphery et al. 1977) that will help explain, and in turn, facilitate planners efforts in developing and implementing appropriate recycling plans. Additionally, it provides an arena for studying the relationship between

attitudes, identity, and behavior.

"The term "recycling" denotes the return of a discarded material or article to the same product system, such as the return of waste paper to make new paper" (Barton 1979, p. 3). This is a rather low-tech strategy that offers a cost-effective solution to the problem of solid waste management and ecological degradation (De Young 1986). Reusing metals, glass, and paper products as resources, rather than waste, for instance, could make a significant contribution toward the solution of these ecological problems (Luyben and Bailey 1979). But pro-ecological or recycling behavior among the general populous has not been widely adopted. For everyone to reap equally the benefits of recycling everyone must participate. At least this is the stand taken by those promoting the concept of a clean and safe environment as a public good, because the payoff is highest if everyone cooperates. Those that don't participate in recycling, but benefit from it by enjoying a lower cost of goods from recycled material and a cleaner environment at the cost of those that have paid by participating, would be called 'free riders'; a person who receives a good without paying for it. The study of recycling, therefore, is significant for several reasons. Besides holding the possibility of resolving some of our ecological problems, it is of theoretical importance to social psychologists because recycling constitutes a voluntary behavior that involves no

extrinsic reward, and helps to understand how common attitudes favoring conservation and ecological awareness will be carried over into behavior that can improve environmental quality. Furthermore, it provides an additional setting and type of behavior to be studied.

This chapter has stated that the problem of ecological degradation is ever increasing and that solutions may be found by investigating and applying appropriate behavior theory. Chapter two consists of a review of literature related to behavioral analysis and ecological issues.

The establishment of hypotheses and indication of the relationships of the variables to be studied will be developed into a conceptual framework in chapter three. The methods of operationalizing this research, and the instruments used for measuring the variables will be discussed in chapter four. In chapter five the data and results will be presented. Conclusions and discussion will be developed in chapter 6.

CHAPTER II

REVIEW OF RELATED LITERATURE

In recent years there has been a number of behavioral studies designed to alter ecologically relevant behavior by manipulating prompts (eg., reminders and informational brochures) as antecedent stimuli to produce behavior change (Geller 1973a, 1973b; Finnie 1973). Others have investigated the use of rewards to promote ecologically relevant behavior (Clark et al. 1972; Chapman and Risley 1974; Everett 1973; powers et al. 1973; Kohenberg and Phillips 1973).

PROMPT, REWARDS, AND PROXIMITY OF RECYCLING CONTAINERS AS DETERMINANTS OF RECYCLING BEHAVIOR

In one study, Geller (1973a) used prompts as antecedent stimuli and found that they produced an increase in the number of returnable bottles purchased in a convenience store, and they also reduced littering of paper cups and the littering in a lunchroom area as well (Geller 1973b). The availability and attractiveness of litter receptacles were found to be important variables by Finnie (1973) in reducing litter on limited access highways and on urban streets.

Reid et al. (1976) in a newspaper recycling study found that both locations of close physical proximity to common activities of newspaper recycling containers and prompting people to recycle newspaper by informing them of locations of recycling containers were associated with an increase in

newspaper recycling among residents in an apartment complex. Luyben and Bailey (1979) performed a systematic replication of the Reid et al. (1976) study with a different subject population and compared the approach taken by Reid et al. (1976) with a strategy based upon the use of rewards for recycling. Reasoning that making recycling containers more convenient and offering rewards for recycling would be a way to effectively increase newspaper recycling, their study produced results that met their expectations indicating that both the prize (monetary rewards) and proximity (convenience of recycling containers) procedures produced increases in newspaper recycling, but overall the prize condition was more effective. Luyben and Bailey (1979) suggest the effectiveness of offering rewards to children for recycling papers and making recycling containers more convenient. Jacobs and Bailey (1982-1983) reported on the effectiveness of a monetary reward in increasing participation in a residential newspaper recycling program. And Luyben and Cummings (1981-1982) found that the combination of a prompt, lottery, and contest was more effective in promoting beverage container recycling than a baseline treatment using only the prompt and convenient recycling containers.

While the above cited investigations demonstrated in general that prizes and proximity can influence recycling behavior, other researchers have investigated behavioral strategies such as prompting and providing information.

In some of these studies prompting people to recycle with regular reminders, either alone or in conjunction with other strategies has been successful (Jacobs and Bailey 1982-1983; Luyben and Bailey 1979; Luyben and Cummings 1981-1982; Luyben et al. 1979-1980; Reid et al. 1976), but not too successful in others (Jacobs et al. 1984; Witmer and Geller 1976).

INTRINSIC MOTIVATION, SATISFACTION, AND ALTRUISM AS DETERMINANTS OF RECYCLING BEHAVIOR

A few recycling studies have departed from a behaviorist tradition to suggest the importance of manipulating attitudes to affect behavior change. For example, De Young (1985-1986) found that the most important reasons for recycling were intrinsic motivation and personal satisfaction. De Young (1986), for instance, recognized that prior research had taught us very little about the sources of satisfaction gained during peoples daily lives and as a result focused his research on understanding the structure of satisfactions derived from everyday activities, in particular the satisfactions derived from the recycling of household solid waste materials. His findings indicated that the satisfactions people derived from recycling were distinct and specific. The satisfactions were frugality, the avoidance of wasteful practices, and participation, being in activities that could make a long-term difference in the

reduction of solid waste accumulations. His research finding suggested that our understanding of why people bother to conserve resources may be improved by investigating the personal satisfactions derived from conservation activities. The findings of this research were part of a broader program for environmental research (De Young 1986; De Young and Kaplan 1985-1986) which also showed that ecologically concerned people do not seek economic advantages but rather the general satisfaction of knowing they are doing something worthwhile and beneficial.

While De Young's research (1986) tended to focus on the general psychological aspects of recycling in order to explain recycling behavior, Hopper and Nielson (1991) took a different approach to understanding this phenomena. These researchers sought to determine the extent to which recycling could be conceptualized as altruistic behavior. The researchers claimed that results of their experiment and survey confirmed that recycling behavior was consistent with Schwartz's altruism model because the relationships among recycling behavior and the scaled attitude variables were precisely the same (Hopper and Nielson 1991), and substantiates the hypothesis that pro-ecology behaviors are shaped by moral norms. A critical feature of Schwartz's (1977) altruism model is that people's actions and verbal endorsements of norms are discordant. Thus the crucial link in the model is between personal norms and behavior, because

individuals may internalize certain norms but may not act in accordance with them. According to Schwartz, two variables are important for translating altruistic norms into individual behavior. These are 1) awareness of the consequences that action or inaction will have, and 2)the ascription of responsibility for those consequences. Thus when an individuals awareness of consequences are high, and that individual takes responsibility for those consequences, then that individuals' behavior is guided by personal norms. In a study conducted by Schwartz (1977) empirical evidence demonstrated the capability of his model to show that the effect of a social norm is entirely mediated through the personal norm and that awareness of consequences and taking responsibility for those consequences are represented in an individuals' behavior by reflecting their personal values and attitudes. In other words, an individual behaves according to the way society influences him/her (see figure 1. of Hopper and Nielson 1991, p. 200).

Hopper and Nielson's (1991) findings further showed that a factor responsible for influencing altruistic norms, and increasing altruistic norms and increasing recycling behavior, was the presence of a block-leader program in which residents encouraged their neighbors to recycle. When prompting and information strategies were introduced into a community recycling program as an experimental intervention, their results showed that prompting and information

increased recycling behavior, but did not affect norms and attitudes. The presence of block leaders was shown to have the most substantial impact on recycling attitudes, information had the least. Their data also indicated that more than simple prompts in the way of reminders and informational brochures were necessary to influence attitudes. Following a similar vein of research, Davidson-Cummings (1977) also found that recyclers who transported materials to a local recycling drop off site described moral and altruistic motives for recycling.

ATTITUDES AND NORMATIVE BELIEFS AS DETERMINANTS OF RECYCLING BEHAVIOR

In spite of the variety of approaches taken in previous research to explain recycling, one theory in particular has been especially influential for understanding the relationships among behavior, beliefs, and attitudes appears in a series of articles by Fishbein (1967). In an article written in 1965 (Anderson and Fishbein, p. 437), Fishbein expressed his summation theory by using the formula $(A_o = \sum_{i=1}^{N} B_i a_i)$,

where:

A_o = The attitude toward object "o"
B_i = the strength of belief i about "o" (i.e., the probability that "o" is related to some other object "x_i")
a_i = the evaluative aspect of Bi(i.e., the evaluation of x_i)
N = the number of beliefs.

What this theory explains is that an individual's attitude toward any object can be predicted to be partly a function of the total amount of influence associated with each of the individual's beliefs about an object. This is slightly different than Osgood's congruity theory which is based on the principle of balance or consistency, and predicts that an individual's attitude is partly a function of the mean amount of the influence (or affect) associated with an individual's beliefs. Many studies (Fishbein and Hunter 1964; Trandis & Fishbein 1963; Kerrick 1958) have provided support for summation theory.

Bruvold (1972) tested hypotheses of attitude-belief and attitude-behavior consistency in a piece of research that involved water resource issues in California. His research dealt with attitudes toward the use of reclaimed water for swimming, behavior involving community recreational areas supplied with reclaimed water, and beliefs regarding California's need for new water resources and the relative merits of scientific versus natural methods of water purification (Bruvold 1972). The results from his research provided support for the consistency hypotheses he developed. The major difference, though, in Bruvold's (1972) research and Anderson and Fishbein's (1965) was the way in which beliefs, attitudes-belief consistency, and attitude-behavior consistency were defined. Anderson and Fishbein's (1965, p. 437) definition of attitude is

consistent with Osgood et al. (1957) as "the evaluative dimension of a concept, where the term " concept" refers to any discriminable aspect of an individual's world, verbalizable or not", and Osgood et al. (1957) can be described as a mediating evaluative response associated with any stimulus . Belief was defined "as the probability dimension of a concept" (Anderson and Fishbein 1965, p. 437). Bruvold (1972, p. 127) , on the other hand, defined belief "as an assertion regarding the natural universe accepted as true by the individual rather than as a perceived relation between attitudinal objects". Attitude was defined as "the unidimensional affective reaction toward a denotable object or proposition" (Bruvold 1972, p. 127). Consistency, Bruvold (1972) defined "in terms of diadic consequence of attitude with belief or behavior" (p. 128). Nevertheless, he reported interesting results from relating several different types of behaviors and beliefs together with attitude. These results were similar to what was reported in Anderson and Fishbein (1965). For example, whereas Anderson and Fishbein (1965) found that affective response toward an attitude object was a function of the many beliefs held regarding that object, Bruvold's (1972) data offered support to this view in that the correlation between the number of "positive" beliefs and attitude toward the use of reclaimed water for swimming found in his studies was significant. However, although his results also showed

that in some instances specific attitude-belief and attitude -behavior consistencies were not always statistically significant, he claimed that there was enough evidence to suggest that there was consistency of attitudes with beliefs and behavior when several beliefs or several behaviors were assessed.

These hypotheses were further elaborated in Bruvold (1973). In a study similar to his previous research (Bruvold 1972), Bruvold (1973) undertook a study in 1973 that followed previous developments in social psychology regarding the relationship between beliefs and attitudes, and closely adhered to Anderson and Fishbein's (1965) model that related behavior to attitudes.

In this study Bruvold (1973) proposed and tested hypotheses dealing with relationships between environmental beliefs and attitude, and between environmental behavior and attitudes. The primary focus of his effort was the study of behavioral responses to water reclaimed from domestic sewage in which he elaborated on previous hypotheses proposed in Bruvold (1972). The central findings of this research was that a more useful understanding could be obtained when the relations of many aspects of belief and of behavior to attitude are considered jointly. Useful theoretic and applied consequences, Bruvold (1973) argued, should be considered from these concepts that he developed, and suggested generalizing them to other environmental topics.

His research further indicated that relations between affect and "single units" of belief or behavior will likely not be impressive, and argued that a more useful understanding would be obtained by jointly considering the relation of many aspects of belief and of behavior toward attitude.

CHAPTER III

CONCEPTUAL FRAMEWORK

As stated earlier, this study seeks to examine recycling behavior by using an augmented Fishbein-Ajzen model that was developed by Charng et al. (1988) which incorporates variables from identity theory. The assumption of Charng et al. (1988) was that the theory of reasoned action would be enhanced by adding these other theoretical constructs such as "centrality of role identity in relationship to the activity, social relations connected to the activity, and habit" (p. 306). The inclusion of these variables in the model offers more to the development of behavior theory than just improving the explanatory power of the Fishbein-Ajzen model. These variables, taken from identity theory also help explain variation in behaviors across the social structure, which is not accomplished by the Fishbein-Ajzen model alone (Charng et al. 1988). Identity theory, unlike the theory of reasoned action, is based on the premise that an individuals behavior is the product of an interaction process influenced by definitions of the self, other, and the social setting that are limited by the social structure.

As can be seen in the review of related literature, several studies of behavior theory that focused on conservation behavior, encouraging environmentally appropriate behavior, and psychological aspects of recycling

have noted the significance of attitude, satisfaction, and normative beliefs as intervening variables (eg., De Young 1986; Hopper and Nielson 1991; Bruvold 1972, 1973; Anderson and Fishbein 1965) in explaining and predicting recycling behavior.

Another stream of attitude research in particular that has received much attention for predicting behavioral intention is that based on the Fishbein-Ajzen model (Ajzen and Fishbein 1969, 1970, 1973, 1977; Wilson et al. 1975; Bouman and Fishbein 1978; Bentler and Spekart 1979; Manstead et al. 1983; Ajzen and Madden 1986). This model is different from their summation theory discussed earlier which uses an individuals beliefs about an object to predict their attitudes. Fishbein and Ajzen (1975) and Ajzen and Fishbein (1980) have described a model of behavioral intentions that aids understanding of numerous behaviors such as smoking, weight reduction, family planning and voting behavior. The model proposes that volitional behavior is determined by intentions to perform that behavior and subjective norms concerning the behavior.

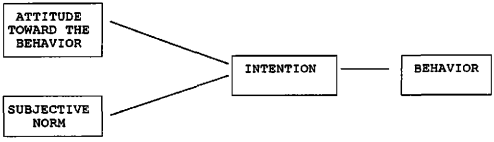


Figure 1. Ajzen and Fishbein's Theory of Reasoned Action

Ajzen and Fishbein (1980) argue that attitude and subjective norms are sufficient to predict behavioral intentions. Further, attitudes are predicted by behavioral beliefs, and subjective norms are predicted by normative beliefs (see Fig 1). The theory holds that a persons behavior (B) is a function of his behavioral intentions (BI) which is determined by his attitude toward the act (A-act) and by his beliefs about the expectations of another player,i.e., social normative beliefs (NBs) (Ajzen and Fishbein 1970). These relations have been explained in a symbolic form which may help to clarify the components involved in the model (Ajzen and Fishbein 1969, p. 401);

$$B \sim BI = [A\text{-act}]\, W_o + [NB_p]w_1 + [(NB_s)(Mc_s)]w_2$$

where B : Overt Behavior
BI : Behavioral Intentions
A-act: Attitude toward the behavior in a given situation
NB_p : Personal normative beliefs
NB_s : Social normative beliefs i.e., expectations of others
Mc_s : Motivation to comply with social normative beliefs
W_o,W_1 and W_2 : Empirically determined weights.

This theory of reasoned actions developed by Fishbein and Ajzen (1975; Ajzen and Fishbein 1980) is a parsimonious model that attempts to account for a variety of behaviors by reference to a small number of concepts that are linked together in a single theoretical system. But the method in which this model was tested leaves its external validity and generalizability questionable. Therefore, investigating the

usefulness of the Fishbein-Ajzen model will be a primary aim of this study in order to examine the applicability of this theory to the prediction and understanding of the behavioral intentions of recyclers in a sample of individuals from the general population. Additionally, in an attempt to increase the explanatory capability and predictability of the model, this study will also seek to augment the Fishbein-Ajzen model by incorporating variables from identity theory (see Charng et al. 1988). The reason for incorporating identity theory into the model rather than any other theory is because of the important implication that role-identity salience or centrality has in its association with behavior: "the more salient the role identity, the higher the probability that the individual will behave consistently with that identity" (Charng et al. 1988, p. 304). Role-identity and hierarchy salience are potentially important predictors of behavior (Stryker 1968). Thus, predictions and a better understanding of repeated behavior may be attained if some measure of an individuals self-concept were added to the variables of the Fishbein-Ajzen model of reasoned action in relation to the behavior to be predicted.

Identity theory, which grows out of the root idea of symbolic interactionism, suggests that one's self-concept is organized into a hierarchy of role identities that correspond to one's positions in the social structure (Burke

1980; McCall and Simmons 1978). Role identity is the character and the role that an individual devises for himself as occupant of a particular social position. Charng et al. (1988, p. 304) explains that "the relative importance of a given role-identity in one's self-structure is generally referred to as the salience of the role-identity. The extent to which a role is internalized as part of the self has been referred to as 'role-person merger' (Turner 1978)." The concept of identity salience has its root in James' (1890) notion of multiple selves and the varying degree of value placed on each.

Social context variables have mainly been used to explain variation in role-identity salience or centrality (Charng et al. 1988). As stated by Charng et al. (1988, p. 304), "the degree to which significant others identify the actor with the role identity (Turner 1978), the amount of social support one receives in the role identity (Mc Call and Simmons 1978), and the relative size of one's social network linked to the role identity (Stryker 1980), all have been identified as key variables influencing the strength, salience, or certainty of role identities." Furthermore, in contrast to the Fishbein-Ajzen's inability to explain consistent behavior over time (Charng et al. 1988), because behavioral intentions could change after they have been measured, one might expect behavioral intentions to predict repeated behavior over a considerable period if an

individuals intentions were based on a central or salient role identity. Compared to the identity theory, Fishbein and Ajzen's model by itself generally should be less able to explain consistent behavior over time. According to the Fishbein and Ajzen model, "The longer the time interval between the measurement of intention and the observations of behavior, the less likely it is that the intention measured will predict overt behavior accurately" (Ajzen and Fishbein 1973, p. 44), and as a result, "the lower the behavioral intention-behavior correlation will tend to be" (Ajzen and Fishbein 1969, p. 401). Charng et al. (1988) has reinforced this idea and suggested that behavioral intentions will predict repeated behavior over a considerable period, if those intentions are based on central or salient role identity. In Charng et al.'s (1988) study they also added two additional factors to deal with repeated behavior, that is, social relations and the matter of habit. Therefore by adding the identity theory variables to the Fishbein-Ajzen model this study hopes to improve the prediction of both intention and behavior more strongly for individuals farther along in their activities of recycling behavior.

In general terms the hypotheses underpinning this research are similar to the ones posited in Charng et al. (1988, p. 306) except for two major difference: these differences are the behavior under study and the setting in this research. Whereas Charng et al. (1988) determined the

importance of variables such as role identity, social relations connected to blood donation, and habit in the prediction of intentions and blood donation by using an augmented model that incorporated both the Fishbein-Ajzen model of reasoned action and identity-theory variables, this research is aimed at testing the same augmented model used in Charng et al. (1988), but studying a different behavior instead i.e. recycling. In Charng et al. (1988, p. 303) they interpreted their results "to mean that although the Fishbein-Ajzen model may be the most parsimonious model for the prediction of many non-role behaviors, it should be augmented with identity theory variables for the prediction of established role behaviors." If the results of this research provides further validation for Charng et al. (1988) augmented model, then this theory may be generalized to a variety of behaviors besides just blood donation. Therefore, in following with Charng et al. (1988), the specific hypotheses underlying this research are as follows:

1) The theory of reasoned action will be applicable to repeated behavior: attitude toward recycling and subjective norms will predict intentions to recycle over a one month period; intention alone will predict the actual behavior (see Fig. 1).

2) The prediction of intention to recycle and of actual recycling behavior will be improved by the addition of variables from identity theory: Role-person merger, social

relations of recycling, and habit (see Fig. 2).

3) Adding the identity theory variables will improve the prediction of both behavioral intention and behavior more strongly for recyclers farther along in their activities of recycling behavior "careers."

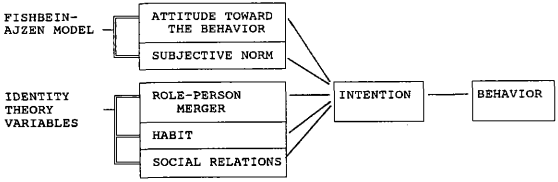


Figure 2. Augmented Model incorporating both the Ajzen and Fishbein's Model of Reasoned Action and Identity Theory Variables for Predicting Behavioral Intentions and Recycling Behavior.

CHAPTER IV

METHODS AND MEASURES

The data in this study were obtained from a structured questionnaire to be administered at four recycling centers. These four recycling centers were chosen because they did not offer monetary rewards in Bryan and College Station, Texas: City of Bryan Solid Waste Department, The Deluxe, Friends of The Library, and Twin City Mission.

The recycler was selected at random. This was accomplished by assigning two digit numbers to the hours which the recycling centers are open, and then use a table of randomly generated numbers to select numbers that correspond to a certain hour. Interviews were conducted at those hours selected at random. For example, a recycling center that is open from 8:00 a.m to 5:00 p.m will have nine hours to which corresponding two digits numbers will be assigned:

8 a.m	00
9 a.m	01
10 a.m	02
11 a.m	03
12 noon	04
1 p.m	05
2 p.m	06
3 p.m	07
4 p.m	08

Two digit numbers are assigned to each hour in order to give every hour the same known chance of selection (Nachmias 1981). All respondents that arrive at the centers during the randomly selected times will be interviewed. For example, using a table of random digits found in Appendix B of Nachmias (1981, p. 519) and dropping the last three digits of the five digit numbers listed there, one may proceed down column one until a 2 digit number in the 00 to 08 range appears. In this case that number is 07, which corresponds to 3 p.m. The second two digit number in this range is 02, which corresponds with 10:00 a.m. and the third random hour selected corresponds to 01 which is 9:00 a.m..

Each respondent was asked if he/she would participate in a follow up interview by phone, and if willing was paid $5.00 for their time and assistance in this research. The phone number and address of the interviewee was taken for this purpose.

Questionnaire items, developed by following the suggestions in Ajzen and Fishbein (1980), will assess each component of the Fishbein and Ajzen model: attitude toward behavior, subjective norms, and behavioral intentions; and role identity theory: role-person merger, social relations, and habit.

1. Attitudes toward recycling will be measured using a single item (e.g., "In general, my attitude toward recycling is..."). The scale end-points will be labeled favorable /

unfavorable and positive / negative with two seven-point semantic differential scales.

2. Subjective norms will be assessed by a seven-item scale which is rated on a seven-point strongly agree/strongly disagree scale; responses will be summed to form the scale score.

1. Other people think that recycling is important to me.

2. It is important to my friends and relatives that I continue to recycling.

3. It really would not matter to most people I know, if I decided to give up recycling (reversed).

4. No one would really be surprised if I just stopped recycling (reversed).

5. Many people would probably be disappointed in me if I just decided to stop recycling.

6. Many of the people that I know expect me to continue recycling.

7. Others would probably make me feel guilty if I quit recycling

3. Behavioral intention will be measured by asking subjects directly;

How many times do you intend to take recyclable products to a recycling center next month, and how many items do you intend to recycle?

4. Role-person merger will be assessed by asking questions

that can be answered dichotomously i.e., yes or no.

1. Recycling is something I rarely even think about (reversed).

2. I would feel a loss if I could not recycle.

3. I really do not have any clear feelings about recycling (reversed).

4. For me, being an environmentalist means more than just the act of recycling.

5. Recycling is an important part of who I am.

5. Social Relations will be measured by asking respondents to answer the following questions with the appropriate number. The items are scored from 0 to 5, with 5 equalling 5 or more. The items will then be summed to form total scale on which a Cronbach's alpha reliability coefficient will be performed.

1. Of all the people you know through recycling, how many are important to you, i.e., You would really miss if you did not see them?

2. Think of those people that are important to you. About how many would you lose contact with if you stopped recycling ?

3. How many people do you know on a first name basis through recycling ?

4. Of the people you know through recycling, how many are close friends ?

5. Of the people you know through recycling activities,

how many participate in other activities with you ?

6. Habit

How often have you taken recyclable products to a recycling center each month ?

7. Actual Recycling Behavior was determined by responses given in a follow-up interview that was conducted one month after the initial interview. This was accomplished by assessing the actual number of times the individual engaged in recycling behavior the previous month: "How many times did you take recyclable products to a recycling center last month ?", for example, and "What kinds of products did you recycle ?"

Due to the way in which the dependent and independent variables are measured (i.e., as nominal and ordinal; recycled or did not recycle or agree-disagree on a 7 point scale, for example) ordinary least squares regression was used to determine the relative importance of the independent variables in predicting recycling behavior.

CHAPTER V

RESULTS

RESPONDENT CHARACTERISTICS

Sixty-eight percent (Table 1) of the respondents were women. The distribution of age among respondents was concentrated in three of the age categories. The 21-30 year old group contained 42% of those surveyed; which was followed by the 31-40 age group with 20%, and 51 or over age groups with 22%. There were relatively few (4%) recyclers surveyed in the 41-50 age group, and only 12% were under 20 years of age.

TABLE 1. Respondent Characteristics

	Frequency	Percent	Cumulative Frequency	Cumulative Percent
SEX				
Male	16	32.0	16	32.0
Female	34	68.0	50	100.0
AGE				
20 or Under	6	12.0	6	12.0
21-30	21	42.0	27	54.0
31-40	10	20.0	37	74.0
41-50	2	4.0	39	78.0
51 or Over	11	22.0	50	100.0
MARITAL STATUS				
Married	22	44.0	22	44.0
Widowed	3	6.0	25	50.0
Divorced	2	4.0	27	54.0
Never Married	23	46.0	50	100.0
CHILDREN				
None	31	64.6	31	64.6
One	1	2.1	32	66.7
Two	4	8.3	36	75.0
Three	7	14.6	43	89.6
Four	4	8.3	47	97.9
Eight or More	1	2.1	48	100.0

Frequency Missing = 2

As far as marital status goes, the respondents were somewhat evenly divided. There were 44% that were married,

and 46% that were never married. Only 6% were widowed and 4% were divorced.

Most of the respondents had no children (65%), although nearly 15% had at least three. A few had one (2%) or two (8%) and only 1 (2%) had eight or more. The majority of the respondents were college educated (72%) (Table 2) with either an associates degree(16%), a bachelor's degree (34%) or a graduate degree (22%). Family income was high among the respondents. About 23% (Table 2) made over $55,000 per year. The next highest family income group was the $40,000 to $44,999 category (19%), closely followed by the $10,000 to $14,999 range (13%), and lastly by the under $5,000 (11%) family income group. The most frequent occupation cited among respondents was graduate student (44%) (Table 2). Other occupations were fairly evenly distributed. The second most frequent occupation was professor (8%).

TABLE 2. Socioeconomic Status of Respondents

	Frequency	Percent	Cumulative Frequency	Cumulative Percent
EDUCATION				
High School	13	26.0	13	26.0
Junior College	8	16.0	21	42.0
Bachelor's	17	34.0	38	76.0
Graduate	11	22.0	49	98.0
No Answer	1	2.0	50	100.0
FAMILY INCOME				
Under $5,000	5	10.6	5	10.6
$5,000 to 9,999	3	6.4	8	17.0
$10,000 to 14,999	6	12.8	14	29.8
$15,000 to 19,999	1	2.1	15	31.9
$20,000 to 24,999	2	4.3	17	36.2
$25,000 to 29,999	2	4.3	19	40.4
$30,000 to 34,999	1	2.1	20	42.6
$35,000 to 39,999	2	4.3	22	46.8
$40,000 to 44,999	9	19.1	31	66.0
$45,000 to 49,999	3	6.4	34	72.3
$50,000 to 54,999	2	4.3	36	76.6
Over $55,000	11	23.4	47	100.0
Frequency Missing = 3				
OCCUPATION				
Science Writer	1	2.0	1	2.0
Graduate Student	22	44.0	23	46.0
Librarian	1	2.0	24	48.0
Professor	4	8.0	28	56.0
Guide	1	2.0	29	58.0
Scheduling Coordinator	1	2.0	30	60.0
Office Manager	2	4.0	32	64.0
Retired	2	4.0	34	68.0
Home Maker	3	6.0	37	74.0
Waitress	1	2.0	38	76.0
Floral Designer	1	2.0	39	78.0
Computer analyst	1	2.0	40	80.0
Technician	1	2.0	41	82.0
Owner	1	2.0	42	84.0
Interpreter	1	2.0	43	86.0
Teacher	2	4.0	45	90.0
Engineer	1	2.0	46	92.0
Church Work	1	2.0	47	94.0
Sales Person	1	2.0	48	96.0
Retail	1	2.0	49	98.0
Child Care Worker	1	2.0	50	100.0

PRODUCTS RECYCLED BY RESPONDENTS

To the question; what kinds of recyclable products have you taken to a recycling center each month? (question 13 of survey, see in appendix), respondents' answers were

distributed over a variety of intended, habitual, and actual behaviors (Table 3). Paper was the most frequently recycled product among respondents. When the initial survey was taken, 92% of the respondents had intentions (Intended Behavior) of recycling paper in the future, 90% had recycled paper each month up to that time (habit), and 80% of the respondents had actually (Actual Behavior) taken paper to a recycling center a month later as indicated by responses given in a follow-up phone interview conducted one month after the initial survey. The second most frequently recycled product was aluminum. In the initial interview 42 respondents (84%) had intentions of recycling aluminum products, and 36 of them (72%) had already established a habit of recycling aluminum. The follow-up interview showed that 32 of the respondents (64%) had actually recycled aluminum products a month later. Plastics and glass products appear to have been recycled by respondents with about the same frequencies, across intended, habitual, and actual behaviors. Over 60% of the respondents recycled plastic, and their responses were consistent among all three levels of behavior: intend, 31 (62%); habit, 32 (64%); and actual behavior, 33 (66%). Glass was about the same, 32 (64%) respondents had intentions of recycling glass in the future and 33 of them (66%) had already formed a habit of it at the time of the survey. A month later 28 respondents (56%) had actually recycled glass products as intended. Grocery Bags

TABLE 3. Products Recycled by Respondents

	BEHAVIOR		
PRODUCT:	INTENDED FREQUENCY (%)	HABIT FREQUENCY (%)	ACTUAL FREQUENCY (%)
PAPER			
NO	4 (8.0)	5 (10.0)	10 (20.0)
YES	46 (92.0)	45 (90.0)	40 (80.0)
ALUMINUM			
NO	8 (16.0)	14 (28.0)	18 (36.0)
YES	42 (84.0)	36 (72.0)	32 (64.0)
PLASTIC			
NO	19 (38.0)	18 (36.0)	17 (34.0)
YES	31 (62.0)	32 (64.0)	33 (66.0)
GLASS			
NO	18 (36.0)	17 (34.0)	22 (44.0)
YES	32 (64.0)	33 (66.0)	28 (56.0)
GROCERY BAGS			
NO	22 (44.0)	21 (42.0)	30 (60.0)
YES	28 (56.0)	29 (58.0)	20 (40.0)
CARD BOARD			
NO	46 (92.0)	47 (94.0)	48 (96.0)
YES	4 (8.0)	3 (6.0)	2 (4.0)

was another product that showed consistency in intended, 28 (56%), habitual, 29 (58%), and actual behaviors, 20 (40%). In an open-ended question soliciting unspecified types of products that the respondents might recycle, card board appeared on 4 (8%) of the surveys as intended behavior of recycle. Only three (6%) made a habit of recycling card board, and just 2 (4%) actually recycled it according to their previous intentions to do so.

OTHER PRO-ECOLOGICAL ACTIVITIES OF RESPONDENTS

Besides asking respondents about the kinds of products they recycled, the survey also asked about other pro-ecological activities such as saving energy (turning off lights when not needed), using rechargeable batteries, and

using phosphate-free detergents (Table 4). The most frequent of pro-ecological behaviors was conserving energy use by turning off lights when they weren't needed. Thirty-nine (78%) indicated they had intentions of taking energy conservation measures. Thirty-seven (74%) had already performed this activity habitually. Respondents that actually took energy conservation measures a month later according to prior intentions comprised 72% of the respondents (36) in the follow-up phone interview. Using phosphate-free detergents was the next most frequently responded to item. Forty-two percent indicated they engaged in this activity in both intended and habitual behavior categories. Only sixteen (32%) had actually followed through a month later with their intentions of using phosphate-free detergents. The use of rechargeable batteries was the least frequent responded to pro-ecological activity on the list of items of the survey, although responses were fairly consistent across behavior categories. Sixteen (32%) had intentions of using rechargeable batteries in the future, fifteen (30%) had already formed a habit of it, and 14 (28%) actually did it a month later according to their previous intentions. As far as other pro-ecological activities go, only one (2%) had both the intentions and the habit of composting leaves, walking instead of using car, and conserving water, but no one actually did any of them according to information provided by the follow-up phone

interview conducted one month later.

TABLE 4. Other Pro-Ecological Activities of Respondents

	BEHAVIOR		
ACTIVITY:	INTENDED FREQUENCY (%)	HABIT FREQUENCY (%)	ACTUAL FREQUENCY (%)
ENERGY USE (SAVING LIGHTS)			
NO	11 (22.0)	13 (26.0)	14 (28.0)
YES	39 (78.0)	37 (74.0)	36 (72.0)
USING RECHARGEABLE BATTERIES			
NO	34 (68.0)	35 (70.0)	36 (72.0)
YES	16 (32.0)	15 (30.0)	14 (28.0)
USING PHOSPHATE (FREE DETERGENT)			
NO	29 (58.0)	29 (58.0)	34 (68.0)
YES	21 (42.0)	21 (42.0)	16 (32.0)
OTHERS			
NO	47 (94.0)	47 (92.0)	50 (100.0)
COMPOST LEAVES	1 (2.0)	1 (2.0)	--
WALK	1 (2.0)	1 (2.0)	--
CONSERVE WATER	1 (2.0)	1 (2.0)	--
NO PACKAGED PRODUCT	--	1 (2.0)	--

RESPONDENT AFFILIATIONS WITH ENVIRONMENTAL ORGANIZATIONS

Question 14 of the survey (see appendix) asked if any of the respondents belonged to any associations / clubs that promoted environmental issues, especially recycling. Of the respondents, eighty-six percent belonged to no such organizations (Table 5). Of the remaining seven (14%) who did, two belonged to the Garden club, two to Green Peace, and one each for the recycling coalition of Texas, American Medical Auxiliary, and the American Society of Landscape.

TABLE 5. Respondent Affiliations with Environmental Organizations

	Frequency	Percent	Cumulative Frequency	Cumulative Percent
AFFILIATION:				
NO	43	86.0	43	86.0
YES	7	14.0	50	100.0
ORGANIZATIONS:				
NONE	43	86.0	43	86.0
GARDENER CLUB	2	4.0	45	90.0
GREEN PEACE	2	4.0	47	94.0
RECYCLING COALITION OF TEXAS	1	2.0	48	96.0
AMERICAN MEDICAL AUXILIARY	1	2.0	49	98.0
AMERICAN SOCIETY OF LANDSCAPE	1	2.0	50	100.0

ANALYSIS OF APTNESS OF THE REGRESSION MODELS

In order to determine the appropriateness of the regression models for recycling behavior, several plots of residuals against fitted values and the independent variables of the various models were constructed.

The data assessing the Fishbein-Ajzen model predicting intended behavior did not meet the requirements for a linear regression model. Plots of residuals against the independent variables (Attitude and Subjective Norms) and predicted values were inconsistent with the conclusions of a good fit of the data. A residual plot of the Fishbein-Ajzen model predicting actual recycling behavior indicated that attitude was heteroscaedastic. The error variance of attitude increased in a trapezoidal fashion with increasing values of this independent variable. Subjective Norms, on the other hand, showed no systematic deviations from zero and appeared to fit the data well. For the augmented model predicting intended behavior residual plots of one of the Fishbein-

Ajzen variables, attitude, again showed a systematic increase in error variance with increasing values of this variable. Identity theory variables in this model that showed non-constant variance were habit and social relations. Since the residuals of these variables departed from zero in a systematic fashion, a lack of fit of the linear regression model is suggested by these residual plots. Subjective Norms and Role-person Merger appeared to fit the data well suggesting that a linear model is appropriate for these variables.

Residual plots for the augmented model predicting actual behavior were also done. As in the previous analysis attitude, habit, and social relation showed systematic departures from zero, suggesting non-linearity. Attitude showed its typical trapezoidal form of non-constant error variance. Habit showed systematic variation in being positive and negative for lower values of this variable. Likewise, the residual for social relations tended to vary systematically for lower values of this variable. Only subjective norms and Role-person Merger had residual plots that were fairly homoscaedastic. When behavioral intention was included in the Fishbein-Ajzen and Augmented models for predicting actual behavior, this variable showed some deviations at the lower levels of its measurement scale, but remained fairly constant in variance, suggesting that this variable may not be appropriately fitted to a linear model.

Table 6. Number of Items Recycled By Respondents.

	# OF ITEMS	# OF RESPONDENTS	PERCENT
INTENDED BEHAVIOR			
	0	1	2.0
	1	2	4.0
	2	12	24.0
	3	6	12.0
	4	9	18.0
	5	17	34.0
	6	3	6.0
RECYCLING HABIT			
	0	2	4.0
	1	4	8.0
	2	7	14.0
	3	9	18.0
	4	9	18.0
	5	17	34.0
	6	2	4.0
ACTUAL RECYCLING			
	0	5	10.0
	1	4	8.0
	2	7	14.0
	3	10	20.0
	4	13	26.0
	5	11	22.0

REGRESSION OF THE FISHBEIN-AJZEN AND AUGMENTED MODELS ON THE NUMBER OF ITEMS RECYCLED PER MONTH.

In order to determine which variables of the Fishbein-Ajzen and Augmented models are associated with the number of items recycled, these models were regressed on the number of responses given to question 10 of the survey; What kinds of recyclable products do you intend to take to a recycling center next month ?

In table 6 the greatest proportion of responses for

intended recycling behavior was five items per month. Seventeen respondents (34%) answered this question at the time of the initial survey stating that they had intentions of recycling five recyclable items over the next month. Twenty-four percent (twelve people) intended to recycle 2 items. Nine respondents intended to recycle four items over the next month and six respondents intended to recycle three items, and there were three people who intended to recycle six items per month. Two respondents stated intentions of recycling only one item, and only one respondent had no intentions (0 items) of recycling any recyclable item over the next month. When asked a variation of question 10 of the survey on how many recyclable items the respondents had formed a habit of recycling, the results of Table 6 indicate that, consistent with intended behavior, seventeen and nine respondents performed habitually the recycling of five and four items per month, respectively. Two indicated that they had a habit of recycling six items per month, and nine respondents said they recycled habitually three items per month. Two items per month were recycled by seven respondents. Four respondents had a habit of recycling at least one item per month, and two respondents hadn't established a habit, up to the time of the survey, of recycling at all.

One month after the initial survey was taken, a follow-up phone interview of the same respondents yielded results

in Table 6 of Actual recycling. One month later eleven respondents had actually recycled five items, while thirteen had actually recycled four items. The frequency of the responses associated with the number of items recycled do not appear to show any consistent pattern for either intended, habitual, or actual recycling behavior. Twenty percent (10 respondents) of the follow-up phone interviewees had actually recycled three items over the month, whereas in the initial survey nine respondents (eighteen percent) and six respondents (twelve percent) had recycled three items habitually or intentionally, respectively. Two items were actually recycled by only seven respondents (14%) compared to the twelve (24%) who had intentions of recycling this many items. However, four respondents actually recycled one item over the month, but only two had intentions to do so. Finally, five respondents (10%) had not recycled any items at all over the month, whereas only one (2%) in the initial survey said that they had intentions of recycling no items over the next month.

The results from the regression analysis testing the Fishbein-Ajzen model (Attitude, Subjective Norms, and Intentions) and the augmented model (Fishbein-Ajzen variables plus Identity Theory variables: Role-Person Merger, Habit, and Social Relation) for the number of items recycled over a one month period are presented in Table 7. For the Fishbein-Ajzen model predicting intended behavior,

Table 7. Regression Analysis Testing the Fishbein-Ajzen Model (1) and the Augmented Model (2) for the Number of Items Recycled for the Total sample (Entries in the table are standardized beta weights).

	INTENDED BEHAVIOR		ACTUAL BEHAVIOR	
VARIABLE	(1) BETA	(2) BETA	(1) BETA	(2) BETA
Intercept	0.000	0.000	0.000	0.000
Attitude	0.290	0.311	0.328*	0.273
Subjective Norms	0.181	0.170	0.109	0.133
Role Person Merger	--	-0.174	--	0.028
Habit	--	0.183	--	0.011
Social Relation	--	0.166	--	0.244
Intention	--	--	0.147	0.107
R-square	0.162	0.225	0.192	0.251
Adj R-SQ	0.127	0.137	0.139	0.147
Root MSE	1.408	1.400	1.479	1.472
F-value	4.551**	2.556*	3.646**	2.404*
D.F	2/47	5/44	3/46	6/43
R-square Change	--	0.063	--	0.059
F-value+	--	1.235	--	1.205

* p < .05. ** p < .01.
+ indicates increment R-square test.

neither of its variables, attitude (beta=.290) nor subjective norms (beta=.181), were statistically discernible predictors, even at the lowest level of significance ($p < .05$). However, the overall model was significant ($F_{2/47} = 4.551$) at the $p < .01$ level.

When identity theory variables were added, the ability of the Augmented model to explain variation in the number of items that respondents intended to recycle over one month was significant ($F_{5/44} = 2.556$) at the .05 level. Variables of the Fishbein-Ajzen and Identity Theory were not statistically important predictors of behavioral intentions. Adding identity theory variables to the augmented model did not improve the amount of variance explained as indicated by

an increment in R-square test.

Similar results are given for the models regressed on the actual number of items recycled (Actual Behavior) over a one month period. In the Fishbein-Ajzen model only attitude (beta=.328, $p < .05$) was a statistically significant contributor for predicting actual behavior, while subjective norms (beta=.109) was not. The model however, was significant ($F_{3/46} = 3.646$) at $p < .01$. But only 19% of the variation in the number of items recycled is explained by this model. By contrast, 81% of the variation is not explained by this model.

When identity theory variables were added to the Augmented model, no single variable in the model made a statistically important contribution to predicting Actual recycling behavior. The model is significant ($F_{6/43} = 2.404$) at the $p < .05$ level, but an increment in R-square test suggests that the addition of the identity theory variables makes no difference for the amount of variance explained.

TEST OF THE FISHBEIN-AJZEN MODEL PREDICTING INTENDED BEHAVIOR AND ACTUAL BEHAVIOR FOR THE TOTAL SAMPLE

The results of the Fishbein-Ajzen model are presented in Table 8. This analysis was performed on the entire sample, unlike later analyses that were performed on smaller samples of people who recycled One-time, Two-time,...etc.,

and 5+ times per month.

When attitude (Cronbach alpha standardized reliability coefficient = .9001) and subjective norms (Cronbach alpha standardized reliability coefficient = .8366) were regressed on Behavior Intention (Table 8, column(1) under Intended Behavior), the results did not provide support for the Fishbein-Ajzen model. Both attitude (standardized beta = .030) and subjective norms (standardized beta = .233) were not significant predictors of behavior intention. Neither of the independent variables nor the regression equation itself ($F_{2/47} = 1.531$) were significant at the $p < .05$ level.

Table 8. Regression Analysis Testing the Fishbein-Ajzen Model (1) and the Augmented Model (2) for the Total Sample (Entries in the table are standardized beta weights).

	INTENDED BEHAVIOR		ACTUAL BEHAVIOR	
VARIABLE	(1) BETA	(2) BETA	(1) BETA	(2) BETA
Intercept	0.000	0.000	0.000	0.000
Attitude	0.030	0.055	0.045	0.012
Subjective Norms	0.233	-0.021	0.018	0.005
Role Person Merger	--	-0.057	--	0.119
Habit	--	0.960***	--	0.035
Social Relation	--	0.060	--	0.006
Intention	--	--	0.874***	0.816***
R-Square	0.061	0.897	0.784	0.797
Adj R-square	0.021	0.886	0.770	0.768
Root MSE	1.712	0.585	0.729	0.732
F-value	1.531	76.871***	55.759***	28.093***
D.F	2/47	5/44	3/46	6/43
R-square Change	--	0.836	--	0.013
F-value+	--	119.056***	--	0.917

* p < .05. ** p < .01.
+ indicates increment R-square test.

Similarly, in the equation predicting actual recycling behavior (Table 8, column (1) under Actual Behavior) only

one of the independent variables made a contribution to explaining actual behavior. Attitude and Subjective Norms (beta = 0.045 and .018, respectively) were not statistically discernible at the $p < .05$ level. Intention, however, made a statistically significant contribution (beta=.874) to predicting Actual behavior at the $p < .001$ level.

TEST OF THE AUGMENTED MODEL PREDICTING INTENDED BEHAVIOR AND ACTUAL BEHAVIOR FOR THE TOTAL SAMPLE

In addition to the variables used in the Fishbein-Ajzen model, the Augmented model includes variables from identity theory, which are measures of a recyclers Role-Person Merger (Cronbach alpha standardized reliability coefficient = .7120), Social Relations (Cronbach alpha standardized reliability coefficient = .7149), and the Habit of recycling.

The results presented in Table 8 (column (2) under Intended Behavior) show that only habit has a significant influence on predicting Intended behavior at the $p < .001$ level, whereas the other variables do not. In the Augmented model, the addition of identity theory variables did increase significantly the amount of variance in Intended behavior explained by the model ($p < .001$). There was an 83 percent change in R-square from the Fishbein-Ajzen model, and 89.7 percent of the variation in Intended behavior was

explained by the variables in the Augmented model, with habit making the most significant contribution ($F_{3/44}$ = 119.056, $p < .001$). The overall Augmented model predicting behavior intention was significant at the $p < .001$ level, however, the effect of subjective norms and role-person merger on behavioral intention become negative; the more recyclers perceive that others expected them to recycle and the more strong a recyclers' role-person merger, the less strong their Intention to recycle, net of other variables in the regression.

In the regression predicting Actual recycling behavior by using the augmented model (Table 8, column (2) under Actual Behavior), only Intention had a significant effect on Actual behavior ($p < .001$). Neither attitude, subjective norms, role-person merger, social relations, nor habit had a statistically discernible effect on Actual behavior. Similar to the Augmented models ability to explain Behavior Intention (R-square = .897), Actual behavior is explained as well by the Augmented model (R-square = .797) and is significant overall at the $p < .001$ level. The change in explanatory capability increased by only 2% (from R-Square=.784 to R-Square=.797), indicating the addition of the identity theory variables makes no substantial difference in the amount of variance explained ($F_{3/43}$ = 0.917).

In general, the augmented model predicted Intended behavior better than the more parsimonious Fishbein-Ajzen model. But there was no significant difference (increment R-Sq test = .917, $p > .05$) between the models in predicting Actual behavior. These results indicate that both Intended behavior and Actual behavior can be predicted by factors in the Augmented model, namely, attitude, subjective norms, role-person merger, habit, and social relations, with intention having the only statistically significant, positive affect on predicting Actual behavior ($p < .001$) and habit having the only statistically significant affect on predicting Intended behavior in the Augmented model. In addition, the Fishbein-Ajzen model is significant in predicting actual behavior.

So far the results of these analyses have provided some evidence that the factors comprising Identity Theory are important in predicting Intended behavior of recyclers. To be consistent with Charng et al. (1988) this research will follow their suggestions that place certain expectations on the Fishbein-Ajzen and Augmented models' abilities to predict intention and actual behavior at various stages in recyclers' careers over time (a one month period). Charng et al. (1988, p. 311) suggested that; "theoretically,.. role identity develops over time with experience in performing the role", and by extension, "the Fishbein-Ajzen model should work best to predict the Intentions and Actual

behaviors of early career donors (recyclers), while the Augmented model might be expected to work best with experienced donors (recyclers)". To test the implications of these suggestions, as did Charng et al. (1988), the recyclers surveyed in this research were divided into five stages according to the number of times they actually took recyclable products to recycling centers each month (as determined by follow-up phone interviews one month after the initial survey).

Actual recycling behavior here is defined as recycling actions noted during the follow-up phone interview conducted one month after the initial survey. The contrast between Intended and Actual recycling behavior, then, is provided by respondents answers to questions about recycling at only these two points in time. A note about a slight deviation in this research from the methodology used by Charng et al. (1988) needs to be explained here before proceeding to the next section, Test of The Developmental Model. Whereas the researchers in Charng et al. (1988) had access to well kept blood donation records provided by the blood donation centers in order to establish a baseline of individuals who donated blood regularly and who were kept track of for several months during the research project, but in this research the actual recycling behavior variable was derived from follow-up phone-interviews one month later, not from recycling records kept at various recycling centers as

Charng et al. (1988) research was able to obtain.

TEST OF THE DEVELOPMENTAL MODEL

In order to provide a preliminary test of the developmental model, the Scheffe multiple comparison test was employed to detect significant differences among population means across the various stages of Actual recycling behavior (i.e., One-Time, Two-Time, ...etc..5 + Time per month). This test indicates which variables differ significantly across the stages, and thus tests the implications of Charng et al.'s suggestions that Intended behavior will be predicted better by the Fishbein-Ajzen and Augmented models in the early and latter stages of recycling careers, respectively.

Table 9. Means and Standard Deviations on Predictor and Dependent Variables for Whole Sample and among One-Time, Two-Time, Three-time, and Regular (+ 5 time) Recyclers.

STAGE	TOTAL		ONE-TIME		TWO-TIME		THREE-TIME		FOUR-TIME		FIVE'TIME	
VARIABLE	MEAN (N=50)	STD	MEAN (N=20)	STD	MEAN (N=13)	STD	MEAN (N=6)	STD	MEAN (N=4)	STD	MEAN (N=2)	STD
ATTITUDE	6.77	0.57	6.75	0.72	6.92	0.28	6.92	0.20	6.88	0.25	6.75	0.35
SUBJECTIVE-NORMS *	4.39	1.14	4.35	0.99	4.53	0.87	3.71	0.54	6.04	0.77	4.93	1.92
MERGER	0.56	0.50	0.45	0.51	0.62	0.51	0.83	0.41	0.75	0.50	1.00	0
RELATION	0.39	0.68	0.48	0.76	0.29	0.61	0.57	0.98	0.40	0.43	0.50	0.71
HABIT ***	2.04	1.78	1.10	0.31	2.15	0.99	2.67	1.21	4.50	2.52	7.50	0.71
INTEND***	2.16	1.73	1.10	0.31	2.38	0.96	3.17	0.98	4.00	1.63	8.00	0

Indicators of significant differences among population means using Scheffe multiple comparison test;
* p < .05, ** p < .01, *** p < .001

The results given in Table 9 provide sufficient evidence to indicate that the means for some of the predictor variables differ from one stage (dependent

variable) to another. The variables that differ significantly across stages are subjective norms, habit, and intend. These variables show significant increases from the one-time per month recycling group to the 5 + times per month regular recycling group. For the measure of subjective norms, there is a significant difference ($p < .05$) among three-time, and especially four-time per month recyclers. The predictor variable Intention to recycle has heterogeneous population means across all developmental stages, increasing from one-time to 5 + times per month; differences that are significant at the $p < .001$ level. The only other variable of the Fishbein-Ajzen model, attitude, did not show any significant increase or decrease across stages. The population means remained fairly homogeneous across all stages for this variable. Particularly noteworthy, in addition, is the fact that for the range of the measurement scale for attitude (1 to 7), the mean for this variable remained consistently high across all stages.

Among the role-identity variables, habit is the only one whose population mean increases significantly ($p < .001$) from one-time per month to 5 + time per month recyclers, across all developmental stages of recyclers careers. Other role-identity variables such as role-person merger and social relations had population means that remained homogeneous across all stages and, therefore, provide insufficient evidence that the means for these variables

from one-time per month recyclers differ from two-time, three-time, four-time, or five or more time per month recyclers.

In Table 9 information about the number of observations for each category of the developmental stages can be noted. For example, the number of observations for three-time recyclers (N=6), four time recyclers (N=4), and five or more time recyclers (N=2) are very small. The division of repeated behaviors into five categories was a method used by Charng et al. (1988) to identify blood donors who frequented blood donation centers. The previous researchers' sample size was 658 blood donors. In the present research the sample size is 50 recyclers. This small sample size, when divided among the five developmental stages used in Charng et al.' (1988) methodology, leaves very few observations distributed over these categories. This sparseness of observations has too little variation for regression analysis and therefore the following analysis will be altered slightly by collapsing into only two categories the measure of repeated behavior. Thus, only one-time recyclers and two or more time per month recycler categories will be used in the remainder of the analysis. Unlike Charng et al. (1988) who used five categories, this research will use only two developmental stages.

In order to determine precisely which variables of both the Fishbein-Ajzen and Augmented (including role-identity

variables) models are important predictors of both intended and actual recycling behaviors at various stages of recyclers careers, these models were regressed on each stage individually. The determinants of behavioral Intentions and Actual recycling at various stages (one time and two or more time recyclers) are discussed in the following sections. Their respective regressions are presented in tables 11 and table 12.

In order to test the original hypotheses of this research, a different method of determining which independent variables of the Fishbein-Ajzen and Augmented models are significantly related to behavioral Intention and Actual behavior will be used than was in Charng et al. (1988). This represents a departure from the previous researchers who used least squares regression on a dichotomous dependent variable,i.e., the presence or absence of blood donation during each month of the research project. When the outcome variable is binary or dichotomous, the preferred method of analysis is logistic regression (Hosmer and Lemeshow 1989). There are several reasons for this; 1) The data set is small (OLS, Ordinary Least Squares, is best on large sample, normally distributed data, while logistic regression provides accurate estimates of the parameters even if the data are not normally distributed and the sample size is small.) 2) The dependent variable for the recyclers developmental stages are measured dichotomously (i.e. one

time, 1 = Yes 0 = No, two or more time 1 = Yes 0 = No, for example), and 3) Logistic regression is more theoretically correct when the dependent variable is dichotomous. The difference between logistic and linear regression is reflected both in the choice of a parametric model and in the assumptions. When the differences in the basic underlying assumptions are accounted for, the methods employed in logistic regression follow the same general principles used in linear regression for data that is binomially distributed instead of normally distributed.

Table 11 and 12 give the results of the logistic regression on the data of one-time and two or more time recyclers. The response variable is the number of times respondents recycled per month (one-time per month; 1 = yes, 0 = no, two or more times per month; 1 = yes, 0 = no, see table 10).

Table 10. Coding For Variables used in Logistic Regression.

Variables	Codes/Values
Response Variables - Actual and Intention	
One time	1 = Yes, 0 = No
Two or More time	1 = Yes, 0 = No
Independent Variables	
Attitude	1 to 7
Subjective-Norms	1 to 7
Role-Person Merger	1 = Present, 0 = Absent
Habit	0 to infinity
Social Relation	1 to 5 or more

ONE-TIME RECYCLERS

For one-time recyclers the augmented model was significant ($p < .001$) indicating that at least one or perhaps all of the variables in this model are significant in predicting behavioral Intention. The Wald test on parameter estimates indicated that habit was the most significant variable in the augmented model for predicting behavioral intentions.

Considering that one of the goals of this and previous research is to obtain the best fitting model while minimizing the number of parameters (the parsimonious Fishbein-Ajzen model, for example), the next step in this analysis is to compare the parsimonious Fishbein-Ajzen model to the full Augmented model containing additional variables from Identity Theory. The difference between the two models is the exclusion of the Identity Theory variables from the Augmented model. The likelihood ratio test comparing these two models is obtained by using the G test statistic (Hosmer and lemeshow 1989). The value of the test statistic comparing the one-time recycler models in table 11 is

$$G = -2\ [(-33.123) - (-14.814)] = 37.41$$

which, with 2 degrees of freedom, has a p-value $< .001$. Since the p-value is small, indicating a significant difference in the two models, one could conclude that the Fishbein-Ajzen model does not provide as good a fit to the data as the Augmented model for predicting Intentions. There

is an advantage, therefore, to including Identity theory variables in the Augmented model.

For the logistic regression predicting Actual recycling (table 12) behavior of one-time recyclers both the Fishbein-Ajzen and Augmented models were significant ($p < .001$), but none of their parameter estimates were significantly different from zero according to the Wald test statistic. As before, to compare the differences in the two models for one-time recyclers to see if the inclusion of Identity Theory variables provide an advantage for predicting Actual recycling behavior, the G statistic was used;

$$G = -2\ [(-19.813) - (16.249)] = 7.128$$

which, with 2 degrees of freedom, has a p-value < .05. Adherence to the $a = .05$ level of significance would justify including Identity Theory variables in the Augmented model for predicting Actual behavior.

Table 11. Logistic Regression Analysis Predicting Intention, Testing the Fishbein-Ajzen (1) and Augmented (2) Models among One-Time, Two + time Recyclers.

Stage	One-Time (N=22)		Two or More Time (N=27)	
VARIABLE	(1)	(2)	(1)	(2)
Intercept	5.379	5.218	-8.123	-74.855
Attitude	-0.784	-0.300	1.127	0.593
Subjective Norms	-0.68E-01	0.702	0.141	-0.513
Role Person Merger	--	-1.454	--	23.571
Habit	--	-4.151***	--	48.450
Social Relation	--	0.257	--	-0.114E-01
Log-Likelihood	-33.123	-14.814	-32.418	-6.503
G	2.348	38.966***	4.159	55.989***
DF	2	5	2	5
G^+	--	37.41 ***	--	51.83***

*** p < .001.

TWO OR MORE TIME RECYCLERS

As in the previous analysis of one-time recyclers, the significance of the Fishbein-Ajzen and Augmented models were determined by comparing each model containing only its constant (intercept) term to models containing their respective independent variables. This makes it possible to check for the significance of the addition of independent variable to the model. A significant G statistic for the model merely indicates that a model containing the independent variables has an advantage in predicting the response variable over one that has no variables i.e., only the intercept term. Furthermore, one or perhaps all the variables may be statistically significant, but it is not known until t-tests (Wald tests) are performed on each variable to determine which ones are significant. In the present research table 11 indicates that the addition of the variables attitude and subjective norms in the Fishbein-Ajzen model made no significant difference over the model containing only the intercept term. The addition of Identity Theory variables, along with the Fishbein-Ajzen variables did make a significant difference ($p < .001$) over the model containing only the intercept term for behavior Intentions of two or more time recyclers. To compare the difference between the two models predicting Intentions of two or more time recyclers, the G test is used in a similar manner as before by determining the difference between a model with an

intercept term only and the same model containing independent variables. The difference between the model containing only the Fishbein-Ajzen variables and the Augmented model containing additional Identity Theory variables is given by the test statistic;

$$G = -2\ [(-32.418) - (-6.503)] = 51.83$$

which, with 2 degrees of freedom, has a p-value < .001. Since the p-value is small, there is an advantage to including Identity Theory variables in the model. For comparing the models predicting Actual behavior of two or more time recyclers, table 12 shows that both the Fishbein-Ajzen and Augmented models contained variables that provided better fits to the data than models with intercept only terms. Wald tests, however, did not provide sufficient

Table 12. Logistic Regression Analysis Predicting Actual Recycling, Testing the Fishbein-Ajzen (1) and Augmented (2) Models among One-Time, Two + time Recyclers.

Stage	One-Time (N=20)		Two or More Time (N=25)	
VARIABLE	(1)	(2)	(1)	(2)
Intercept	-0.318	0.230	-26.61	-10.512
Attitude	0.454	0.299	-18.696	-37.157
Subjective Norms	0.268	0.500	0.365	-3.179
Role Person Merger	--	-0.967	--	110.46
Habit	--	4.252	--	37.612
Social Relation	--	1.427	--	-55.001
Intention	-2.769	-7.322	78.884	115.05
Log-Likelihood	-19.813	-16.249	-5.810	-2.348
G	27.676***	34.803***	57.70***	64.62***
DF	3	6	3	6
G*	--	7.128*	--	6.924*

* p < .05, ** p < .01, *** p < .001.

evidence for rejecting the null hypothesis that the parameter estimates were significantly different from zero.

The likelihood ratio test comparing the model containing Identity Theory variables to the one containing only Fishbein-Ajzen variables yields

$$G = -2\ [(-5.810) - (-2.348)] = 6.924$$

which, with 2 degrees of freedom yields a p-value < .05. This provides sufficient evidence for including variables from Identity Theory in a model for predicting Actual recycling behavior.

The use of logistic regression is helpful not only for testing hypotheses to determine which independent variables have a statistically significant affect on the response or outcome variable, but also for interpreting parameter estimates to determine the individual or joint effects of a number of variables. In general, logistic regression provides on estimate of the probability of an event occurring as a function of several independent variables. And it helps to answer the question; what is the probability that some randomly selected individual from the population will have a particular combination of characteristics ? Specifically, what are the factors that characterize one time or two or more time recyclers ? What affect do these factors have on Intended or Actual behavior ?

In table 11 and 12 the results given provides sufficient evidence that the Augmented models containing

Identity theory variables were significant for predicting Intended and Actual behavior for one time and two or more time recyclers. Therefore, this section will interpret the parameter estimates for these models only. Furthermore, only the Augmented model will be interpreted.

In the Augmented model predicting Intentions to recycle for one time recyclers (Table 11) the coefficient for attitude is -0.300. This indicates that a one unit increase in attitude is associated with an increase of -0.300 in the logit of Intention to recycle one time per month, or equivalently, that the odds of someone having intentions of recycling one time per month are increased by 74 percent [exp(-0.300)=0.74] for every unit increase in the attitude measurement scale. The odds represents the effect of attitude on intentions of recycling, adjusted for the effects of the other variables. Subjective norms for instance, has an estimated odds ratio of exp(0.702) = 2.02. This indicates that for every one unit increase in the subjective norms measurement scale, the odds of an individual having intentions to recycle one time per month increases 2.02 times. If role-person merger is present in an individual, it will be associated with an increase in the odds of that person having intentions to recycle of 23 percent [exp(-1.454)=0.234]. With an increase in each time an individual makes a trip to a recycling center each month (Habit), the odds of that persons' intentions to recycle

one-time per month increases by .02 times [exp(-4.151) = 0.016] or 2 percent. The estimates odds for an increase of one unit in the social relations measure is exp(0.257) = 1.293, which indicates that the odds of randomly selecting an individual from the population having intentions to recycle one time per month will be increased by 1.29 times or 29 percent.

As an example of how the estimates or coefficients in table 11 or 12 could be used to determine the probability of behavioral intentions occurring in a randomly selected individual from the study population, consider the characteristics of one of the respondents in the survey whose measurements for predicting intentions for one time recycling was;

Attitude	(7)
Subjective Norms	(5.29)
Role-person Merger	(1)
Habit	(1)
Social Relation	(0.6)

X_s = 7, 5.29, 1, 1, 0.6

P_x = 1 / { 1 + exp[-(5.218 + (-.300)(7) + 0.702(5.29) + (-1.454)(1) + (-4.151)(1) + 0.257(0.6))] }

= 1 / { 1 + exp[-(5.218 + (-2.1) + 3.72 + (-1.454) + (-4.1510 + 0.015]}

= 1 / { 1 + exp[-1.248]}

$= 1 / [1 + \exp(1.248)] = 0.223$

Thus, the probability that some randomly selected individual from the study population will have the above combination of characteristics is 22 percent. Alternatively, for every 100 recyclers with the preceding characteristics one would expect 22 of them to have intentions of recycling one time per month.

In summary, the logistic model in table 11 for one time recyclers has specified that the probability of behavioral Intentions depends on the set of variables including both Fishbein-Ajzen and Identity Theory variables (the augmented model). Throughout the analysis, the results given in tables 11 and 12 have indicated that the Augmented model is the more statistically important model in predicting both Intended and Actual behaviors.

CHAPTER VI

CONCLUSION

The analysis of the data collected on Intended and Actual recycling behavior of respondents was begun by constructing residual plots to determine the aptness of the linear models. Since several of the residuals fitted against expected values and the independent variables revealed that the data did not fit a linear model, it was concluded that logistic regression was more appropriate. However, for a preliminary analysis, OLS was used to detect possible patterns and correlations between the dependent and independent variables.

In the OLS regression of the Fishbein-Ajzen and Augmented models on the number of items (Table 7) recycled per month by respondents, the Fishbein-Ajzen models were applicable to explaining the behavior of recycling. Attitude and Subjective Norms were important in determining recyclers' Intended Behavior, and intentions were important in determining Actual Behavior. The only independent variable that made a statistically important contribution to predicting Actual behavior was attitude, a Fishbein-Ajzen variable. Based on this analysis, one may conclude that the Fishbein-Ajzen model worked best to predict Actual recycling behavior.

When the entire sample was used in a regression on Intended and Actual behavior using the Fishbein-Ajzen and

Augmented models, the augmented model was statistically significant for predicting both Intended and Actual behavior. The Fishbein-Ajzen model was significant only in predicting Actual recycling behavior. In both models, intentions was the most statistically significant contributor to predicting Actual behavior. The Identity Theory variable, habit, was the only independent variable that made a statistically significant contribution to predicting Intended behavior. These results cannot support the hypothesis that the variables of the Fishbein-Ajzen model, attitude and subjective norms, are causally related to behavior intentions. This conclusion is inconsistent with Charng et al. (1988) results that concluded the opposite. Thus, the Augmented model is a better predictor of Intended behavior using the total sample, but didn't provide an advantage over the Fishbein-Ajzen model in explaining Actual behavior (increment R-Sq = .917, $p > .05$). Adding Identity Theory variables to the Augmented model did not improve the explanatory capability of the model.

To test the hypotheses associated with the Developmental model as did Charng et al. (1988) for repeated behaviors across blood donors careers, this research sought to test the same implications as the previous researchers who stated that the Fishbein-Ajzen model would work best to predict intentions and actual behaviors of early career (one time per month) recyclers, and the augmented model might be

expected to work best with latter stage (two or more time per month) recyclers. The conclusions from this research are different than those of Charng et al. (1988).

Unlike the previous researchers, who obtained results that supported their hypotheses, a logistic regression predicting intention to recycle was unable to provide conclusive evidence that the Fishbein-Ajzen model worked best to predict behavioral intention for early career (stage 1) recyclers. Only the augmented model was significant in predicting intentions for early career recyclers (Table 11 and 12). Nevertheless, the Augmented model was significant at predicting intentions of more experienced recyclers (stage 2) as the previous researchers posited. Although this research cannot support the hypothesis that Fishbein-Ajzen variables such as attitude and subjective norms are causally related to behavior intentions, the hypothesis that the Identity Theory variables comprising the augmented improve the predictability of intentions of experienced (stage 2) recyclers is tentatively accepted. These conclusions are supported by the G test statistic comparing the two logistic regression models at both stage 1 and 2.

For the logistic regression predicting actual recycling behavior one month after the initial survey, the conclusions provided by this analysis are different than those reached by the previous researchers. The G test statistic comparing the intercept only term of each model (observed frequencies)

with the model containing its respective independent variable(predicted frequencies) provided evidence that both the Fishbein-Ajzen and Augmented models were statistically important models of Actual behavior. The theoretical assumption made by Charng et al. (1988) cannot be accepted. Both models contained variables that were statistically important predictors of Actual behavior at both stage 1 and 2. Nevertheless, one assumption of the previous researchers is supported by these data; that the prediction of both intention and actual behaviors are increased significantly when the model is augmented by the Identity Theory variables: Role-Person Merger, Habit, and social Relation. This conclusion is supported by the comparison of the models with and without Identity Theory variables by using the G test statistic at both stages. Moreover, this conclusion appears to be consistent with Charng et al. (1988), whose overall conclusions were that "the farther an individual moves into a 'career' as a (recycler), the greater the chance that he or she will develop a (recycler) role identity." And furthermore, "once such a role identity becomes central to the self, the importance of attitude and subjective norms in determining behavioral intention" and actual behavior "diminishes". (p. 316)

SUMMARY OF FACTORS FOUND IMPORTANT FOR RECYCLING

Table 13 summarizes the models found significant by this research for predicting Intended and Actual Behaviors of recyclers. In summary, the factors found most important in explaining respondents' recycling behavior were those comprising the augmented model which includes variables from Identity Theory as well as Fishbein-Ajzen variables. Yet even though the respondents demonstrate a common interest in recycling, the findings of this research show that there are difference that impact recycling behavior. Specifically, the Augmented model examined the degree to which a respondents self-concept became incorporated into an identifiable role. As a respondents role identity became more salient, the

Table 13. Summary of Models Significant In Predicting Recycling Behavior*.

	RECYCLING BEHAVIOR			
	INTENTIONS		ACTUAL	
MODELS	STAGE 1	STAGE 2	STAGE 1	STAGE 2
AUGMENTED MODELS	+	+	+	+
Fishbein-Ajzen Variables				
Attitude Toward Behavior				
Subjective Norms				
Intentions				
Identity Theory Variables				
Habit				
Social Relations				
Role-Person Merger				
FISHBEIN-AJZEN MODELS	-	-	+	+
Attitude Toward Behavior				
Subjective Norms				
Intentions				

* Determined by Logistic Regression

probability that that respondent would behave consistently

with that identity increased. Carrying out the act of recycling conveyed by the respondents a meaning over and above the attitudes that they held toward recycling. In addition a possible interpretation of the lack of the Fishbein-Ajzen model alone to explain recycling behavior could be that respondents in the early stages of forming a role identity with recycling thought of their actions as voluntary and not the result of social pressure (Subjective Norms). As a result, the Augmented model was able to explain the extent to which a respondents' role as a recycler was internalized as a part of their self-concept (Role-Person Merger), and the relative size of the respondents' social network linked to their role identity (Social Relations). Social Relations developed in this manner probably depend on the social concept of recycling. Particularly interesting of the Augmented model is its ability to explain the extent to which respondents stopped making conscious decisions about recycling (Habit).

This research, compared to literature cited in previous chapters (Charng et al. 1988; Geller 1973a, 1973b; Finnie 1973; Clark et al. 1972; Chapman and Risley 1974; Everett 1973; Powers et al. 1973; Kohlenberg and Phillips 1973; Reid et al. 1976; and Luyben and Bailey 1979) is significant for two important reasons. First, it provides another theoretical test of the Fishbein-Ajzen and Identity theory variables for a public good behavior. The results point to

some weakness in both Fishbein-Ajzen and Identity theory. In particular, the Fishbein-Ajzen model does not provide a good prediction of intention. In predicting actual behavior, only intention is important. Likewise not all components of operationalization of Identity Theory seem theoretically relevant. Habit seems most important. Second, this is the first study of its kind that focuses on recycling, a public good behavior. Results indicate that the type of behavior seems to make a difference. Those results differ for Charng et al. (1988) and so indicates that the theoretical properties of the public good itself are important for model specification.

REFERENCES

Ajzen, I. and M. Fishbein. 1969. "The prediction of Behavioral Intentions in a Choice Situation." *Journal of Experimental Social Psychology* 5:400-416.

----. 1970. "The prediction of Behavior from Attitudinal and Normative Variables." *Journal of Experimental Social Psychology* 6: 466-487.

----. 1973. "Attitudinal and Normative Variables as Predictors of Specific Behavior." *Journal of Personality and Social Psychology* 27:41-57.

----. 1977. "Attitude-Behavior Relations: A theoretical analysis and Review of Empirical Research." *Psychological Bulletin* 84:888-915.

----. 1980. *Understanding Attitudes and Predicting Social Behavior*. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Ajzen, I. and T.J. Madden. 1986. "Prediction of Goal - Directed Behavior: Attitudes, Intentions, and Perceived Behavioral Control." *Journal of Experimental Social Psychology* 22:453-474.

Anderson, L.R. and M. Fishbein. 1965. "Predictions of attitude from the number, strength, and evaluative aspect of beliefs about the attitude object: A comparison of summation and congruity theories." *Journal of Personality and Social Psychology* 3:437-443.

Barton, A.F. 1979. *Resource Recovery and Recycling*. A Wiley-Interscience Publication, New York.

Bentler, P.M. and G. Speckart. 1979. "Models of Attitude-Behavior Relations." *Psychological Review* 86:452-64.

Bowman, C.H. and M. Fishbein. 1978. "Understanding Public Relations to Energy Proposals: An Application of Fishbein Model." *Journal of Applied Social Psychology* 8:319-40.

Bruvold, W.H. 1972. "Consistency among Attitudes, Beliefs, and Behavior." *The Journal of Social Psychology* 86:127-134.

----. 1973. "Belief and Behavior as Determinants of Environmental attitudes." *Environment and Behavior* 5,2: 202-218.

Burke, P.J. 1980. "The Self: Measurement Requirements from an Interactionist Perspective." *Social Psychology Quarterly* 43:18-29.

Chapman, C. and R.L. Risley. 1974. "Anti-litter Procedures in an Urban Hidensity Area." *Journal of Applied Behavior Analysis* 7:377-383.

Charng, H., J.A. Piliavin., and P.L. Callero. 1988. "Role Identity and Reasoned Action in the Prediction of Repeated Behavior." *Social Psychology Quarterly* 51, 4: 303-317.

Clark, R.N., R.L. Burgess., and J.C. Hendee. 1972. "The development of Anti-litter behavior in a forest campground." *Journal of Applied Behavior Analysis* 5,1: 1-5.

Davidson-Cummings, L. 1977. " Voluntary Strategies in the Environmental Movement: Recycling As Cooperation." *Journal of Voluntary Action Research* 6:153-160.

De young, R. 1986. "Some psychological Aspects of Recycling: The Structure of Conservation Satisfactions." *Environment and Behavior* 18,4:435-449.

----. 1985-1986. "Encouraging Environmentally Appropriate Behavior: The Role of Intrinsic Motivation." *Journal of Environment System* 15:281-292.

De young, R. and S. Kaplan. 1985-1986. "Conservation Behavior and The Structure of Satisfactions." *Journal of Environment System* 15:233-242.

Everett, P.B. 1973. "Use of the Reinforcement Procedure to Increase Bus Ridership." *Proceedings of the Eighty-First Annual Convention of the American Psychological Association*, Montreal,Canada.

Finnie, A.C. 1973. "Field Experiments in Litter Control." *Environment and Behavior* 5,2:123-144.

Fishbein, M. 1967. *Reading in Attitude Theory and Measurement*. New York: Wiley.

Fishbein, M., and I. Ajzen. 1975. *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*. Reading, Mass: Addison-Wesley.

Fishbein, M., and R. Hunter. 1964. "Summation Versus. Balance in Attitude Organization and Change." *Journal*

of Abnormal and Social Psychology 69:505-510.

Geller, E.S. 1973a. "Prompting a Consumer Behavior for Pollution Control." *Journal of Applied Behavior Analysis* 6,3:367-376.

----. 1973b. "Prompting Anti-Litter Behavior." *Proceedings of the Eighty-First Annual Convention of the American Psychological Association*, Montreal, Canada.

Hopper, J.R. and J.M. Nielson. 1991. "Recycling As Altruistic Behavior: Normative and Behavioral Strategies to expand Participation in a community Recycling Program." *Environment and Behavior* 23.2:195-220

Hosmer, D.W. and Lemeshow, S. 1989. *Applied Logistic Regression*. New York: A Wiley-Interscience publication.

Humphrey, C.R.,R.J. Bord, M.M. Hammond, and S.H. Mann. 1977. "Attitudes and Conditions for Cooperation in a paper Recycling Program." *Environment and Behavior* 9,1:107-124.

Jacobs, H.E. and J.S. Bailey. 1982-1983. "Evaluating Participation in a Residential Recycling Program." *Journal of Environment System* 12:141-152.

Jacobs, H.E, J.S. Bailey, and J.I. Crews. 1984. "Development and Analysis of a Community-based Resource Recovery Program." *Journal of Applied Behavior Analysis* 17:127-145.

James, W. 1890. *Principles of Psychology(vol 2.)* New York: Holt.

Kerrick, J.S. 1958. "The effect of Relevant and Nonrelevant Sources on attitude Change." *Journal of Social Psychology* 47:15-20.

Kohlenberg, R. and T. Phillips. 1973. "Reinforcement and Rate of Litter Depositing." *Journal of Applied Behavior Analysis* 6,3:391-396.

Luyben, P.D. and J.S. Bailey. 1979. "Newspaper Recycling: The Effects of Rewards and Proximity of Containers." *Environment and Behavior* 11,4:539-557.

Luyben, P.D. and S. Cummings. 1981-1982. "Motivating Beverage Container Recycling on a College Campus." *Journal of Environment System* 11:235-245.

Luyben, P.D., S.B. Warren, and I.A. Tallman. 1979-1980. "Recycling Beverage Container on a College Campus. *Journal of Environment System* 9:189-202.

Manstead, A.S.R., C. Proffitt, and J.L. Smart. 1983. "Predicting and Understanding Mothers' Infant-Feeding Intentions and Behavior: Testing the Theory of Reasoned Action." *Journal of Personality and Social Psychology* 44:657-71.

McCall, G.J., and J.T. Simmons. 1978. *Identities and Interaction (rev.ed.)*. New York:Free Press.

Melosi, M.V. 1981. *Garbage in the Cities:Refuse, Reform, and the Environment, 1880-1980*. College Station: Texas A&M Univ. Press.

Millier, S.P. 1974. *Recycling can help Alleviate Nationwide Newsprint Shortage*. Garfield,N.J.: Garden State Paper Company, Report.

Nachmias, D., and C. Nachmias. 1981. *Research Methods in the Social Sciences*. New York: St. Martin's Press.

Osgood, C.E., G.J. Suci, and P.H. Tannenbaum. 1957. *The measurement of meaning*. Urbana: University Illinois Press.

Powers, R.B.,J.G. Osborne, and E.G. Anderson. 1973. "Positive Reinforcement of Litter Removal in the Natural Environment." *Journal of Applied Behavior Analysis* 6,4:573-578.

Purcell, A.H. 1980. *The Waste Watchers: A citizen's Handbook for Conserving Energy*. New York: Anchor Press.

Reid, D.H., P.D. Luyben, R.J. Rawers, and J.S. Bailey. 1976. "Newspaper Recycling Behavior: The Effects of Prompting and Proximity of Containers." *Environment and Behavior* 8,3:471-482.

Schwartz, S.H. 1977. "Normative Influences on Altruism." In L. Berkowitz(Ed.), *Advances in Experimental Social Psychology* 10:221-279.

Sewell, W.R.D. and H.D. Foster. 1971. "Environmental Revival." *Environment and Behavior* 3,2:123-134.

Stryker, S. 1968. "Identity Salience and Role Performance: The relevance of Symbolic Interaction

Theory for Family Research." *Journal of Marriage and the Family* 30:558-564.

----. 1980. *Symbolic Interactionism: A Social Structural Version*. Menlo Park, CA: Benjamin/Cummings.

Trandis, H.C. and M. Fishbein. 1963. "Cognitive Interaction in Person Perception." *Journal of Abnormal and Social Psychology* 67:446-453.

Turner, R.H. 1978. "The Role and Person." *American Journal of Sociology* 84,1:1-23.

Wilson, D.T., H.L. Mathews, and J.W. Harvey. 1975. "An Empirical test of the Fishbein Behavioral Intention Model." *Journal of Consumer Research* 1:39-48.

Witmer, J.F., and E.S. Geller. 1976."Facilitating Paper Recycling: Effects of Prompts, Raffles, and Contests." *Journal of Applied Behavior Analysis* 9:315-322.

APPENDIX

QUESTIONNAIRE

This questionnaire concerns people's attitudes and feelings about recycling. Your answers will be important for the completion of a study conducted by the sociology department of Texas A&M. Your name is not necessary for the study: All responses are confidential. Please take about 5 minutes to respond to these questions.

The following questions ask for some very general information about you. Please circle the appropriate response.

1). Sex
1. Male 2. Female

2). Age

1. 20 or Under 2. 21-30 3. 31-40 4.41-50
5. 51 or Over

3). Marital Status

1. Married 2. Widowed 3. Divorced 4. Separated
5. Never Married

4). How many children do you have? (include any you had from a previous marriage).

1. None 2. One 3. Two 4. Three 5. Four
6. Five 7. Six 8. Seven 9. Eight or More

5). Education (Please circle highest level obtained)

1. Less than High School 2. High School
3. Associate/Junior College 4. Bachelor's
5. Graduate 6. No Answer

6). Estimated Family Income (yearly)

1. Under $5,000 2. $ 5,000 to 9,999
3. $10,000 to 14,999 4. $15,000 to 19,999
5. $20,000 to 24,999 6. $25,000 to 29,999
7. $30,000 to 34,999 8. $35,000 to 39,999
9. $40,000 to 44,999 10. $45,000 to 49,999
11. $50,000 to 54,999 12. Over $55,000

7). Occupation.

What kind of work (do/did) you normally do? That is, what (is/was) the job called?

Below are a list of statements. Please circle the number that best corresponds to your feeling about the statement.

8). In general, my attitude toward recycling is...

1	2	3	4	5	6	7
Unfavorable			Neutral			Favorable

1	2	3	4	5	6	7
Negative			Neutral			Positive

9).

1. Other people think that recycling is important to me.

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

2. It is important to my friends and relatives that I continue to recycling.

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

3. It really would not matter to most people I know, if I decided to give up recycling.

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

4. No one would really be surprised if I just stopped recycling.

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

5. Many people would probably be disappointed in me if I just decided to stop recycling.

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

6. Many of the people that I know expect me to continue recycling.

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

7. Others would probably make me feel guilty if I quit recycling

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

10). How many times do you intend to take recyclable products to a recycling center next month?

What kinds of recyclable products do you intend to take recyclable products to a recycling center next month?

	YES	NO
1. Paper	( )	( )
2. Aluminum	( )	( )
3. Plastic	( )	( )
4. Glass	( )	( )
5. Motor Oil	( )	( )
6. Grocery Bags	( )	( )
7. Others(Please specify _____)		

What other activities do you intend next month?

	YES	NO
1. Use energy - saving lights	( )	( )
2. Use rechargeable batteries	( )	( )
3. Use phosphate - free detergent	( )	( )
4. Others(Please specify _____)		

The following statements can be answered by either a "Yes" or "No". Please circle the appropriate response.

11).

1. Recycling is something I rarely even think about
Yes No

2. I would feel a loss if I could not recycle.
Yes No

3. I really do not have any clear feelings about recycling.
Yes No

4. For me, being an environmentalist means more than just the act of recycling.

Yes No

5. Recycling is an important part of who I am.
Yes No

The following questions ask about people you may have met through recycling. Please circle the appropriate response.

12). 1. Of all the people you know through recycling, how many are important to you, i.e., You would really miss if you did not see them?

0 1 3 4 5 or More

2. Think of those people that are important to you. About how many would you lose contact with if you stopped recycling?

0 1 3 4 5 or More

3. How many people do you know on a first name basis through recycling ?

0 1 3 4 5 or More

4. Of the people you know through recycling, how many are close friends?

0 1 3 4 5 or More

5. Of the people you know through recycling activities, how many participate in other activities with you?

0 1 3 4 5 or More

Please answer the following questions.

13). Habit

How often have you taken recyclable products to a recycling center each month?

What kinds of recyclable products have you taken recyclable products to a recycling center each month?

	YES	NO
1. Paper	( )	( )
2. Aluminum	( )	( )
3. Plastic	( )	( )
4. Glass	( )	( )
5. Motor Oil	( )	( )
6. Grocery Bags	( )	( )
7. Others (Please specify _____)		

What other activities have you done each month?

	YES	NO
1. Use energy - saving lights	( )	( )
2. Use rechargeable batteries	( )	( )
3. Use phosphate - free detergent	( )	( )
4. Others (Please specify _____)		

14). Do you belong to any associations / clubs that promote environmental issues, especially recycling?

Yes No

If Yes, Please specify

Thank you for your time. If you have any comments / questions, Please list them below. In addition, if you would like a copy of the results, give your name and address to the researcher who gave you the questionnaire.

VITA

Yeongi Son

Address

801 Spring Loop #1007
College Station, Texas 77840
(409) 268-7468

Education

B.A. (Psychology) Korea University, January 1984
B.S. (Sociology) Utah State University, June 1986

Academic Positions

Graduate Teaching Assistant, 1989 - Present

Papers

"A Heuristic for Locating A Retail Business in Japan," *Journal of Global Business* (1990), co-authored with Hiroshi Hukurai et al.

"The Ecological Integration of Religious Identification in South Korea," currently under review, co-authored with Jon Alston et al.

A14815 646753

WHY PEOPLE RECYCLE:

AN APPLICATION AND TEST OF THE THEORY

OF REASONED ACTION AND IDENTITY THEORY

A Thesis

BY

YEONGI SON

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the
degree of

MASTER OF SCIENCE

May 1992

Major Subject: Sociology

WHY PEOPLE RECYCLE:

AN APPLICATION AND TEST OF THE THEORY

OF REASONED ACTION AND IDENTITY THEORY

A Thesis

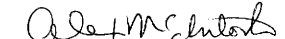
BY

YEONGI SON

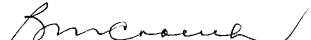
Approved as to style and content by:

Jane Sell
(Chair of Committee)

Olga Pendleton
(Member)



Alex McIntosh
(Member)



Ben Crouch
(Head of Department)

May 1992

ABSTRACT

Why People Recycle:
An Application and Test of The Theory
of Reasoned Action and Identity Theory. (May 1992)
Yeongi Son, B.A., Korea University;
B.S., Utah State University
Chair of Advisory Committee: Dr. Jane Sell

This study seeks to replicate the work of previous researchers (Charng et al. 1988) which compares predictions of intended and actual recycling behavior based on theories of reasoned action and identity theory. A stratified, random sample of 50 recyclers was taken from the study population. Using least squares regression in a preliminary analysis of the data, it was found that the addition of identity theory variables such as role-person merger, habit, and social relations did not consistently improve the explanation of intended and actual recycling behavior, as found by Charng et al. (1988) over the more parsimonious Fishbein-Ajzen model. A logistic regression of the Fishbein-Ajzen and Augmented models on intended and actual behavior for two developmental stages indicated that the Augmented model was significant in predicting both intended and actual recycling behavior across all stages. The parsimonious Fishbein-Ajzen model was significant in predicting only actual recycling

behavior for stage 1 and stage 2 recyclers. After applying the likelihood ratio test statistic (G) comparing the two models, it was concluded that there is an advantage to including identity theory variables in the Augmented model.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

STATEMENT OF PROBLEM

The ever increasing depletion of natural resources in the U.S and throughout the world has received growing attention from a variety of academic disciplines such as economics, sociology, psychology, political science, and environmental researchers, as well as concerned citizens. In this research I intend to examine the issue of recycling using both the Fishbein-Ajzen theory of reasoned action and identity theory. I propose, as did Charng et al. (1988) that both theories aid in understanding recycling behavior. Specifically, this study will augment the Fishbein-Ajzen model by incorporating variables from identity theory, as did Charng et al. (1988), except for two major differences: 1) the behavior under study, and 2) a different setting. By testing this model under a different situation and on a different behavior, this research will test the validity and generalizability of the Charng et al. (1988) model as a means of theory development. The Hypotheses underpinning this research will be similar to those posited in Charng et al. (1988, p. 306).

Awareness of the problem of exhausting vital resources was heightened during the fuel shortages of the early to mid-seventies (Reid et al. 1976). Since then, the concern

---

Journal model is Social Psychology Quarterly.

for this ecological crisis has been demonstrated by the establishment of a number of local, national, and international organizations for dealing with the problem (Sewell and Foster 1971). One option proposed by policy makers and environmental researchers for dealing with these problems is at-source separations and recycling of household waste. Implicit in this proposition is the idea that personal behaviors can make a difference, since it would require individuals working independently at the household level to effectively reduce waste accumulations on a local, regional, or even global scale.

The rate at which paper, plastic, aluminum and other recyclable materials are produced and wasted constitutes one component of the environmental problem, but another equally important component of the problem is the relatively little amount of pro-ecological behavior required to effectively reduce the amount of waste accumulating in the environment through recycling. Americans throw away on a daily basis about three to five pounds of trash, amounting to nearly three tons per year for an average household. Since the 1920s the rate of solid waste generation has increased about five times as rapidly as the population (Melosi 1981).

In 1970 the consumption of paper products in the U.S totaled nearly 60 million tons (Reid et al. 1976). By 1971 over 125 million tons of solid waste was generated. The amount of newsprint consumption per capita increased from 80

pounds in 1962 to 99 pounds in 1972 (Reid et al. 1976). In addition to the increasing usage of newsprint the eventual depletion of timber resources adds considerably to ecological problems. Newsprint comprises about 20% of solid waste in some urban areas, and the amount of newsprint consumed in 1972 translated to an annual cut of approximately 155 million trees (Millier 1974). Solid waste generated in 1980 reached nearly 150 million tons; and projections made in the mid-eighties indicated that it would top 200 million tons by 1990 (De Young 1986).

Predicted shortages of fuel and paper products, as well as food and other natural resources have caused a great deal of concern for finding ways to conserve our natural resources. To address this concern many urban areas have spent enormous amounts of money on solid waste management, which represents a considerable tax burden on citizens. In 1960 Americans spent one billion dollars to collect and dispose waste. By 1980 this figure rose to over four billion dollars, and was expected to reach six million dollars by 1985 (Purcell 1980). These data reflect a pressing need to find a viable solution for this problem. This topic is important for studying and developing appropriate behavior theory (Humphery et al. 1977) that will help explain, and in turn, facilitate planners efforts in developing and implementing appropriate recycling plans. Additionally, it provides an arena for studying the relationship between

attitudes, identity, and behavior.

"The term "recycling" denotes the return of a discarded material or article to the same product system, such as the return of waste paper to make new paper" (Barton 1979, p. 3). This is a rather low-tech strategy that offers a cost-effective solution to the problem of solid waste management and ecological degradation (De Young 1986). Reusing metals, glass, and paper products as resources, rather than waste, for instance, could make a significant contribution toward the solution of these ecological problems (Luyben and Bailey 1979). But pro-ecological or recycling behavior among the general populous has not been widely adopted. For everyone to reap equally the benefits of recycling everyone must participate. At least this is the stand taken by those promoting the concept of a clean and safe environment as a public good, because the payoff is highest if everyone cooperates. Those that don't participate in recycling, but benefit from it by enjoying a lower cost of goods from recycled material and a cleaner environment at the cost of those that have paid by participating, would be called 'free riders'; a person who receives a good without paying for it. The study of recycling, therefore, is significant for several reasons. Besides holding the possibility of resolving some of our ecological problems, it is of theoretical importance to social psychologists because recycling constitutes a voluntary behavior that involves no

extrinsic reward, and helps to understand how common attitudes favoring conservation and ecological awareness will be carried over into behavior that can improve environmental quality. Furthermore, it provides an additional setting and type of behavior to be studied.

This chapter has stated that the problem of ecological degradation is ever increasing and that solutions may be found by investigating and applying appropriate behavior theory. Chapter two consists of a review of literature related to behavioral analysis and ecological issues.

The establishment of hypotheses and indication of the relationships of the variables to be studied will be developed into a conceptual framework in chapter three. The methods of operationalizing this research, and the instruments used for measuring the variables will be discussed in chapter four. In chapter five the data and results will be presented. Conclusions and discussion will be developed in chapter 6.

CHAPTER II

REVIEW OF RELATED LITERATURE

In recent years there has been a number of behavioral studies designed to alter ecologically relevant behavior by manipulating prompts (eg., reminders and informational brochures) as antecedent stimuli to produce behavior change (Geller 1973a, 1973b; Finnie 1973). Others have investigated the use of rewards to promote ecologically relevant behavior (Clark et al. 1972; Chapman and Risley 1974; Everett 1973; powers et al. 1973; Kohenberg and Phillips 1973).

PROMPT, REWARDS, AND PROXIMITY OF RECYCLING CONTAINERS AS DETERMINANTS OF RECYCLING BEHAVIOR

In one study, Geller (1973a) used prompts as antecedent stimuli and found that they produced an increase in the number of returnable bottles purchased in a convenience store, and they also reduced littering of paper cups and the littering in a lunchroom area as well (Geller 1973b). The availability and attractiveness of litter receptacles were found to be important variables by Finnie (1973) in reducing litter on limited access highways and on urban streets.

Reid et al. (1976) in a newspaper recycling study found that both locations of close physical proximity to common activities of newspaper recycling containers and prompting people to recycle newspaper by informing them of locations of recycling containers were associated with an increase in

newspaper recycling among residents in an apartment complex. Luyben and Bailey (1979) performed a systematic replication of the Reid et al. (1976) study with a different subject population and compared the approach taken by Reid et al. (1976) with a strategy based upon the use of rewards for recycling. Reasoning that making recycling containers more convenient and offering rewards for recycling would be a way to effectively increase newspaper recycling, their study produced results that met their expectations indicating that both the prize (monetary rewards) and proximity (convenience of recycling containers) procedures produced increases in newspaper recycling, but overall the prize condition was more effective. Luyben and Bailey (1979) suggest the effectiveness of offering rewards to children for recycling papers and making recycling containers more convenient. Jacobs and Bailey (1982-1983) reported on the effectiveness of a monetary reward in increasing participation in a residential newspaper recycling program. And Luyben and Cummings (1981-1982) found that the combination of a prompt, lottery, and contest was more effective in promoting beverage container recycling than a baseline treatment using only the prompt and convenient recycling containers.

While the above cited investigations demonstrated in general that prizes and proximity can influence recycling behavior, other researchers have investigated behavioral strategies such as prompting and providing information.

In some of these studies prompting people to recycle with regular reminders, either alone or in conjunction with other strategies has been successful (Jacobs and Bailey 1982-1983; Luyben and Bailey 1979; Luyben and Cummings 1981-1982; Luyben et al. 1979-1980; Reid et al. 1976), but not too successful in others (Jacobs et al. 1984; Witmer and Geller 1976).

INTRINSIC MOTIVATION, SATISFACTION, AND ALTRUISM AS DETERMINANTS OF RECYCLING BEHAVIOR

A few recycling studies have departed from a behaviorist tradition to suggest the importance of manipulating attitudes to affect behavior change. For example, De Young (1985-1986) found that the most important reasons for recycling were intrinsic motivation and personal satisfaction. De Young (1986), for instance, recognized that prior research had taught us very little about the sources of satisfaction gained during peoples daily lives and as a result focused his research on understanding the structure of satisfactions derived from everyday activities, in particular the satisfactions derived from the recycling of household solid waste materials. His findings indicated that the satisfactions people derived from recycling were distinct and specific. The satisfactions were frugality, the avoidance of wasteful practices, and participation, being in activities that could make a long-term difference in the

reduction of solid waste accumulations. His research finding suggested that our understanding of why people bother to conserve resources may be improved by investigating the personal satisfactions derived from conservation activities. The findings of this research were part of a broader program for environmental research (De Young 1986; De Young and Kaplan 1985-1986) which also showed that ecologically concerned people do not seek economic advantages but rather the general satisfaction of knowing they are doing something worthwhile and beneficial.

While De Young's research (1986) tended to focus on the general psychological aspects of recycling in order to explain recycling behavior, Hopper and Nielson (1991) took a different approach to understanding this phenomena. These researchers sought to determine the extent to which recycling could be conceptualized as altruistic behavior. The researchers claimed that results of their experiment and survey confirmed that recycling behavior was consistent with Schwartz's altruism model because the relationships among recycling behavior and the scaled attitude variables were precisely the same (Hopper and Nielson 1991), and substantiates the hypothesis that pro-ecology behaviors are shaped by moral norms. A critical feature of Schwartz's (1977) altruism model is that people's actions and verbal endorsements of norms are discordant. Thus the crucial link in the model is between personal norms and behavior, because

individuals may internalize certain norms but may not act in accordance with them. According to Schwartz, two variables are important for translating altruistic norms into individual behavior. These are 1) awareness of the consequences that action or inaction will have, and 2)the ascription of responsibility for those consequences. Thus when an individuals awareness of consequences are high, and that individual takes responsibility for those consequences, then that individuals' behavior is guided by personal norms. In a study conducted by Schwartz (1977) empirical evidence demonstrated the capability of his model to show that the effect of a social norm is entirely mediated through the personal norm and that awareness of consequences and taking responsibility for those consequences are represented in an individuals' behavior by reflecting their personal values and attitudes. In other words, an individual behaves according to the way society influences him/her (see figure 1. of Hopper and Nielson 1991, p. 200).

Hopper and Nielson's (1991) findings further showed that a factor responsible for influencing altruistic norms, and increasing altruistic norms and increasing recycling behavior, was the presence of a block-leader program in which residents encouraged their neighbors to recycle. When prompting and information strategies were introduced into a community recycling program as an experimental intervention, their results showed that prompting and information

increased recycling behavior, but did not affect norms and attitudes. The presence of block leaders was shown to have the most substantial impact on recycling attitudes, information had the least. Their data also indicated that more than simple prompts in the way of reminders and informational brochures were necessary to influence attitudes. Following a similar vein of research, Davidson-Cummings (1977) also found that recyclers who transported materials to a local recycling drop off site described moral and altruistic motives for recycling.

ATTITUDES AND NORMATIVE BELIEFS AS DETERMINANTS OF RECYCLING BEHAVIOR

In spite of the variety of approaches taken in previous research to explain recycling, one theory in particular has been especially influential for understanding the relationships among behavior, beliefs, and attitudes appears in a series of articles by Fishbein (1967). In an article written in 1965 (Anderson and Fishbein, p. 437), Fishbein expressed his summation theory by using the formula ($A_o = \sum_{i=1}^{N} B_i a_i$),

where:

A_o = The attitude toward object "o"
B_i = the strength of belief i about "o" (i.e., the probability that "o" is related to some other object "x_i")
a_i = the evaluative aspect of Bi(i.e., the evaluation of x_i)
N = the number of beliefs.

What this theory explains is that an individual's attitude toward any object can be predicted to be partly a function of the total amount of influence associated with each of the individual's beliefs about an object. This is slightly different than Osgood's congruity theory which is based on the principle of balance or consistency, and predicts that an individual's attitude is partly a function of the mean amount of the influence (or affect) associated with an individual's beliefs. Many studies (Fishbein and Hunter 1964; Trandis & Fishbein 1963; Kerrick 1958) have provided support for summation theory.

Bruvold (1972) tested hypotheses of attitude-belief and attitude-behavior consistency in a piece of research that involved water resource issues in California. His research dealt with attitudes toward the use of reclaimed water for swimming, behavior involving community recreational areas supplied with reclaimed water, and beliefs regarding California's need for new water resources and the relative merits of scientific versus natural methods of water purification (Bruvold 1972). The results from his research provided support for the consistency hypotheses he developed. The major difference, though, in Bruvold's (1972) research and Anderson and Fishbein's (1965) was the way in which beliefs, attitudes-belief consistency, and attitude-behavior consistency were defined. Anderson and Fishbein's (1965, p. 437) definition of attitude is

consistent with Osgood et al. (1957) as "the evaluative dimension of a concept, where the term " concept" refers to any discriminable aspect of an individual's world, verbalizable or not", and Osgood et al. (1957) can be described as a mediating evaluative response associated with any stimulus . Belief was defined "as the probability dimension of a concept" (Anderson and Fishbein 1965, p. 437). Bruvold (1972, p. 127) , on the other hand, defined belief "as an assertion regarding the natural universe accepted as true by the individual rather than as a perceived relation between attitudinal objects". Attitude was defined as "the unidimensional affective reaction toward a denotable object or proposition" (Bruvold 1972, p. 127). Consistency, Bruvold (1972) defined "in terms of diadic consequence of attitude with belief or behavior" (p. 128). Nevertheless, he reported interesting results from relating several different types of behaviors and beliefs together with attitude. These results were similar to what was reported in Anderson and Fishbein (1965). For example, whereas Anderson and Fishbein (1965) found that affective response toward an attitude object was a function of the many beliefs held regarding that object, Bruvold's (1972) data offered support to this view in that the correlation between the number of "positive" beliefs and attitude toward the use of reclaimed water for swimming found in his studies was significant. However, although his results also showed

that in some instances specific attitude-belief and attitude -behavior consistencies were not always statistically significant, he claimed that there was enough evidence to suggest that there was consistency of attitudes with beliefs and behavior when several beliefs or several behaviors were assessed.

These hypotheses were further elaborated in Bruvold (1973). In a study similar to his previous research (Bruvold 1972), Bruvold (1973) undertook a study in 1973 that followed previous developments in social psychology regarding the relationship between beliefs and attitudes, and closely adhered to Anderson and Fishbein's (1965) model that related behavior to attitudes.

In this study Bruvold (1973) proposed and tested hypotheses dealing with relationships between environmental beliefs and attitude, and between environmental behavior and attitudes. The primary focus of his effort was the study of behavioral responses to water reclaimed from domestic sewage in which he elaborated on previous hypotheses proposed in Bruvold (1972). The central findings of this research was that a more useful understanding could be obtained when the relations of many aspects of belief and of behavior to attitude are considered jointly. Useful theoretic and applied consequences, Bruvold (1973) argued, should be considered from these concepts that he developed, and suggested generalizing them to other environmental topics.

His research further indicated that relations between affect and "single units" of belief or behavior will likely not be impressive, and argued that a more useful understanding would be obtained by jointly considering the relation of many aspects of belief and of behavior toward attitude.

CHAPTER III

CONCEPTUAL FRAMEWORK

As stated earlier, this study seeks to examine recycling behavior by using an augmented Fishbein-Ajzen model that was developed by Charng et al. (1988) which incorporates variables from identity theory. The assumption of Charng et al. (1988) was that the theory of reasoned action would be enhanced by adding these other theoretical constructs such as "centrality of role identity in relationship to the activity, social relations connected to the activity, and habit" (p. 306). The inclusion of these variables in the model offers more to the development of behavior theory than just improving the explanatory power of the Fishbein-Ajzen model. These variables, taken from identity theory also help explain variation in behaviors across the social structure, which is not accomplished by the Fishbein-Ajzen model alone (Charng et al. 1988). Identity theory, unlike the theory of reasoned action, is based on the premise that an individuals behavior is the product of an interaction process influenced by definitions of the self, other, and the social setting that are limited by the social structure.

As can be seen in the review of related literature, several studies of behavior theory that focused on conservation behavior, encouraging environmentally appropriate behavior, and psychological aspects of recycling

have noted the significance of attitude, satisfaction, and normative beliefs as intervening variables (eg., De Young 1986; Hopper and Nielson 1991; Bruvold 1972, 1973; Anderson and Fishbein 1965) in explaining and predicting recycling behavior.

Another stream of attitude research in particular that has received much attention for predicting behavioral intention is that based on the Fishbein-Ajzen model (Ajzen and Fishbein 1969, 1970, 1973, 1977; Wilson et al. 1975; Bouman and Fishbein 1978; Bentler and Spekart 1979; Manstead et al. 1983; Ajzen and Madden 1986). This model is different from their summation theory discussed earlier which uses an individuals beliefs about an object to predict their attitudes. Fishbein and Ajzen (1975) and Ajzen and Fishbein (1980) have described a model of behavioral intentions that aids understanding of numerous behaviors such as smoking, weight reduction, family planning and voting behavior. The model proposes that volitional behavior is determined by intentions to perform that behavior and subjective norms concerning the behavior.

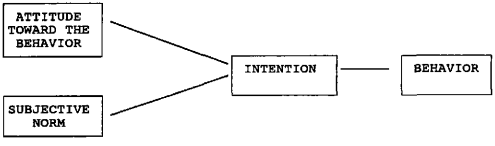


Figure 1. Ajzen and Fishbein's Theory of Reasoned Action

Ajzen and Fishbein (1980) argue that attitude and subjective norms are sufficient to predict behavioral intentions. Further, attitudes are predicted by behavioral beliefs, and subjective norms are predicted by normative beliefs (see Fig 1). The theory holds that a persons behavior (B) is a function of his behavioral intentions (BI) which is determined by his attitude toward the act (A-act) and by his beliefs about the expectations of another player,i.e., social normative beliefs (NBs) (Ajzen and Fishbein 1970). These relations have been explained in a symbolic form which may help to clarify the components involved in the model (Ajzen and Fishbein 1969, p. 401);

$$B \sim BI = [A\text{-act}]\, W_o + [NB_p]w_1 + [(NB_s)(Mc_s)]w_2$$

where B : Overt Behavior
BI : Behavioral Intentions
A-act: Attitude toward the behavior in a given situation
NB_p : Personal normative beliefs
NB_s : Social normative beliefs i.e., expectations of others
Mc_s : Motivation to comply with social normative beliefs
W_o,W_1 and W_2 : Empirically determined weights.

This theory of reasoned actions developed by Fishbein and Ajzen (1975; Ajzen and Fishbein 1980) is a parsimonious model that attempts to account for a variety of behaviors by reference to a small number of concepts that are linked together in a single theoretical system. But the method in which this model was tested leaves its external validity and generalizability questionable. Therefore, investigating the

usefulness of the Fishbein-Ajzen model will be a primary aim of this study in order to examine the applicability of this theory to the prediction and understanding of the behavioral intentions of recyclers in a sample of individuals from the general population. Additionally, in an attempt to increase the explanatory capability and predictability of the model, this study will also seek to augment the Fishbein-Ajzen model by incorporating variables from identity theory (see Charng et al. 1988). The reason for incorporating identity theory into the model rather than any other theory is because of the important implication that role-identity salience or centrality has in its association with behavior: "the more salient the role identity, the higher the probability that the individual will behave consistently with that identity" (Charng et al. 1988, p. 304). Role-identity and hierarchy salience are potentially important predictors of behavior (Stryker 1968). Thus, predictions and a better understanding of repeated behavior may be attained if some measure of an individuals self-concept were added to the variables of the Fishbein-Ajzen model of reasoned action in relation to the behavior to be predicted.

Identity theory, which grows out of the root idea of symbolic interactionism, suggests that one's self-concept is organized into a hierarchy of role identities that correspond to one's positions in the social structure (Burke

1980; McCall and Simmons 1978). Role identity is the character and the role that an individual devises for himself as occupant of a particular social position. Charng et al. (1988, p. 304) explains that "the relative importance of a given role-identity in one's self-structure is generally referred to as the salience of the role-identity. The extent to which a role is internalized as part of the self has been referred to as 'role-person merger' (Turner 1978)." The concept of identity salience has its root in James' (1890) notion of multiple selves and the varying degree of value placed on each.

Social context variables have mainly been used to explain variation in role-identity salience or centrality (Charng et al. 1988). As stated by Charng et al. (1988, p. 304), "the degree to which significant others identify the actor with the role identity (Turner 1978), the amount of social support one receives in the role identity (Mc Call and Simmons 1978), and the relative size of one's social network linked to the role identity (Stryker 1980), all have been identified as key variables influencing the strength, salience, or certainty of role identities." Furthermore, in contrast to the Fishbein-Ajzen's inability to explain consistent behavior over time (Charng et al. 1988), because behavioral intentions could change after they have been measured, one might expect behavioral intentions to predict repeated behavior over a considerable period if an

individuals intentions were based on a central or salient role identity. Compared to the identity theory, Fishbein and Ajzen's model by itself generally should be less able to explain consistent behavior over time. According to the Fishbein and Ajzen model, "The longer the time interval between the measurement of intention and the observations of behavior, the less likely it is that the intention measured will predict overt behavior accurately" (Ajzen and Fishbein 1973, p. 44), and as a result, "the lower the behavioral intention-behavior correlation will tend to be" (Ajzen and Fishbein 1969, p. 401). Charng et al. (1988) has reinforced this idea and suggested that behavioral intentions will predict repeated behavior over a considerable period, if those intentions are based on central or salient role identity. In Charng et al.'s (1988) study they also added two additional factors to deal with repeated behavior, that is, social relations and the matter of habit. Therefore by adding the identity theory variables to the Fishbein-Ajzen model this study hopes to improve the prediction of both intention and behavior more strongly for individuals farther along in their activities of recycling behavior.

In general terms the hypotheses underpinning this research are similar to the ones posited in Charng et al. (1988, p. 306) except for two major difference: these differences are the behavior under study and the setting in this research. Whereas Charng et al. (1988) determined the

importance of variables such as role identity, social relations connected to blood donation, and habit in the prediction of intentions and blood donation by using an augmented model that incorporated both the Fishbein-Ajzen model of reasoned action and identity-theory variables, this research is aimed at testing the same augmented model used in Charng et al. (1988), but studying a different behavior instead i.e. recycling. In Charng et al. (1988, p. 303) they interpreted their results "to mean that although the Fishbein-Ajzen model may be the most parsimonious model for the prediction of many non-role behaviors, it should be augmented with identity theory variables for the prediction of established role behaviors." If the results of this research provides further validation for Charng et al. (1988) augmented model, then this theory may be generalized to a variety of behaviors besides just blood donation. Therefore, in following with Charng et al. (1988), the specific hypotheses underlying this research are as follows:

1) The theory of reasoned action will be applicable to repeated behavior: attitude toward recycling and subjective norms will predict intentions to recycle over a one month period; intention alone will predict the actual behavior (see Fig. 1).

2) The prediction of intention to recycle and of actual recycling behavior will be improved by the addition of variables from identity theory: Role-person merger, social

relations of recycling, and habit (see Fig. 2).

3) Adding the identity theory variables will improve the prediction of both behavioral intention and behavior more strongly for recyclers farther along in their activities of recycling behavior "careers."

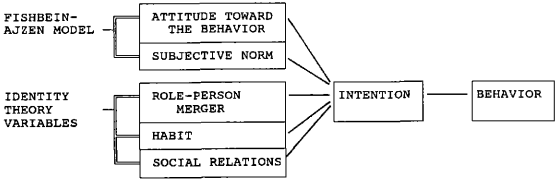


Figure 2. Augmented Model incorporating both the Ajzen and Fishbein's Model of Reasoned Action and Identity Theory Variables for Predicting Behavioral Intentions and Recycling Behavior.

CHAPTER IV

METHODS AND MEASURES

The data in this study were obtained from a structured questionnaire to be administered at four recycling centers. These four recycling centers were chosen because they did not offer monetary rewards in Bryan and College Station, Texas: City of Bryan Solid Waste Department, The Deluxe, Friends of The Library, and Twin City Mission.

The recycler was selected at random. This was accomplished by assigning two digit numbers to the hours which the recycling centers are open, and then use a table of randomly generated numbers to select numbers that correspond to a certain hour. Interviews were conducted at those hours selected at random. For example, a recycling center that is open from 8:00 a.m to 5:00 p.m will have nine hours to which corresponding two digits numbers will be assigned:

8 a.m	00
9 a.m	01
10 a.m	02
11 a.m	03
12 noon	04
1 p.m	05
2 p.m	06
3 p.m	07
4 p.m	08

Two digit numbers are assigned to each hour in order to give every hour the same known chance of selection (Nachmias 1981). All respondents that arrive at the centers during the randomly selected times will be interviewed. For example, using a table of random digits found in Appendix B of Nachmias (1981, p. 519) and dropping the last three digits of the five digit numbers listed there, one may proceed down column one until a 2 digit number in the 00 to 08 range appears. In this case that number is 07, which corresponds to 3 p.m. The second two digit number in this range is 02, which corresponds with 10:00 a.m. and the third random hour selected corresponds to 01 which is 9:00 a.m..

Each respondent was asked if he/she would participate in a follow up interview by phone, and if willing was paid $5.00 for their time and assistance in this research. The phone number and address of the interviewee was taken for this purpose.

Questionnaire items, developed by following the suggestions in Ajzen and Fishbein (1980), will assess each component of the Fishbein and Ajzen model: attitude toward behavior, subjective norms, and behavioral intentions; and role identity theory: role-person merger, social relations, and habit.

1. Attitudes toward recycling will be measured using a single item (e.g., "In general, my attitude toward recycling is..."). The scale end-points will be labeled favorable /

unfavorable and positive / negative with two seven-point semantic differential scales.

2. Subjective norms will be assessed by a seven-item scale which is rated on a seven-point strongly agree/strongly disagree scale; responses will be summed to form the scale score.

1. Other people think that recycling is important to me.

2. It is important to my friends and relatives that I continue to recycling.

3. It really would not matter to most people I know, if I decided to give up recycling (reversed).

4. No one would really be surprised if I just stopped recycling (reversed).

5. Many people would probably be disappointed in me if I just decided to stop recycling.

6. Many of the people that I know expect me to continue recycling.

7. Others would probably make me feel guilty if I quit recycling

3. Behavioral intention will be measured by asking subjects directly;

How many times do you intend to take recyclable products to a recycling center next month, and how many items do you intend to recycle?

4. Role-person merger will be assessed by asking questions

that can be answered dichotomously i.e., yes or no.

1. Recycling is something I rarely even think about (reversed).

2. I would feel a loss if I could not recycle.

3. I really do not have any clear feelings about recycling (reversed).

4. For me, being an environmentalist means more than just the act of recycling.

5. Recycling is an important part of who I am.

5. Social Relations will be measured by asking respondents to answer the following questions with the appropriate number. The items are scored from 0 to 5, with 5 equalling 5 or more. The items will then be summed to form total scale on which a Cronbach's alpha reliability coefficient will be performed.

1. Of all the people you know through recycling, how many are important to you, i.e., You would really miss if you did not see them?

2. Think of those people that are important to you. About how many would you lose contact with if you stopped recycling ?

3. How many people do you know on a first name basis through recycling ?

4. Of the people you know through recycling, how many are close friends ?

5. Of the people you know through recycling activities,

how many participate in other activities with you ?

6. Habit

How often have you taken recyclable products to a recycling center each month ?

7. Actual Recycling Behavior was determined by responses given in a follow-up interview that was conducted one month after the initial interview. This was accomplished by assessing the actual number of times the individual engaged in recycling behavior the previous month: "How many times did you take recyclable products to a recycling center last month ?", for example, and "What kinds of products did you recycle ?"

Due to the way in which the dependent and independent variables are measured (i.e., as nominal and ordinal; recycled or did not recycle or agree-disagree on a 7 point scale, for example) ordinary least squares regression was used to determine the relative importance of the independent variables in predicting recycling behavior.

CHAPTER V

RESULTS

RESPONDENT CHARACTERISTICS

Sixty-eight percent (Table 1) of the respondents were women. The distribution of age among respondents was concentrated in three of the age categories. The 21-30 year old group contained 42% of those surveyed; which was followed by the 31-40 age group with 20%, and 51 or over age groups with 22%. There were relatively few (4%) recyclers surveyed in the 41-50 age group, and only 12% were under 20 years of age.

TABLE 1. Respondent Characteristics

	Frequency	Percent	Cumulative Frequency	Cumulative Percent
SEX				
Male	16	32.0	16	32.0
Female	34	68.0	50	100.0
AGE				
20 or Under	6	12.0	6	12.0
21-30	21	42.0	27	54.0
31-40	10	20.0	37	74.0
41-50	2	4.0	39	78.0
51 or Over	11	22.0	50	100.0
MARITAL STATUS				
Married	22	44.0	22	44.0
Widowed	3	6.0	25	50.0
Divorced	2	4.0	27	54.0
Never Married	23	46.0	50	100.0
CHILDREN				
None	31	64.6	31	64.6
One	1	2.1	32	66.7
Two	4	8.3	36	75.0
Three	7	14.6	43	89.6
Four	4	8.3	47	97.9
Eight or More	1	2.1	48	100.0

Frequency Missing = 2

As far as marital status goes, the respondents were somewhat evenly divided. There were 44% that were married,

and 46% that were never married. Only 6% were widowed and 4% were divorced.

Most of the respondents had no children (65%), although nearly 15% had at least three. A few had one (2%) or two (8%) and only 1 (2%) had eight or more. The majority of the respondents were college educated (72%) (Table 2) with either an associates degree(16%), a bachelor's degree (34%) or a graduate degree (22%). Family income was high among the respondents. About 23% (Table 2) made over $55,000 per year. The next highest family income group was the $40,000 to $44,999 category (19%), closely followed by the $10,000 to $14,999 range (13%), and lastly by the under $5,000 (11%) family income group. The most frequent occupation cited among respondents was graduate student (44%) (Table 2). Other occupations were fairly evenly distributed. The second most frequent occupation was professor (8%).

TABLE 2. Socioeconomic Status of Respondents

	Frequency	Percent	Cumulative Frequency	Cumulative Percent
EDUCATION				
High School	13	26.0	13	26.0
Junior College	8	16.0	21	42.0
Bachelor's	17	34.0	38	76.0
Graduate	11	22.0	49	98.0
No Answer	1	2.0	50	100.0
FAMILY INCOME				
Under $5,000	5	10.6	5	10.6
$5,000 to 9,999	3	6.4	8	17.0
$10,000 to 14,999	6	12.8	14	29.8
$15,000 to 19,999	1	2.1	15	31.9
$20,000 to 24,999	2	4.3	17	36.2
$25,000 to 29,999	2	4.3	19	40.4
$30,000 to 34,999	1	2.1	20	42.6
$35,000 to 39,999	2	4.3	22	46.8
$40,000 to 44,999	9	19.1	31	66.0
$45,000 to 49,999	3	6.4	34	72.3
$50,000 to 54,999	2	4.3	36	76.6
Over $55,000	11	23.4	47	100.0
Frequency Missing = 3				
OCCUPATION				
Science Writer	1	2.0	1	2.0
Graduate Student	22	44.0	23	46.0
Librarian	1	2.0	24	48.0
Professor	4	8.0	28	56.0
Guide	1	2.0	29	58.0
Scheduling Coordinator	1	2.0	30	60.0
Office Manager	2	4.0	32	64.0
Retired	2	4.0	34	68.0
Home Maker	3	6.0	37	74.0
Waitress	1	2.0	38	76.0
Floral Designer	1	2.0	39	78.0
Computer analyst	1	2.0	40	80.0
Technician	1	2.0	41	82.0
Owner	1	2.0	42	84.0
Interpreter	1	2.0	43	86.0
Teacher	2	4.0	45	90.0
Engineer	1	2.0	46	92.0
Church Work	1	2.0	47	94.0
Sales Person	1	2.0	48	96.0
Retail	1	2.0	49	98.0
Child Care Worker	1	2.0	50	100.0

PRODUCTS RECYCLED BY RESPONDENTS

To the question; what kinds of recyclable products have you taken to a recycling center each month? (question 13 of survey, see in appendix), respondents' answers were

distributed over a variety of intended, habitual, and actual behaviors (Table 3). Paper was the most frequently recycled product among respondents. When the initial survey was taken, 92% of the respondents had intentions (Intended Behavior) of recycling paper in the future, 90% had recycled paper each month up to that time (habit), and 80% of the respondents had actually (Actual Behavior) taken paper to a recycling center a month later as indicated by responses given in a follow-up phone interview conducted one month after the initial survey. The second most frequently recycled product was aluminum. In the initial interview 42 respondents (84%) had intentions of recycling aluminum products, and 36 of them (72%) had already established a habit of recycling aluminum. The follow-up interview showed that 32 of the respondents (64%) had actually recycled aluminum products a month later. Plastics and glass products appear to have been recycled by respondents with about the same frequencies, across intended, habitual, and actual behaviors. Over 60% of the respondents recycled plastic, and their responses were consistent among all three levels of behavior: intend, 31 (62%); habit, 32 (64%); and actual behavior, 33 (66%). Glass was about the same, 32 (64%) respondents had intentions of recycling glass in the future and 33 of them (66%) had already formed a habit of it at the time of the survey. A month later 28 respondents (56%) had actually recycled glass products as intended. Grocery Bags

TABLE 3. Products Recycled by Respondents

	BEHAVIOR		
PRODUCT:	INTENDED FREQUENCY (%)	HABIT FREQUENCY (%)	ACTUAL FREQUENCY (%)
PAPER			
NO	4 (8.0)	5 (10.0)	10 (20.0)
YES	46 (92.0)	45 (90.0)	40 (80.0)
ALUMINUM			
NO	8 (16.0)	14 (28.0)	18 (36.0)
YES	42 (84.0)	36 (72.0)	32 (64.0)
PLASTIC			
NO	19 (38.0)	18 (36.0)	17 (34.0)
YES	31 (62.0)	32 (64.0)	33 (66.0)
GLASS			
NO	18 (36.0)	17 (34.0)	22 (44.0)
YES	32 (64.0)	33 (66.0)	28 (56.0)
GROCERY BAGS			
NO	22 (44.0)	21 (42.0)	30 (60.0)
YES	28 (56.0)	29 (58.0)	20 (40.0)
CARD BOARD			
NO	46 (92.0)	47 (94.0)	48 (96.0)
YES	4 (8.0)	3 (6.0)	2 (4.0)

was another product that showed consistency in intended, 28 (56%), habitual, 29 (58%), and actual behaviors, 20 (40%). In an open-ended question soliciting unspecified types of products that the respondents might recycle, card board appeared on 4 (8%) of the surveys as intended behavior of recycle. Only three (6%) made a habit of recycling card board, and just 2 (4%) actually recycled it according to their previous intentions to do so.

OTHER PRO-ECOLOGICAL ACTIVITIES OF RESPONDENTS

Besides asking respondents about the kinds of products they recycled, the survey also asked about other pro-ecological activities such as saving energy (turning off lights when not needed), using rechargeable batteries, and

using phosphate-free detergents (Table 4). The most frequent of pro-ecological behaviors was conserving energy use by turning off lights when they weren't needed. Thirty-nine (78%) indicated they had intentions of taking energy conservation measures. Thirty-seven (74%) had already performed this activity habitually. Respondents that actually took energy conservation measures a month later according to prior intentions comprised 72% of the respondents (36) in the follow-up phone interview. Using phosphate-free detergents was the next most frequently responded to item. Forty-two percent indicated they engaged in this activity in both intended and habitual behavior categories. Only sixteen (32%) had actually followed through a month later with their intentions of using phosphate-free detergents. The use of rechargeable batteries was the least frequent responded to pro-ecological activity on the list of items of the survey, although responses were fairly consistent across behavior categories. Sixteen (32%) had intentions of using rechargeable batteries in the future, fifteen (30%) had already formed a habit of it, and 14 (28%) actually did it a month later according to their previous intentions. As far as other pro-ecological activities go, only one (2%) had both the intentions and the habit of composting leaves, walking instead of using car, and conserving water, but no one actually did any of them according to information provided by the follow-up phone

interview conducted one month later.

TABLE 4. Other Pro-Ecological Activities of Respondents

	BEHAVIOR		
ACTIVITY:	INTENDED FREQUENCY (%)	HABIT FREQUENCY (%)	ACTUAL FREQUENCY (%)
ENERGY USE (SAVING LIGHTS)			
NO	11 (22.0)	13 (26.0)	14 (28.0)
YES	39 (78.0)	37 (74.0)	36 (72.0)
USING RECHARGEABLE BATTERIES			
NO	34 (68.0)	35 (70.0)	36 (72.0)
YES	16 (32.0)	15 (30.0)	14 (28.0)
USING PHOSPHATE (FREE DETERGENT)			
NO	29 (58.0)	29 (58.0)	34 (68.0)
YES	21 (42.0)	21 (42.0)	16 (32.0)
OTHERS			
NO	47 (94.0)	47 (92.0)	50 (100.0)
COMPOST LEAVES	1 (2.0)	1 (2.0)	--
WALK	1 (2.0)	1 (2.0)	--
CONSERVE WATER	1 (2.0)	1 (2.0)	--
NO PACKAGED PRODUCT	--	1 (2.0)	--

RESPONDENT AFFILIATIONS WITH ENVIRONMENTAL ORGANIZATIONS

Question 14 of the survey (see appendix) asked if any of the respondents belonged to any associations / clubs that promoted environmental issues, especially recycling. Of the respondents, eighty-six percent belonged to no such organizations (Table 5). Of the remaining seven (14%) who did, two belonged to the Garden club, two to Green Peace, and one each for the recycling coalition of Texas, American Medical Auxiliary, and the American Society of Landscape.

TABLE 5. Respondent Affiliations with Environmental Organizations

	Frequency	Percent	Cumulative Frequency	Cumulative Percent
AFFILIATION:				
NO	43	86.0	43	86.0
YES	7	14.0	50	100.0
ORGANIZATIONS:				
NONE	43	86.0	43	86.0
GARDENER CLUB	2	4.0	45	90.0
GREEN PEACE	2	4.0	47	94.0
RECYCLING COALITION OF TEXAS	1	2.0	48	96.0
AMERICAN MEDICAL AUXILIARY	1	2.0	49	98.0
AMERICAN SOCIETY OF LANDSCAPE	1	2.0	50	100.0

ANALYSIS OF APTNESS OF THE REGRESSION MODELS

In order to determine the appropriateness of the regression models for recycling behavior, several plots of residuals against fitted values and the independent variables of the various models were constructed.

The data assessing the Fishbein-Ajzen model predicting intended behavior did not meet the requirements for a linear regression model. Plots of residuals against the independent variables (Attitude and Subjective Norms) and predicted values were inconsistent with the conclusions of a good fit of the data. A residual plot of the Fishbein-Ajzen model predicting actual recycling behavior indicated that attitude was heteroscaedastic. The error variance of attitude increased in a trapezoidal fashion with increasing values of this independent variable. Subjective Norms, on the other hand, showed no systematic deviations from zero and appeared to fit the data well. For the augmented model predicting intended behavior residual plots of one of the Fishbein-

Ajzen variables, attitude, again showed a systematic increase in error variance with increasing values of this variable. Identity theory variables in this model that showed non-constant variance were habit and social relations. Since the residuals of these variables departed from zero in a systematic fashion, a lack of fit of the linear regression model is suggested by these residual plots. Subjective Norms and Role-person Merger appeared to fit the data well suggesting that a linear model is appropriate for these variables.

Residual plots for the augmented model predicting actual behavior were also done. As in the previous analysis attitude, habit, and social relation showed systematic departures from zero, suggesting non-linearity. Attitude showed its typical trapezoidal form of non-constant error variance. Habit showed systematic variation in being positive and negative for lower values of this variable. Likewise, the residual for social relations tended to vary systematically for lower values of this variable. Only subjective norms and Role-person Merger had residual plots that were fairly homoscaedastic. When behavioral intention was included in the Fishbein-Ajzen and Augmented models for predicting actual behavior, this variable showed some deviations at the lower levels of its measurement scale, but remained fairly constant in variance, suggesting that this variable may not be appropriately fitted to a linear model.

Table 6. Number of Items Recycled By Respondents.

	# OF ITEMS	# OF RESPONDENTS	PERCENT
INTENDED BEHAVIOR			
	0	1	2.0
	1	2	4.0
	2	12	24.0
	3	6	12.0
	4	9	18.0
	5	17	34.0
	6	3	6.0
RECYCLING HABIT			
	0	2	4.0
	1	4	8.0
	2	7	14.0
	3	9	18.0
	4	9	18.0
	5	17	34.0
	6	2	4.0
ACTUAL RECYCLING			
	0	5	10.0
	1	4	8.0
	2	7	14.0
	3	10	20.0
	4	13	26.0
	5	11	22.0

REGRESSION OF THE FISHBEIN-AJZEN AND AUGMENTED MODELS ON THE NUMBER OF ITEMS RECYCLED PER MONTH.

In order to determine which variables of the Fishbein-Ajzen and Augmented models are associated with the number of items recycled, these models were regressed on the number of responses given to question 10 of the survey; What kinds of recyclable products do you intend to take to a recycling center next month ?

In table 6 the greatest proportion of responses for

intended recycling behavior was five items per month. Seventeen respondents (34%) answered this question at the time of the initial survey stating that they had intentions of recycling five recyclable items over the next month. Twenty-four percent (twelve people) intended to recycle 2 items. Nine respondents intended to recycle four items over the next month and six respondents intended to recycle three items, and there were three people who intended to recycle six items per month. Two respondents stated intentions of recycling only one item, and only one respondent had no intentions (0 items) of recycling any recyclable item over the next month. When asked a variation of question 10 of the survey on how many recyclable items the respondents had formed a habit of recycling, the results of Table 6 indicate that, consistent with intended behavior, seventeen and nine respondents performed habitually the recycling of five and four items per month, respectively. Two indicated that they had a habit of recycling six items per month, and nine respondents said they recycled habitually three items per month. Two items per month were recycled by seven respondents. Four respondents had a habit of recycling at least one item per month, and two respondents hadn't established a habit, up to the time of the survey, of recycling at all.

One month after the initial survey was taken, a follow-up phone interview of the same respondents yielded results

in Table 6 of Actual recycling. One month later eleven respondents had actually recycled five items, while thirteen had actually recycled four items. The frequency of the responses associated with the number of items recycled do not appear to show any consistent pattern for either intended, habitual, or actual recycling behavior. Twenty percent (10 respondents) of the follow-up phone interviewees had actually recycled three items over the month, whereas in the initial survey nine respondents (eighteen percent) and six respondents (twelve percent) had recycled three items habitually or intentionally, respectively. Two items were actually recycled by only seven respondents (14%) compared to the twelve (24%) who had intentions of recycling this many items. However, four respondents actually recycled one item over the month, but only two had intentions to do so. Finally, five respondents (10%) had not recycled any items at all over the month, whereas only one (2%) in the initial survey said that they had intentions of recycling no items over the next month.

The results from the regression analysis testing the Fishbein-Ajzen model (Attitude, Subjective Norms, and Intentions) and the augmented model (Fishbein-Ajzen variables plus Identity Theory variables: Role-Person Merger, Habit, and Social Relation) for the number of items recycled over a one month period are presented in Table 7. For the Fishbein-Ajzen model predicting intended behavior,

Table 7. Regression Analysis Testing the Fishbein-Ajzen Model (1) and the Augmented Model (2) for the Number of Items Recycled for the Total sample (Entries in the table are standardized beta weights).

	INTENDED BEHAVIOR		ACTUAL BEHAVIOR	
VARIABLE	(1) BETA	(2) BETA	(1) BETA	(2) BETA
Intercept	0.000	0.000	0.000	0.000
Attitude	0.290	0.311	0.328*	0.273
Subjective Norms	0.181	0.170	0.109	0.133
Role Person Merger	--	-0.174	--	0.028
Habit	--	0.183	--	0.011
Social Relation	--	0.166	--	0.244
Intention	--	--	0.147	0.107
R-square	0.162	0.225	0.192	0.251
Adj R-SQ	0.127	0.137	0.139	0.147
Root MSE	1.408	1.400	1.479	1.472
F-value	4.551**	2.556*	3.646**	2.404*
D.F	2/47	5/44	3/46	6/43
R-square Change	--	0.063	--	0.059
F-value+	--	1.235	--	1.205

* p < .05. ** p < .01.
+ indicates increment R-square test.

neither of its variables, attitude (beta=.290) nor subjective norms (beta=.181), were statistically discernible predictors, even at the lowest level of significance ($p < .05$). However, the overall model was significant ($F_{2/47} = 4.551$) at the $p < .01$ level.

When identity theory variables were added, the ability of the Augmented model to explain variation in the number of items that respondents intended to recycle over one month was significant ($F_{5/44} = 2.556$) at the .05 level. Variables of the Fishbein-Ajzen and Identity Theory were not statistically important predictors of behavioral intentions. Adding identity theory variables to the augmented model did not improve the amount of variance explained as indicated by

an increment in R-square test.

Similar results are given for the models regressed on the actual number of items recycled (Actual Behavior) over a one month period. In the Fishbein-Ajzen model only attitude (beta=.328, $p < .05$) was a statistically significant contributor for predicting actual behavior, while subjective norms (beta=.109) was not. The model however, was significant ($F_{3/46} = 3.646$) at $p < .01$. But only 19% of the variation in the number of items recycled is explained by this model. By contrast, 81% of the variation is not explained by this model.

When identity theory variables were added to the Augmented model, no single variable in the model made a statistically important contribution to predicting Actual recycling behavior. The model is significant ($F_{6/43} = 2.404$) at the $p < .05$ level, but an increment in R-square test suggests that the addition of the identity theory variables makes no difference for the amount of variance explained.

TEST OF THE FISHBEIN-AJZEN MODEL PREDICTING INTENDED BEHAVIOR AND ACTUAL BEHAVIOR FOR THE TOTAL SAMPLE

The results of the Fishbein-Ajzen model are presented in Table 8. This analysis was performed on the entire sample, unlike later analyses that were performed on smaller samples of people who recycled One-time, Two-time,...etc.,

and 5+ times per month.

When attitude (Cronbach alpha standardized reliability coefficient = .9001) and subjective norms (Cronbach alpha standardized reliability coefficient = .8366) were regressed on Behavior Intention (Table 8, column(1) under Intended Behavior), the results did not provide support for the Fishbein-Ajzen model. Both attitude (standardized beta = .030) and subjective norms (standardized beta = .233) were not significant predictors of behavior intention. Neither of the independent variables nor the regression equation itself ($F_{2/47} = 1.531$) were significant at the $p < .05$ level.

Table 8. Regression Analysis Testing the Fishbein-Ajzen Model (1) and the Augmented Model (2) for the Total Sample (Entries in the table are standardized beta weights).

	INTENDED BEHAVIOR		ACTUAL BEHAVIOR	
VARIABLE	(1) BETA	(2) BETA	(1) BETA	(2) BETA
Intercept	0.000	0.000	0.000	0.000
Attitude	0.030	0.055	0.045	0.012
Subjective Norms	0.233	-0.021	0.018	0.005
Role Person Merger	--	-0.057	--	0.119
Habit	--	0.960***	--	0.035
Social Relation	--	0.060	--	0.006
Intention	--	--	0.874***	0.816***
R-Square	0.061	0.897	0.784	0.797
Adj R-square	0.021	0.886	0.770	0.768
Root MSE	1.712	0.585	0.729	0.732
F-value	1.531	76.871***	55.759***	28.093***
D.F	2/47	5/44	3/46	6/43
R-square Change	--	0.836	--	0.013
F-value+	--	119.056***	--	0.917

* p < .05. ** p < .01.
+ indicates increment R-square test.

Similarly, in the equation predicting actual recycling behavior (Table 8, column (1) under Actual Behavior) only

one of the independent variables made a contribution to explaining actual behavior. Attitude and Subjective Norms (beta = 0.045 and .018, respectively) were not statistically discernible at the $p < .05$ level. Intention, however, made a statistically significant contribution (beta=.874) to predicting Actual behavior at the $p < .001$ level.

TEST OF THE AUGMENTED MODEL PREDICTING INTENDED BEHAVIOR AND ACTUAL BEHAVIOR FOR THE TOTAL SAMPLE

In addition to the variables used in the Fishbein-Ajzen model, the Augmented model includes variables from identity theory, which are measures of a recyclers Role-Person Merger (Cronbach alpha standardized reliability coefficient = .7120), Social Relations (Cronbach alpha standardized reliability coefficient = .7149), and the Habit of recycling.

The results presented in Table 8 (column (2) under Intended Behavior) show that only habit has a significant influence on predicting Intended behavior at the $p < .001$ level, whereas the other variables do not. In the Augmented model, the addition of identity theory variables did increase significantly the amount of variance in Intended behavior explained by the model ($p < .001$). There was an 83 percent change in R-square from the Fishbein-Ajzen model, and 89.7 percent of the variation in Intended behavior was

explained by the variables in the Augmented model, with habit making the most significant contribution ($F_{3/44}$ = 119.056, $p < .001$). The overall Augmented model predicting behavior intention was significant at the $p < .001$ level, however, the effect of subjective norms and role-person merger on behavioral intention become negative; the more recyclers perceive that others expected them to recycle and the more strong a recyclers' role-person merger, the less strong their Intention to recycle, net of other variables in the regression.

In the regression predicting Actual recycling behavior by using the augmented model (Table 8, column (2) under Actual Behavior), only Intention had a significant effect on Actual behavior ($p < .001$). Neither attitude, subjective norms, role-person merger, social relations, nor habit had a statistically discernible effect on Actual behavior. Similar to the Augmented models ability to explain Behavior Intention (R-square = .897), Actual behavior is explained as well by the Augmented model (R-square = .797) and is significant overall at the $p < .001$ level. The change in explanatory capability increased by only 2% (from R-Square=.784 to R-Square=.797), indicating the addition of the identity theory variables makes no substantial difference in the amount of variance explained ($F_{3/43}$ = 0.917).

In general, the augmented model predicted Intended behavior better than the more parsimonious Fishbein-Ajzen model. But there was no significant difference (increment R-Sq test = .917, $p > .05$) between the models in predicting Actual behavior. These results indicate that both Intended behavior and Actual behavior can be predicted by factors in the Augmented model, namely, attitude, subjective norms, role-person merger, habit, and social relations, with intention having the only statistically significant, positive affect on predicting Actual behavior ($p < .001$) and habit having the only statistically significant affect on predicting Intended behavior in the Augmented model. In addition, the Fishbein-Ajzen model is significant in predicting actual behavior.

So far the results of these analyses have provided some evidence that the factors comprising Identity Theory are important in predicting Intended behavior of recyclers. To be consistent with Charng et al. (1988) this research will follow their suggestions that place certain expectations on the Fishbein-Ajzen and Augmented models' abilities to predict intention and actual behavior at various stages in recyclers' careers over time (a one month period). Charng et al. (1988, p. 311) suggested that; "theoretically,.. role identity develops over time with experience in performing the role", and by extension, "the Fishbein-Ajzen model should work best to predict the Intentions and Actual

behaviors of early career donors (recyclers), while the Augmented model might be expected to work best with experienced donors (recyclers)". To test the implications of these suggestions, as did Charng et al. (1988), the recyclers surveyed in this research were divided into five stages according to the number of times they actually took recyclable products to recycling centers each month (as determined by follow-up phone interviews one month after the initial survey).

Actual recycling behavior here is defined as recycling actions noted during the follow-up phone interview conducted one month after the initial survey. The contrast between Intended and Actual recycling behavior, then, is provided by respondents answers to questions about recycling at only these two points in time. A note about a slight deviation in this research from the methodology used by Charng et al. (1988) needs to be explained here before proceeding to the next section, Test of The Developmental Model. Whereas the researchers in Charng et al. (1988) had access to well kept blood donation records provided by the blood donation centers in order to establish a baseline of individuals who donated blood regularly and who were kept track of for several months during the research project, but in this research the actual recycling behavior variable was derived from follow-up phone-interviews one month later, not from recycling records kept at various recycling centers as

Charng et al. (1988) research was able to obtain.

TEST OF THE DEVELOPMENTAL MODEL

In order to provide a preliminary test of the developmental model, the Scheffe multiple comparison test was employed to detect significant differences among population means across the various stages of Actual recycling behavior (i.e., One-Time, Two-Time, ...etc..5 + Time per month). This test indicates which variables differ significantly across the stages, and thus tests the implications of Charng et al.'s suggestions that Intended behavior will be predicted better by the Fishbein-Ajzen and Augmented models in the early and latter stages of recycling careers, respectively.

Table 9. Means and Standard Deviations on Predictor and Dependent Variables for Whole Sample and among One-Time, Two-Time, Three-time, and Regular (+ 5 time) Recyclers.

STAGE	TOTAL		ONE-TIME		TWO-TIME		THREE-TIME		FOUR-TIME		FIVE'TIME	
VARIABLE	MEAN (N=50)	STD	MEAN (N=20)	STD	MEAN (N=13)	STD	MEAN (N=6)	STD	MEAN (N=4)	STD	MEAN (N=2)	STD
ATTITUDE	6.77	0.57	6.75	0.72	6.92	0.28	6.92	0.20	6.88	0.25	6.75	0.35
SUBJECTIVE-NORMS *	4.39	1.14	4.35	0.99	4.53	0.87	3.71	0.54	6.04	0.77	4.93	1.92
MERGER	0.56	0.50	0.45	0.51	0.62	0.51	0.83	0.41	0.75	0.50	1.00	0
RELATION	0.39	0.68	0.48	0.76	0.29	0.61	0.57	0.98	0.40	0.43	0.50	0.71
HABIT ***	2.04	1.78	1.10	0.31	2.15	0.99	2.67	1.21	4.50	2.52	7.50	0.71
INTEND***	2.16	1.73	1.10	0.31	2.38	0.96	3.17	0.98	4.00	1.63	8.00	0

Indicators of significant differences among population means using Scheffe multiple comparison test;
* p < .05, ** p < .01, *** p < .001

The results given in Table 9 provide sufficient evidence to indicate that the means for some of the predictor variables differ from one stage (dependent

variable) to another. The variables that differ significantly across stages are subjective norms, habit, and intend. These variables show significant increases from the one-time per month recycling group to the 5 + times per month regular recycling group. For the measure of subjective norms, there is a significant difference ($p < .05$) among three-time, and especially four-time per month recyclers. The predictor variable Intention to recycle has heterogeneous population means across all developmental stages, increasing from one-time to 5 + times per month; differences that are significant at the $p < .001$ level. The only other variable of the Fishbein-Ajzen model, attitude, did not show any significant increase or decrease across stages. The population means remained fairly homogeneous across all stages for this variable. Particularly noteworthy, in addition, is the fact that for the range of the measurement scale for attitude (1 to 7), the mean for this variable remained consistently high across all stages.

Among the role-identity variables, habit is the only one whose population mean increases significantly ($p < .001$) from one-time per month to 5 + time per month recyclers, across all developmental stages of recyclers careers. Other role-identity variables such as role-person merger and social relations had population means that remained homogeneous across all stages and, therefore, provide insufficient evidence that the means for these variables

from one-time per month recyclers differ from two-time, three-time, four-time, or five or more time per month recyclers.

In Table 9 information about the number of observations for each category of the developmental stages can be noted. For example, the number of observations for three-time recyclers (N=6), four time recyclers (N=4), and five or more time recyclers (N=2) are very small. The division of repeated behaviors into five categories was a method used by Charng et al. (1988) to identify blood donors who frequented blood donation centers. The previous researchers' sample size was 658 blood donors. In the present research the sample size is 50 recyclers. This small sample size, when divided among the five developmental stages used in Charng et al.' (1988) methodology, leaves very few observations distributed over these categories. This sparseness of observations has too little variation for regression analysis and therefore the following analysis will be altered slightly by collapsing into only two categories the measure of repeated behavior. Thus, only one-time recyclers and two or more time per month recycler categories will be used in the remainder of the analysis. Unlike Charng et al. (1988) who used five categories, this research will use only two developmental stages.

In order to determine precisely which variables of both the Fishbein-Ajzen and Augmented (including role-identity

variables) models are important predictors of both intended and actual recycling behaviors at various stages of recyclers careers, these models were regressed on each stage individually. The determinants of behavioral Intentions and Actual recycling at various stages (one time and two or more time recyclers) are discussed in the following sections. Their respective regressions are presented in tables 11 and table 12.

In order to test the original hypotheses of this research, a different method of determining which independent variables of the Fishbein-Ajzen and Augmented models are significantly related to behavioral Intention and Actual behavior will be used than was in Charng et al. (1988). This represents a departure from the previous researchers who used least squares regression on a dichotomous dependent variable,i.e., the presence or absence of blood donation during each month of the research project. When the outcome variable is binary or dichotomous, the preferred method of analysis is logistic regression (Hosmer and Lemeshow 1989). There are several reasons for this; 1) The data set is small (OLS, Ordinary Least Squares, is best on large sample, normally distributed data, while logistic regression provides accurate estimates of the parameters even if the data are not normally distributed and the sample size is small.) 2) The dependent variable for the recyclers developmental stages are measured dichotomously (i.e. one

time, 1 = Yes 0 = No, two or more time 1 = Yes 0 = No, for example), and 3) Logistic regression is more theoretically correct when the dependent variable is dichotomous. The difference between logistic and linear regression is reflected both in the choice of a parametric model and in the assumptions. When the differences in the basic underlying assumptions are accounted for, the methods employed in logistic regression follow the same general principles used in linear regression for data that is binomially distributed instead of normally distributed.

Table 11 and 12 give the results of the logistic regression on the data of one-time and two or more time recyclers. The response variable is the number of times respondents recycled per month (one-time per month; 1 = yes, 0 = no, two or more times per month; 1 = yes, 0 = no, see table 10).

Table 10. Coding For Variables used in Logistic Regression.

Variables	Codes/Values
Response Variables - Actual and Intention	
One time	1 = Yes, 0 = No
Two or More time	1 = Yes, 0 = No
Independent Variables	
Attitude	1 to 7
Subjective-Norms	1 to 7
Role-Person Merger	1 = Present, 0 = Absent
Habit	0 to infinity
Social Relation	1 to 5 or more

ONE-TIME RECYCLERS

For one-time recyclers the augmented model was significant ($p < .001$) indicating that at least one or perhaps all of the variables in this model are significant in predicting behavioral Intention. The Wald test on parameter estimates indicated that habit was the most significant variable in the augmented model for predicting behavioral intentions.

Considering that one of the goals of this and previous research is to obtain the best fitting model while minimizing the number of parameters (the parsimonious Fishbein-Ajzen model, for example), the next step in this analysis is to compare the parsimonious Fishbein-Ajzen model to the full Augmented model containing additional variables from Identity Theory. The difference between the two models is the exclusion of the Identity Theory variables from the Augmented model. The likelihood ratio test comparing these two models is obtained by using the G test statistic (Hosmer and lemeshow 1989). The value of the test statistic comparing the one-time recycler models in table 11 is

$$G = -2\ [(-33.123) - (-14.814)] = 37.41$$

which, with 2 degrees of freedom, has a p-value $< .001$. Since the p-value is small, indicating a significant difference in the two models, one could conclude that the Fishbein-Ajzen model does not provide as good a fit to the data as the Augmented model for predicting Intentions. There

is an advantage, therefore, to including Identity theory variables in the Augmented model.

For the logistic regression predicting Actual recycling (table 12) behavior of one-time recyclers both the Fishbein-Ajzen and Augmented models were significant ($p < .001$), but none of their parameter estimates were significantly different from zero according to the Wald test statistic. As before, to compare the differences in the two models for one-time recyclers to see if the inclusion of Identity Theory variables provide an advantage for predicting Actual recycling behavior, the G statistic was used;

$$G = -2\ [(-19.813) - (16.249)] = 7.128$$

which, with 2 degrees of freedom, has a p-value $< .05$. Adherence to the $a = .05$ level of significance would justify including Identity Theory variables in the Augmented model for predicting Actual behavior.

Table 11. Logistic Regression Analysis Predicting Intention, Testing the Fishbein-Ajzen (1) and Augmented (2) Models among One-Time, Two + time Recyclers.

Stage	One-Time (N=22)		Two or More Time (N=27)	
VARIABLE	(1)	(2)	(1)	(2)
Intercept	5.379	5.218	-8.123	-74.855
Attitude	-0.784	-0.300	1.127	0.593
Subjective Norms	-0.68E-01	0.702	0.141	-0.513
Role Person Merger	--	-1.454	--	23.571
Habit	--	-4.151***	--	48.450
Social Relation	--	0.257	--	-0.114E-01
Log-Likelihood	-33.123	-14.814	-32.418	-6.503
G	2.348	38.966***	4.159	55.989***
DF	2	5	2	5
G^+	--	37.41 ***	--	51.83***

*** p < .001.

TWO OR MORE TIME RECYCLERS

As in the previous analysis of one-time recyclers, the significance of the Fishbein-Ajzen and Augmented models were determined by comparing each model containing only its constant (intercept) term to models containing their respective independent variables. This makes it possible to check for the significance of the addition of independent variable to the model. A significant G statistic for the model merely indicates that a model containing the independent variables has an advantage in predicting the response variable over one that has no variables i.e., only the intercept term. Furthermore, one or perhaps all the variables may be statistically significant, but it is not known until t-tests (Wald tests) are performed on each variable to determine which ones are significant. In the present research table 11 indicates that the addition of the variables attitude and subjective norms in the Fishbein-Ajzen model made no significant difference over the model containing only the intercept term. The addition of Identity Theory variables, along with the Fishbein-Ajzen variables did make a significant difference ($p < .001$) over the model containing only the intercept term for behavior Intentions of two or more time recyclers. To compare the difference between the two models predicting Intentions of two or more time recyclers, the G test is used in a similar manner as before by determining the difference between a model with an

intercept term only and the same model containing independent variables. The difference between the model containing only the Fishbein-Ajzen variables and the Augmented model containing additional Identity Theory variables is given by the test statistic;

$$G = -2\ [(-32.418) - (-6.503)] = 51.83$$

which, with 2 degrees of freedom, has a p-value < .001. Since the p-value is small, there is an advantage to including Identity Theory variables in the model. For comparing the models predicting Actual behavior of two or more time recyclers, table 12 shows that both the Fishbein-Ajzen and Augmented models contained variables that provided better fits to the data than models with intercept only terms. Wald tests, however, did not provide sufficient

Table 12. Logistic Regression Analysis Predicting Actual Recycling, Testing the Fishbein-Ajzen (1) and Augmented (2) Models among One-Time, Two + time Recyclers.

Stage	One-Time (N=20)		Two or More Time (N=25)	
VARIABLE	(1)	(2)	(1)	(2)
Intercept	-0.318	0.230	-26.61	-10.512
Attitude	0.454	0.299	-18.696	-37.157
Subjective Norms	0.268	0.500	0.365	-3.179
Role Person Merger	--	-0.967	--	110.46
Habit	--	4.252	--	37.612
Social Relation	--	1.427	--	-55.001
Intention	-2.769	-7.322	78.884	115.05
Log-Likelihood	-19.813	-16.249	-5.810	-2.348
G	27.676***	34.803***	57.70***	64.62***
DF	3	6	3	6
G+	--	7.128*	--	6.924*

* p < .05, ** p < .01, *** p < .001.

evidence for rejecting the null hypothesis that the parameter estimates were significantly different from zero.

The likelihood ratio test comparing the model containing Identity Theory variables to the one containing only Fishbein-Ajzen variables yields

$$G = -2\ [(-5.810) - (-2.348)] = 6.924$$

which, with 2 degrees of freedom yields a p-value < .05. This provides sufficient evidence for including variables from Identity Theory in a model for predicting Actual recycling behavior.

The use of logistic regression is helpful not only for testing hypotheses to determine which independent variables have a statistically significant affect on the response or outcome variable, but also for interpreting parameter estimates to determine the individual or joint effects of a number of variables. In general, logistic regression provides on estimate of the probability of an event occurring as a function of several independent variables. And it helps to answer the question; what is the probability that some randomly selected individual from the population will have a particular combination of characteristics ? Specifically, what are the factors that characterize one time or two or more time recyclers ? What affect do these factors have on Intended or Actual behavior ?

In table 11 and 12 the results given provides sufficient evidence that the Augmented models containing

Identity theory variables were significant for predicting Intended and Actual behavior for one time and two or more time recyclers. Therefore, this section will interpret the parameter estimates for these models only. Furthermore, only the Augmented model will be interpreted.

In the Augmented model predicting Intentions to recycle for one time recyclers (Table 11) the coefficient for attitude is -0.300. This indicates that a one unit increase in attitude is associated with an increase of -0.300 in the logit of Intention to recycle one time per month, or equivalently, that the odds of someone having intentions of recycling one time per month are increased by 74 percent [exp(-0.300)=0.74] for every unit increase in the attitude measurement scale. The odds represents the effect of attitude on intentions of recycling, adjusted for the effects of the other variables. Subjective norms for instance, has an estimated odds ratio of exp(0.702) = 2.02. This indicates that for every one unit increase in the subjective norms measurement scale, the odds of an individual having intentions to recycle one time per month increases 2.02 times. If role-person merger is present in an individual, it will be associated with an increase in the odds of that person having intentions to recycle of 23 percent [exp(-1.454)=0.234]. With an increase in each time an individual makes a trip to a recycling center each month (Habit), the odds of that persons' intentions to recycle

one-time per month increases by .02 times [exp(-4.151) = 0.016] or 2 percent. The estimates odds for an increase of one unit in the social relations measure is exp(0.257) = 1.293, which indicates that the odds of randomly selecting an individual from the population having intentions to recycle one time per month will be increased by 1.29 times or 29 percent.

As an example of how the estimates or coefficients in table 11 or 12 could be used to determine the probability of behavioral intentions occurring in a randomly selected individual from the study population, consider the characteristics of one of the respondents in the survey whose measurements for predicting intentions for one time recycling was;

Attitude (7)

Subjective Norms (5.29)

Role-person Merger (1)

Habit (1)

Social Relation (0.6)

X_s = 7, 5.29, 1, 1, 0.6

P_x = 1 / { 1 + exp[-(5.218 + (-.300)(7) + 0.702(5.29) + (-1.454)(1) + (-4.151)(1) + 0.257(0.6))] }

= 1 / { 1 + exp[-(5.218 + (-2.1) + 3.72 + (-1.454) + (-4.1510 + 0.015]}

= 1 / { 1 + exp[-1.248]}

$$= 1 / [1 + \exp(1.248)] = 0.223$$

Thus, the probability that some randomly selected individual from the study population will have the above combination of characteristics is 22 percent. Alternatively, for every 100 recyclers with the preceding characteristics one would expect 22 of them to have intentions of recycling one time per month.

In summary, the logistic model in table 11 for one time recyclers has specified that the probability of behavioral Intentions depends on the set of variables including both Fishbein-Ajzen and Identity Theory variables (the augmented model). Throughout the analysis, the results given in tables 11 and 12 have indicated that the Augmented model is the more statistically important model in predicting both Intended and Actual behaviors.

CHAPTER VI

CONCLUSION

The analysis of the data collected on Intended and Actual recycling behavior of respondents was begun by constructing residual plots to determine the aptness of the linear models. Since several of the residuals fitted against expected values and the independent variables revealed that the data did not fit a linear model, it was concluded that logistic regression was more appropriate. However, for a preliminary analysis, OLS was used to detect possible patterns and correlations between the dependent and independent variables.

In the OLS regression of the Fishbein-Ajzen and Augmented models on the number of items (Table 7) recycled per month by respondents, the Fishbein-Ajzen models were applicable to explaining the behavior of recycling. Attitude and Subjective Norms were important in determining recyclers' Intended Behavior, and intentions were important in determining Actual Behavior. The only independent variable that made a statistically important contribution to predicting Actual behavior was attitude, a Fishbein-Ajzen variable. Based on this analysis, one may conclude that the Fishbein-Ajzen model worked best to predict Actual recycling behavior.

When the entire sample was used in a regression on Intended and Actual behavior using the Fishbein-Ajzen and

Augmented models, the augmented model was statistically significant for predicting both Intended and Actual behavior. The Fishbein-Ajzen model was significant only in predicting Actual recycling behavior. In both models, intentions was the most statistically significant contributor to predicting Actual behavior. The Identity Theory variable, habit, was the only independent variable that made a statistically significant contribution to predicting Intended behavior. These results cannot support the hypothesis that the variables of the Fishbein-Ajzen model, attitude and subjective norms, are causally related to behavior intentions. This conclusion is inconsistent with Charng et al. (1988) results that concluded the opposite. Thus, the Augmented model is a better predictor of Intended behavior using the total sample, but didn't provide an advantage over the Fishbein-Ajzen model in explaining Actual behavior (increment R-Sq = .917, $p > .05$). Adding Identity Theory variables to the Augmented model did not improve the explanatory capability of the model.

To test the hypotheses associated with the Developmental model as did Charng et al. (1988) for repeated behaviors across blood donors careers, this research sought to test the same implications as the previous researchers who stated that the Fishbein-Ajzen model would work best to predict intentions and actual behaviors of early career (one time per month) recyclers, and the augmented model might be

expected to work best with latter stage (two or more time per month) recyclers. The conclusions from this research are different than those of Charng et al. (1988).

Unlike the previous researchers, who obtained results that supported their hypotheses, a logistic regression predicting intention to recycle was unable to provide conclusive evidence that the Fishbein-Ajzen model worked best to predict behavioral intention for early career (stage 1) recyclers. Only the augmented model was significant in predicting intentions for early career recyclers (Table 11 and 12). Nevertheless, the Augmented model was significant at predicting intentions of more experienced recyclers (stage 2) as the previous researchers posited. Although this research cannot support the hypothesis that Fishbein-Ajzen variables such as attitude and subjective norms are causally related to behavior intentions, the hypothesis that the Identity Theory variables comprising the augmented improve the predictability of intentions of experienced (stage 2) recyclers is tentatively accepted. These conclusions are supported by the G test statistic comparing the two logistic regression models at both stage 1 and 2.

For the logistic regression predicting actual recycling behavior one month after the initial survey, the conclusions provided by this analysis are different than those reached by the previous researchers. The G test statistic comparing the intercept only term of each model (observed frequencies)

with the model containing its respective independent variable(predicted frequencies) provided evidence that both the Fishbein-Ajzen and Augmented models were statistically important models of Actual behavior. The theoretical assumption made by Charng et al. (1988) cannot be accepted. Both models contained variables that were statistically important predictors of Actual behavior at both stage 1 and 2. Nevertheless, one assumption of the previous researchers is supported by these data; that the prediction of both intention and actual behaviors are increased significantly when the model is augmented by the Identity Theory variables: Role-Person Merger, Habit, and social Relation. This conclusion is supported by the comparison of the models with and without Identity Theory variables by using the G test statistic at both stages. Moreover, this conclusion appears to be consistent with Charng et al. (1988), whose overall conclusions were that "the farther an individual moves into a 'career' as a (recycler), the greater the chance that he or she will develop a (recycler) role identity." And furthermore, "once such a role identity becomes central to the self, the importance of attitude and subjective norms in determining behavioral intention" and actual behavior "diminishes". (p. 316)

SUMMARY OF FACTORS FOUND IMPORTANT FOR RECYCLING

Table 13 summarizes the models found significant by this research for predicting Intended and Actual Behaviors of recyclers. In summary, the factors found most important in explaining respondents' recycling behavior were those comprising the augmented model which includes variables from Identity Theory as well as Fishbein-Ajzen variables. Yet even though the respondents demonstrate a common interest in recycling, the findings of this research show that there are difference that impact recycling behavior. Specifically, the Augmented model examined the degree to which a respondents self-concept became incorporated into an identifiable role. As a respondents role identity became more salient, the

Table 13. Summary of Models Significant In Predicting Recycling Behavior*.

	RECYCLING BEHAVIOR			
	INTENTIONS		ACTUAL	
MODELS	STAGE 1	STAGE 2	STAGE 1	STAGE 2
AUGMENTED MODELS	+	+	+	+
Fishbein-Ajzen Variables				
Attitude Toward Behavior				
Subjective Norms				
Intentions				
Identity Theory Variables				
Habit				
Social Relations				
Role-Person Merger				
FISHBEIN-AJZEN MODELS	-	-	+	+
Attitude Toward Behavior				
Subjective Norms				
Intentions				

* Determined by Logistic Regression

probability that that respondent would behave consistently

with that identity increased. Carrying out the act of recycling conveyed by the respondents a meaning over and above the attitudes that they held toward recycling. In addition a possible interpretation of the lack of the Fishbein-Ajzen model alone to explain recycling behavior could be that respondents in the early stages of forming a role identity with recycling thought of their actions as voluntary and not the result of social pressure (Subjective Norms). As a result, the Augmented model was able to explain the extent to which a respondents' role as a recycler was internalized as a part of their self-concept (Role-Person Merger), and the relative size of the respondents' social network linked to their role identity (Social Relations). Social Relations developed in this manner probably depend on the social concept of recycling. Particularly interesting of the Augmented model is its ability to explain the extent to which respondents stopped making conscious decisions about recycling (Habit).

This research, compared to literature cited in previous chapters (Charng et al. 1988; Geller 1973a, 1973b; Finnie 1973; Clark et al. 1972; Chapman and Risley 1974; Everett 1973; Powers et al. 1973; Kohlenberg and Phillips 1973; Reid et al. 1976; and Luyben and Bailey 1979) is significant for two important reasons. First, it provides another theoretical test of the Fishbein-Ajzen and Identity theory variables for a public good behavior. The results point to

some weakness in both Fishbein-Ajzen and Identity theory. In particular, the Fishbein-Ajzen model does not provide a good prediction of intention. In predicting actual behavior, only intention is important. Likewise not all components of operationalization of Identity Theory seem theoretically relevant. Habit seems most important. Second, this is the first study of its kind that focuses on recycling, a public good behavior. Results indicate that the type of behavior seems to make a difference. Those results differ for Charng et al. (1988) and so indicates that the theoretical properties of the public good itself are important for model specification.

REFERENCES

Ajzen, I. and M. Fishbein. 1969. "The prediction of Behavioral Intentions in a Choice Situation." *Journal of Experimental Social Psychology* 5:400-416.

----. 1970. "The prediction of Behavior from Attitudinal and Normative Variables." *Journal of Experimental Social Psychology* 6: 466-487.

----. 1973. "Attitudinal and Normative Variables as Predictors of Specific Behavior." *Journal of Personality and Social Psychology* 27:41-57.

----. 1977. "Attitude-Behavior Relations: A theoretical analysis and Review of Empirical Research." *Psychological Bulletin* 84:888-915.

----. 1980. *Understanding Attitudes and Predicting Social Behavior*. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Ajzen, I. and T.J. Madden. 1986. "Prediction of Goal - Directed Behavior: Attitudes, Intentions, and Perceived Behavioral Control." *Journal of Experimental Social Psychology* 22:453-474.

Anderson, L.R. and M. Fishbein. 1965. "Predictions of attitude from the number, strength, and evaluative aspect of beliefs about the attitude object: A comparison of summation and congruity theories." *Journal of Personality and Social Psychology* 3:437-443.

Barton, A.F. 1979. *Resource Recovery and Recycling*. A Wiley-Interscience Publication, New York.

Bentler, P.M. and G. Speckart. 1979. "Models of Attitude-Behavior Relations." *Psychological Review* 86:452-64.

Bowman, C.H. and M. Fishbein. 1978. "Understanding Public Relations to Energy Proposals: An Application of Fishbein Model." *Journal of Applied Social Psychology* 8:319-40.

Bruvold, W.H. 1972. "Consistency among Attitudes, Beliefs, and Behavior." *The Journal of Social Psychology* 86:127-134.

----. 1973. "Belief and Behavior as Determinants of Environmental attitudes." *Environment and Behavior* 5,2: 202-218.

Burke, P.J. 1980. "The Self: Measurement Requirements from an Interactionist Perspective." *Social Psychology Quarterly* 43:18-29.

Chapman, C. and R.L. Risley. 1974. "Anti-litter Procedures in an Urban Hidensity Area." *Journal of Applied Behavior Analysis* 7:377-383.

Charng, H., J.A. Piliavin., and P.L. Callero. 1988. "Role Identity and Reasoned Action in the Prediction of Repeated Behavior." *Social Psychology Quarterly* 51, 4: 303-317.

Clark, R.N., R.L. Burgess., and J.C. Hendee. 1972. "The development of Anti-litter behavior in a forest campground." *Journal of Applied Behavior Analysis* 5,1: 1-5.

Davidson-Cummings, L. 1977. " Voluntary Strategies in the Environmental Movement: Recycling As Cooperation." *Journal of Voluntary Action Research* 6:153-160.

De young, R. 1986. "Some psychological Aspects of Recycling: The Structure of Conservation Satisfactions." *Environment and Behavior* 18,4:435-449.

----. 1985-1986. "Encouraging Environmentally Appropriate Behavior: The Role of Intrinsic Motivation." *Journal of Environment System* 15:281-292.

De young, R. and S. Kaplan. 1985-1986. "Conservation Behavior and The Structure of Satisfactions." *Journal of Environment System* 15:233-242.

Everett, P.B. 1973. "Use of the Reinforcement Procedure to Increase Bus Ridership." *Proceedings of the Eighty-First Annual Convention of the American Psychological Association*, Montreal,Canada.

Finnie, A.C. 1973. "Field Experiments in Litter Control." *Environment and Behavior* 5,2:123-144.

Fishbein, M. 1967. *Reading in Attitude Theory and Measurement*. New York: Wiley.

Fishbein, M., and I. Ajzen. 1975. *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*. Reading, Mass: Addison-Wesley.

Fishbein, M., and R. Hunter. 1964. "Summation Versus. Balance in Attitude Organization and Change." *Journal*

of Abnormal and Social Psychology 69:505-510.

Geller, E.S. 1973a. "Prompting a Consumer Behavior for Pollution Control." *Journal of Applied Behavior Analysis* 6,3:367-376.

----. 1973b. "Prompting Anti-Litter Behavior." *Proceedings of the Eighty-First Annual Convention of the American Psychological Association*, Montreal, Canada.

Hopper, J.R. and J.M. Nielson. 1991. "Recycling As Altruistic Behavior: Normative and Behavioral Strategies to expand Participation in a community Recycling Program." *Environment and Behavior* 23.2:195-220

Hosmer, D.W. and Lemeshow, S. 1989. *Applied Logistic Regression*. New York: A Wiley-Interscience publication.

Humphrey, C.R.,R.J. Bord, M.M. Hammond, and S.H. Mann. 1977. "Attitudes and Conditions for Cooperation in a paper Recycling Program." *Environment and Behavior* 9,1:107-124.

Jacobs, H.E. and J.S. Bailey. 1982-1983. "Evaluating Participation in a Residential Recycling Program." *Journal of Environment System* 12:141-152.

Jacobs, H.E, J.S. Bailey, and J.I. Crews. 1984. "Development and Analysis of a Community-based Resource Recovery Program." *Journal of Applied Behavior Analysis* 17:127-145.

James, W. 1890. *Principles of Psychology(vol 2.)* New York: Holt.

Kerrick, J.S. 1958. "The effect of Relevant and Nonrelevant Sources on attitude Change." *Journal of Social Psychology* 47:15-20.

Kohlenberg, R. and T. Phillips. 1973. "Reinforcement and Rate of Litter Depositing." *Journal of Applied Behavior Analysis* 6,3:391-396.

Luyben, P.D. and J.S. Bailey. 1979. "Newspaper Recycling: The Effects of Rewards and Proximity of Containers." *Environment and Behavior* 11,4:539-557.

Luyben, P.D. and S. Cummings. 1981-1982. "Motivating Beverage Container Recycling on a College Campus." *Journal of Environment System* 11:235-245.

Luyben, P.D., S.B. Warren, and I.A. Tallman. 1979-1980. "Recycling Beverage Container on a College Campus. *Journal of Environment System* 9:189-202.

Manstead, A.S.R., C. Proffitt, and J.L. Smart. 1983. "Predicting and Understanding Mothers' Infant-Feeding Intentions and Behavior: Testing the Theory of Reasoned Action." *Journal of Personality and Social Psychology* 44:657-71.

McCall, G.J., and J.T. Simmons. 1978. *Identities and Interaction (rev.ed.)*. New York:Free Press.

Melosi, M.V. 1981. *Garbage in the Cities:Refuse, Reform, and the Environment, 1880-1980*. College Station: Texas A&M Univ. Press.

Millier, S.P. 1974. *Recycling can help Alleviate Nationwide Newsprint Shortage*. Garfield,N.J.: Garden State Paper Company, Report.

Nachmias, D., and C. Nachmias. 1981. *Research Methods in the Social Sciences*. New York: St. Martin's Press.

Osgood, C.E., G.J. Suci, and P.H. Tannenbaum. 1957. *The measurement of meaning*. Urbana: University Illinois Press.

Powers, R.B.,J.G. Osborne, and E.G. Anderson. 1973. "Positive Reinforcement of Litter Removal in the Natural Environment." *Journal of Applied Behavior Analysis* 6,4:573-578.

Purcell, A.H. 1980. *The Waste Watchers: A citizen's Handbook for Conserving Energy*. New York: Anchor Press.

Reid, D.H., P.D. Luyben, R.J. Rawers, and J.S. Bailey. 1976. "Newspaper Recycling Behavior: The Effects of Prompting and Proximity of Containers." *Environment and Behavior* 8,3:471-482.

Schwartz, S.H. 1977. "Normative Influences on Altruism." In L. Berkowitz(Ed.), *Advances in Experimental Social Psychology* 10:221-279.

Sewell, W.R.D. and H.D. Foster. 1971. "Environmental Revival." *Environment and Behavior* 3,2:123-134.

Stryker, S. 1968. "Identity Salience and Role Performance: The relevance of Symbolic Interaction

Theory for Family Research." *Journal of Marriage and the Family* 30:558-564.

----. 1980. *Symbolic Interactionism: A Social Structural Version*. Menlo Park, CA: Benjamin/Cummings.

Trandis, H.C. and M. Fishbein. 1963. "Cognitive Interaction in Person Perception." *Journal of Abnormal and Social Psychology* 67:446-453.

Turner, R.H. 1978. "The Role and Person." *American Journal of Sociology* 84,1:1-23.

Wilson, D.T., H.L. Mathews, and J.W. Harvey. 1975. "An Empirical test of the Fishbein Behavioral Intention Model." *Journal of Consumer Research* 1:39-48.

Witmer, J.F., and E.S. Geller. 1976."Facilitating Paper Recycling: Effects of Prompts, Raffles, and Contests." *Journal of Applied Behavior Analysis* 9:315-322.

APPENDIX

QUESTIONNAIRE

This questionnaire concerns people's attitudes and feelings about recycling. Your answers will be important for the completion of a study conducted by the sociology department of Texas A&M. Your name is not necessary for the study: All responses are confidential. Please take about 5 minutes to respond to these questions.

The following questions ask for some very general information about you. Please circle the appropriate response.

1). Sex
1. Male 2. Female

2). Age

1. 20 or Under 2. 21-30 3. 31-40 4.41-50
5. 51 or Over

3). Marital Status

1. Married 2. Widowed 3. Divorced 4. Separated
5. Never Married

4). How many children do you have? (include any you had from a previous marriage).

1. None 2. One 3. Two 4. Three 5. Four
6. Five 7. Six 8. Seven 9. Eight or More

5). Education (Please circle highest level obtained)

1. Less than High School 2. High School
3. Associate/Junior College 4. Bachelor's
5. Graduate 6. No Answer

6). Estimated Family Income (yearly)

1. Under $5,000 2. $ 5,000 to 9,999
3. $10,000 to 14,999 4. $15,000 to 19,999
5. $20,000 to 24,999 6. $25,000 to 29,999
7. $30,000 to 34,999 8. $35,000 to 39,999
9. $40,000 to 44,999 10. $45,000 to 49,999
11. $50,000 to 54,999 12. Over $55,000

7). Occupation.

What kind of work (do/did) you normally do? That is, what (is/was) the job called?

Below are a list of statements. Please circle the number that best corresponds to your feeling about the statement.

8). In general, my attitude toward recycling is...

1	2	3	4	5	6	7
Unfavorable			Neutral			Favorable

1	2	3	4	5	6	7
Negative			Neutral			Positive

9).

1. Other people think that recycling is important to me.

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

2. It is important to my friends and relatives that I continue to recycling.

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

3. It really would not matter to most people I know, if I decided to give up recycling.

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

4. No one would really be surprised if I just stopped recycling.

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

5. Many people would probably be disappointed in me if I just decided to stop recycling.

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

6. Many of the people that I know expect me to continue recycling.

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

7. Others would probably make me feel guilty if I quit recycling

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

10). How many times do you intend to take recyclable products to a recycling center next month?

What kinds of recyclable products do you intend to take recyclable products to a recycling center next month?

	YES	NO
1. Paper	( )	( )
2. Aluminum	( )	( )
3. Plastic	( )	( )
4. Glass	( )	( )
5. Motor Oil	( )	( )
6. Grocery Bags	( )	( )
7. Others(Please specify _____)		

What other activities do you intend next month?

	YES	NO
1. Use energy - saving lights	( )	( )
2. Use rechargeable batteries	( )	( )
3. Use phosphate - free detergent	( )	( )
4. Others(Please specify _____)		

The following statements can be answered by either a "Yes" or "No". Please circle the appropriate response.

11).

1. Recycling is something I rarely even think about
Yes No

2. I would feel a loss if I could not recycle.
Yes No

3. I really do not have any clear feelings about recycling.
Yes No

4. For me, being an environmentalist means more than just the act of recycling.

Yes No

5. Recycling is an important part of who I am.
Yes No

The following questions ask about people you may have met through recycling. Please circle the appropriate response.

12). 1. Of all the people you know through recycling, how many are important to you, i.e., You would really miss if you did not see them?

0 1 3 4 5 or More

2. Think of those people that are important to you. About how many would you lose contact with if you stopped recycling?

0 1 3 4 5 or More

3. How many people do you know on a first name basis through recycling ?

0 1 3 4 5 or More

4. Of the people you know through recycling, how many are close friends?

0 1 3 4 5 or More

5. Of the people you know through recycling activities, how many participate in other activities with you?

0 1 3 4 5 or More

Please answer the following questions.

13). Habit

How often have you taken recyclable products to a recycling center each month?

What kinds of recyclable products have you taken recyclable products to a recycling center each month?

	YES	NO
1. Paper	( )	( )
2. Aluminum	( )	( )
3. Plastic	( )	( )
4. Glass	( )	( )
5. Motor Oil	( )	( )
6. Grocery Bags	( )	( )
7. Others (Please specify _____)		

What other activities have you done each month?

	YES	NO
1. Use energy - saving lights	( )	( )
2. Use rechargeable batteries	( )	( )
3. Use phosphate - free detergent	( )	( )
4. Others (Please specify _____)		

14). Do you belong to any associations / clubs that promote environmental issues, especially recycling?

Yes No

If Yes, Please specify

Thank you for your time. If you have any comments / questions, Please list them below. In addition, if you would like a copy of the results, give your name and address to the researcher who gave you the questionnaire.

VITA

Yeongi Son

Address

801 Spring Loop #1007
College Station, Texas 77840
(409) 268-7468

Education

B.A. (Psychology) Korea University, January 1984
B.S. (Sociology) Utah State University, June 1986

Academic Positions

Graduate Teaching Assistant, 1989 - Present

Papers

"A Heuristic for Locating A Retail Business in Japan," *Journal of Global Business* (1990), co-authored with Hiroshi Hukurai et al.

"The Ecological Integration of Religious Identification in South Korea," currently under review, co-authored with Jon Alston et al.