TWO PERSPECTIVES OF IN-HOME RECYCLING CENTERS

By

TRACY LEANN PARKER

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Thesis Approved:

Cheryl A. Farr

Thesis Adviser

Donna H. Branson

Carol Bormann

Timothy J. Peltier

Dean of the Graduate College

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CHAPTER I

INTRODUCTION

Statement of Problem

With increased population, humankind must become more concerned with conserving the earth's resources in order to preserve the environment for future generations (Oskamp, 1995b). To do so, sustainability must be put into practice. Oskamp (1995a) uses information from a Canadian advisory council as well as the National Round Table to define three factors of sustainability. First, sustainability involves people basing their activity and consumer choices only on those actions that promote respect for and preservation of the systems that support life on Earth. Secondly, each generation must care for the resources it inherits so that the following generation inherits the same or more resources. Lastly, each person should have the resources and social conditions to live in a sustainable way (Oskamp, 1995a). By living in a sustainable way, humankind can protect the environment for present and future generations.

Great strides have been made to increase sustainability, especially in the area of recycling. Recycling reduces the amount of waste going to the landfills, saves natural resources, saves energy in manufacturing, and decreases pollution (Oskamp, 1995a,b). Several programs such as drop-off centers and curbside recycling have been introduced to increase the amount of household recycling. These programs have seen success in the past few decades, however, recycling household waste must become a habitual activity in order to sustain the environment (De Young, 1988 - 1989).

Researchers have identified many factors concerning the influences and motivations of those who recycle and those who do not recycle. Some of these reasons included the amount of education about recycling acquired, the perceived amount of effort required to recycle materials, and incentives such as monetary rewards (Vining & Ebreo, 1990). Another factor reported to increase the amount of recycling was intrinsic motives, or altruism, which is defined as the positive feeling that a person is doing something positive for the environment (De Young, 1988-1989). Social influence has also been cited as an incentive to recycle (Vining, Linn, & Burdge, 1992; De Young, 1988-1989).

Ajzen and Fishbein's theory of reasoned action has been used by past researchers to study behaviors using factors such as attitude, subjective norms, and intentions. The theory of reasoned action states that behavioral intentions are the result of a person's attitudes and perceptions of a subjective norm (Schultz & Oskamp, 1996; Madden, Ellen, & Ajzen, 1992). Previous researchers have found that recycling behavior is related to the intention to perform the behavior (Schultz & Oskamp, 1996; Boldero, 1995; Goldenhar & Connell, 1992-1993; Madden et al., 1992). If the intention is high or the effort to perform the behavior is low, then the behavior is more likely to be performed. Research based on the theory of reasoned action in relation to recycling behavior would be advantageous to the design community of architects, interior designers, and contractors. This theoretical model could also be used to understand the prevalence of in-home recycling centers in new home construction in relation to the rate of recycling behavior.

Purpose and Objectives

The purpose of this study was to identify the existence of in-home recycling centers in new home construction as well as the attitudes of design professionals in promoting such spaces in order to support recycling behavior of homeowners. The first phase of the project identified the types and prevalence of in-home recycling centers in new homes in specific areas of Oklahoma. Assessment of this phase included the location of the recycling center in relation to

"waste generating" areas and adequate volume of the recycling center based on the number of bedrooms in the home. The second phase of the project identified professionals' views and awareness of in-home recycling centers in new home construction. Assessment of this phase included the determination of the attitudes of the professionals' toward environmental behavior as well as their role in implementing recycling centers into their projects.

The specific objectives were:

1. To identify the types and prevalence of each type of in-home recycling centers in homes in specific areas of Oklahoma.
2. To identify and compare the attitudes and beliefs of architects, interior designers, and home builders in Oklahoma and Minnesota toward environmental factors regarding recycling, recycling behavior, and in-home recycling centers.
3. To identify and compare the willingness of architects, interior designers, and home builders to promote and incorporate in-home recycling centers in new home construction in specific areas of Oklahoma and Minnesota.

In order to meet these objectives, a series of research questions were constructed for each of the three objectives.

Research questions related to objective 1:

1. To what extent are recycling centers included in new home construction?
2. What types of recycling centers are in new home construction?
3. Where are recycling centers located in new home construction?
4. How many and what percentage of new home constructions contain recycling centers?

Research questions related to objective 2:

1. Is there a difference in attitudes and beliefs toward the state of landfills in the United States among and between:
    a. Architects?
    b. Interior Designers?
    c. Home Builders?
2. Is there a difference in attitudes and beliefs towards the importance of recycling materials among and between:
    a. Architects?
    b. Interior Designers?
    c. Home Builders?
3. Is there a difference in attitudes and beliefs towards the impact of in-home recycling centers among and between:
    a. Architects?
    b. Interior Designers?
    c. Home Builders?
4. To what degree are architects, interior designers, and home builders in Oklahoma aware of recycling programs in their respective cities?
5. To what degree are architects, interior designers, and home builders participating in recycling programs in their respective states?

Research questions related to objective 3:

1. To what degree are in-home recycling centers being offered/promoted by:
    a. Architects?
    b. Interior designers?
    c. Home builders?

2. To what extent do customer requests or comments impact design decisions related to in-home recycling centers by:
   a. Architects?
   b. Interior designers?
   c. Home builders?
3. To what degree are in-home recycling centers being incorporated into new home construction in specific areas of Oklahoma and Minnesota by:
   a. Architects?
   b. Interior Designers?
   c. Home builders?

Assumptions and Limitations

1. It is assumed that the respondents answer truthfully to the testing instrument.
2. It is assumed that the sample surveyed is representative of the population from which it was drawn.
3. The sample was drawn from architects, interior designers, and home builders associated with professional organizations (e. g. American Institute of Architects, American Society of Interior Designers, National Home Builders Association) in Oklahoma and Minnesota. Therefore, the generalizations of the findings are limited to these specific sample populations.
4. It is assumed that the sample surveyed has had input on at least one residential project within the last five years.

Definitions of Major Variables and Terms

Attitude: a person's belief that a behavior leads to a specific outcome and his or her evaluation of the outcome (Ajzen & Fishbein, 1980)

Behavior: a single act performed by an individual (Ajzen & Fishbein, 1980)

Behavioral Intentions: a measure of the likelihood that a person will engage in a given act (Ajzen & Fishbein, 1980)

Buy Back Centers: sites offering money for various recyclable materials based on weight (Oskamp, 1995b)

Commingled Curbside Recycling: a recycling process that involves placing all recyclable materials together in a single bin for collection at the curbside of the residence; the materials are separated by human or mechanical means following collection (Oskamp, 1995a,b)

Deposit/Refund Programs: program requiring consumers to pay a refundable monetary amount (deposit) for the purchase of beverages in glass, plastic, or aluminum containers; the deposit is refunded upon return of the containers to the place of purchase (Oskamp, 1995b)

Environmental Altruism: concern for the environment (Vining et al, 1992; Vining & Ebreo, 1990)

Green Buying: consideration of a product's environmental impact; purchasing products made of recycled material and with minimal packaging (Oskamp, 1995b)

Green: environmentally safe products or materials (Oskamp, 1995b)

Household Waste: garbage accumulated inside a home

Incineration: a process that serves to burn waste and reclaim the energy (Environmental Protection Agency, 2000 April)

In-Home Recycling Center:

a. a section of cabinetry "that can hold multiple containers (usually three) and easily slide in and out or hinge out of the cabinet" allowing for easy sorting of recyclable materials (Sustainable Building Sourcebook, 2000)

b. (working definition) a section of cabinetry with two or more bins that allows sorting of recyclable materials.

Landfill: a cavity either engineered in the ground or above the ground into which wastes are deposited (Zero Waste America, 2000)

Municipal Solid Waste (MSW): trash or garbage consisting of items generated everyday such as packaging, grass, yard waste, food waste, furniture, appliances, clothing, durable goods, and non-durable goods (Environmental Protection Agency, 2000 April)

Recycle: one of the three methods suggested by the EPA to reduce waste; involves reclaiming used materials in order to manufacture new products from materials that otherwise would have been discarded (Environmental Protection Agency, 2000 January 3)

Recycling Drop-off Centers: central locations where people can personally transport their separated, recyclable materials such as newspaper, aluminum, plastic, and glass (Vining et al., 1992)

Reduce: one of the three methods suggested by the EPA to reduce waste; involves limiting the amount of products consumed and discarded (Environmental Protection Agency, 2000 January 3)

Reuse: one of the three methods suggested by the EPA to reduce waste; involves the repeated use of products through repairing, donating, or selling the products (Environmental Protection Agency, 2000 January 3)

Segregated Curbside Recycling: a recycling process that involves the separation of recyclable materials into separate bins or bags for collection at the curbside of the residence (Oskamp, 1995a)

Subjective Norm: a person's perception that specific individuals or groups think he or she should or should not perform a behavior and his or her motivation to adhere to the beliefs of others important to him or her (Ajzen & Fishbein, 1980)

Sustainability: basing activity on actions that promote and preserve the environment; caring for the resources of the present generation and preserving the resources for the following generations (Oskamp, 1995a)

Virgin: original state of a material before processing it into an end product (e. g. tree for paper, bauxite for aluminum)

CHAPTER II

REVIEW OF LITERATURE

Landfill depletion, global warming, and ozone depletion have become serious environmental concerns in the last several decades. Thirty years ago, Victor Papanek (Mackenzie, 1997) argued that a designer was in a powerful position and had two choices. These choices were to either create a better world or aid in increased destruction of the planet. His views were not popular with the design community at that time, however, his words should be addressed now that these concerns are being recognized by people around the world (Mackenzie, 1997).

As solid waste continues to increase, landfill capacity has decreased. As a result, other solutions for decreasing solid waste have been incorporated in order to reduce the amount of waste deposited into landfills. After being advocated by the United States Environmental Protection Agency (EPA) in 1992, the process of reducing, reusing, and recycling products and materials has received great attention and support (Environmental Protection Agency, 2000, April). As a result, a large portion of the review of literature will address these processes and how they aid in reducing the amount of solid waste deposited into landfills. One process in particular that researchers have addressed is recycling. In order to determine the factors that influence people to incorporate this process into their daily lives, previous researchers have studied the behavior of recyclers versus non-recyclers. Several researchers have used the theoretical framework of Ajzen and Fishbein's (1980) theory of reasoned action in order to determine how a person's attitude, subjective norm, and intentions influence recycling behavior.

Previous research based on this framework will constitute the other major portion of the literature review in order to create a framework for this study.

Municipal Solid Waste

The amount of municipal solid waste being discarded by Americans has increased drastically over the past thirty years. Municipal solid waste (MSW) is defined as garbage consisting of items generated everyday such as packaging, grass yard waste, food waste, furniture, appliances, clothing, durable goods (metals, glass, plastics, textiles, and other materials) and non-durable goods (paper, paperboard, plastics, textiles, and other materials) (Environmental Protection Agency, 2000, April). The United States Environmental Protection Agency (EPA) reported that approximately 220 million tons of MSW were generated in 1998, a four million ton increase from 1997 (Environmental Protection Agency, 2000, April). This translates to each person generating approximately 4.46 pounds of MSW daily (Environmental Protection Agency, 2000, April). McCarty and Sherman, as quoted by Oskamp (1995a), reported that the United States makes up 5% of the world population, uses one-quarter of the available energy in the world, and produces more waste than any other nation.

To date, most of the MSW generated in America has been transported to landfills. According to Zero Waste America (2000), a landfill is a cavity either engineered in the ground or above the ground into which wastes are deposited. According to the EPA (2000, April), approximately 55% of waste has been deposited into landfills. As a result, landfills are beginning to reach the point of maximum capacity (Goldstein, 2000). With landfills reaching capacity and landfill costs rising, depositing MSW into landfills at this rate is no longer an option. To relieve environmental stress from the landfills, waste has been diverted to incinerators and recycling programs. Incineration is a process that serves to burn waste and reclaim the energy. In 1998, 16% of MSW was incinerated. However, although the volume of the waste was reduced, the remains were still deposited in the landfills (Environmental Protection Agency, 2000, April).

Recycling programs reduce the amount of waste deposited into landfills and serve manufacture new products from used and discarded materials. In 1998, 17% of MSW was recycled (Environmental Protection Agency, 2000, April). Although incineration and recycling have been successful in reducing the amount of solid waste transported to landfills, many other programs and solutions have been incorporated in order to manage municipal solid waste.

Managing Municipal Solid Waste

Municipal solid waste has steadily increased in the last three decades. Raymond De Young (1988-1989) reported that the amount of waste discarded by Americans was over 125 million tons in 1971. This amount increased to over 160 million tons in 1988. In 1998, the amount of waste generated was 220 million tons (Environmental Protection Agency, 2000, April). In 1992, the EPA challenged Americans to produce less waste by incorporating the "3 R's" into their lives. These R's are now commonly know as "reduce, reuse, and recycle" (Environmental Protection Agency, 2000, April). The first part of this process is reducing which serves to use less packaging and products. The second part of this process involves reusing products several times, such as plastic and glass containers, instead of discarding the products into the garbage. The third part of this process is recycling discarded products or materials in order to create new products (Oskamp, 1995b). Each of these steps is defined further in the following sections.

Reducing

Source reduction, or waste prevention, involves limiting the amount of products consumed and discarded (Environmental Protection Agency, 2000, January 3). This process includes designing products and packaging that reduce the amount of materials used. Packaging of products has also been addressed in order to protect products from damage or spoilage (Environmental Protection Agency, 2000, April). Reducing also involves purchasing goods that

have a long life span, that contain minimal or no toxins, and are packaged and/or manufactured from a limited amount of raw materials. For example, the Society of the Plastics Industry reported that the amount of plastic used for a one gallon HDPE milk container has decreased from 120 grams in the 1960's to 65 grams in the 1990's (Environmental Protection Agency, 2000, April). In addition, The Aluminum Association (2000b) reported that in 1972, 22 cans were manufactured from one pound of aluminum. However, in 1997, 32 cans were manufactured from the same amount of aluminum (Environmental Protection Agency, 2000, April). Source reduction is actually the preferred method for managing solid waste because it serves to reduce the amount of material used to manufacture a product initially (Environmental Protection Agency, 2000, January 3). However, reusing and recycling are also beneficial approaches to reduce solid waste.

Reusing

Reducing and reusing are important steps in reducing solid waste, because the more reducing and reusing of products occurs, the less recycling will have to be utilized (Oskamp, 1995b). Reusing involves the repeated use of products through repairing, donating, or selling the products. For example, using coffee mugs instead of paper or Styrofoam cups when possible would greatly reduce the amount of waste discarded. In addition, items such as glass and plastic containers can be used to store food or other items. Also, clothes, furniture, and automobiles can be repaired, donated, or sold in order to save valuable landfill space (Environmental Protection Agency, 2000, January 3). Reusing products is a more favorable approach to reducing waste than recycling, because reprocessing the product before manufacturing a new product is unnecessary. (Environmental Protection Agency, 2000, January 3).

Recycling

As a result of the depletion of landfill space and the overall benefits of recycling materials, the subject of recycling has received considerable attention over the past several

decades (Oskamp et al., 1991). Recycling involves separating, collecting, and processing used materials in order to manufacture a new product from a material that otherwise would have been deposited into a landfill. Recycling not only reduces the amount of MSW deposited into landfills, it also conserves our natural resources and reduces the amount of air and water pollution generated from manufacturing new products (Environmental Protection Agency, 2000, April).

Boeck and Parker (1995) quoted the Useless Stuff Report which reported that since the first Earth Day in 1970, the amount of solid waste recycled or composted increased from 7% to 22% from 1970 to 1993. The EPA (2000, April) reported that 28.2% of solid waste was recycled in 1998. The recycling of specific products such as aluminum, paper, and plastic has also increased significantly over the past thirty years. The Aluminum Association (2000a) reported that 1.5 billion cans (15.2%) were recycled in 1973. This amount increased to 63.9 billion cans (62.5%) recycled in 1999. In addition, the weight of the aluminum can has been reduced by 52% since 1972 and continues to be reduced (Aluminum Association, 2000a).

The recycling of paper products has also increased in the past several decades. "Paper Recovery Statistics" (2000, August) cites the American Forest and Paper Association (AF&PA) as reporting the recovery rate for paper being 45% in 1999. The figures for old newspapers (68.9%), old corrugated (70.1%), and printing/writing paper (43.2%) each increased for 1999. AF&PA reported that 98,000 tons of recovered paper was used to produce paper in 1990 and increased to 150,000 tons in 1998. Recovered paper is being used to manufacture products such as container board (44.8%), paperboard (22%), newspaper (10.8%), tissue (10.7%), and printing/writing papers (6.5%) ("Paper Recovery Statistics," 2000). Manufacturing paper from recovered materials saves 60% of the energy required to manufacture paper from virgin materials. (Oskamp, 1995a,b).

The Earth Works Group offers two reasons that promote recycling which are cited by Oskamp (1995a,b) and Oskamp et al. (1991). First, recycling saves precious natural resources such as oil and bauxite. For example, Hall and Ward (1995, March 9) quoted Carolina Pad,

which reported that manufacturing one ton of paper from exclusively recycled paper scrap rather than virgin wood saves 17 trees, 7,000 gallons of water, 4,100 kilowatt hours of energy, and three cubic yards of landfill space. Earth Works Group also reported that producing aluminum products from recycled aluminum material results in a 95% reduction in the energy required to manufacture the same product from mined bauxite. Recycling also reduces air and water pollution by the same percentage (95%). Second, the recycling of glass saves additional resources as stated by Earth Works Group. In addition, the manufacturing of glass from recycled materials rather than virgin glass saves 30% more energy, decreases air pollution by 20% and water pollution by 50% (Oskamp, 1995a,b; Oskamp et al., 1991).

Recycling has received considerable attention over the past several decades and has saved numerous tons of MSW from landfills (Environmental Protection Agency, 2000 June 29, Oskamp et al., 1991). Based on the amount of waste generated and recovered, the EPA (2000, April) reported a 28.2% recovery rate, or approximately 61 million tons of MSW in 1998. However, the EPA (2000, April) also estimated that residential waste generates between 55% and 65% of the total municipal solid waste. Many communities and individuals throughout the United States recycle, however, encouraging the majority of the U. S. population to regularly recycle household waste is critical. Recycling household waste must become a habitual activity to significantly impact the environment (De Young, 1988-1989). Knowledge of the recycling process allows people to understand what becomes of recycled materials after collection.

Recycling process

Recycling is a three-step process that involves collecting and processing of used materials, manufacturing products containing the recycled content, and ultimately purchasing the products (Environmental Protection Agency, 2000, January 3). The first step of the recycling process involves collecting materials from communities through one of four methods. First, recycling drop-off centers are sites where people can physically transport their recyclable

materials such as newspaper, aluminum, plastic, and glass to centers in the community as well as other places such as supermarkets (Vining et al., 1992). Second, curbside recycling programs involve residents transporting their recyclable materials to the curb of their residence to be collected in the same way as other household garbage. Two types of curbside recycling exist—segregated and commingled. Segregated curbside recycling involves the sorting of recyclable materials by the residents into separate bins or bags. Commingled curbside recycling allows residents to place all of their recyclable materials together in a single bin. After collection, the materials are separated either by mechanical or human means at a recovery facility (Oskamp, 1995a,b). Third, buy back centers offer monetary rewards for various materials based on weight. Fourth, deposit or refund programs require consumers to place a refundable deposit for the purchase of beverages in glass, plastic, or aluminum containers. The deposit is refunded upon return of the containers to the store (Oskamp, 1995b). After the initial collection of the materials via these four methods, the materials are processed at material recovery facilities. After the materials are prepared, the materials are sold to manufacturers to continue the recycling process (Environmental Protection Agency, 2000, April).

The second step of the recycling process involves the manufacturing of the processed material into a new product. Many household items contain post-consumer recycled content including newspapers, paper products, as well as aluminum, glass, and plastic containers (Environmental Protection Agency, 2000, April). In addition to reducing the amount of MSW deposited into the landfill, manufacturing products from recycled material also saves energy and decreases pollution resulting from the manufacturing of new products from virgin materials (Oskamp, 1995a,b; Oskamp et al., 1991).

The third step of the recycling process involves consumers purchasing products manufactured of recycled material. This step is also referred to as "green buying" and is defined as purchasing that is respectful of the environmental impact of the product (Oskamp, 1995b). Buying recycled products increases the demand for the products. In addition, purchasing

products with less packaging ultimately results in less waste deposited into the landfill (Oskamp, 1995b). Each consumer, both individual and corporate, must contribute to each step of this process in order to benefit the environment. (Environmental Protection Agency, 2000, April).

Comparison of State Recycling Statistics

According to Biocycle's (Glenn, 1988, April) State of Garbage Survey, the percent of garbage recycled (including yard trimmings composting) has increased from eight percent in 1990 to 30 % in 1998. Much of this increase can be attributed to state recycling programs. The State of Garbage Survey (Glenn, 1988, April) listed recycling data for each of the fifty states as well as the District of Columbia. The data gathered for each state included the solid waste in tons per year, and the percent recycled, incinerated, and landfilled (information from Idaho and Texas was not available). The recycling rates for the states ranged from the lowest rate of 5% in Wyoming to the highest rate of 48% in Washington. Table 1 of the State of Garbage Survey (Glenn, 1988, April) reported states' percentage rate of recycling. The number of states and recycling percentage rates are as follows: 4 states recycled between 0-9%; 11 recycled between 10-19% range; 16 states recycled between 20-29%; 11 states recycled between 30-39%; and 7 states recycled between 40-49%. The state of Oklahoma falls within the next to lowest category with a 12% recycling rate. In contrast, Minnesota falls within the highest category with a 42% recycling rate (Glenn, 1988, April). Due to the large difference in recycling rates of these states, professionals from Oklahoma and Minnesota will be compared in this research study.

In addition to the waste generation, recycling and disposal methods, the State of Garbage Survey (Glenn, 1988, April) also listed statistics for the number of curbside programs and the population served with such programs for each state. The number of curbside programs listed for each state ranged from zero curbside programs for the District of Columbia and Hawaii to 1, 472 curbside programs for the state of New York (information for South Carolina was not available). The number of states and number of curbside programs are listed as follows: 12 states with 0-9

programs, 11 states with 10-49 programs, 6 states with 50-99 programs, 9 states with 100-199 programs, 2 states with 200-299 programs, 2 states with 300-399 programs, 2 states with 400-499 programs, 2 states with 500-599 programs, 1 state with 600-699 programs, 1 state with 700-799 programs, 1 state with 800-899 programs, zero states with 900-999 programs, and 1 state with 1000+ programs (Glenn, 1988, April). The state of Oklahoma falls within the lowest category with 7 curbside recycling programs serving a population of 522,000. Minnesota falls within the fourth highest category with 731 curbside recycling programs serving a population of 3,520,000 (Glenn, 1988, April).

A direct relation between the number of curbside programs and state recycling rate was not found, however. Some of the states with the highest number of curbside programs did not necessarily have the highest recycling rate percentage. One must note that this survey (Glenn, 1988, April) did not include the number of drop-off sites in the state that would also account for the amount of garbage recycled in each of the states. Despite curbside recycling and other programs offered to the population in each state, many factors influence why people do or do not engage in recycling household waste. Researchers have studied many factors in order to determine the influences promoting or inhibiting human recycling behavior.

Factors Influencing Human Behavior and Recycling

Previous research has focused on what promotes recycling behavior in people. These studies have revealed many factors concerning the influences and motivations of those who recycle and those who do not recycle. These factors can be grouped into external factors and internal factors.

External factors

External factors for recycling involve those factors that exist outside the home that influence the motivation to recycle. Social influence from the community or neighborhood has been found to influence recycling behavior. If recycling containers are highly visible from the

curbside, a person may be influenced to recycle, or the person may begin to recycle because it would be embarrassing to refuse to comply with the neighborhood norm (Vining et al., 1992; Vining & Ebreo, 1990; De Young, 1988-1989). Likewise, Boldero (1995) found that those who recycle held stronger beliefs than those who did not recycle that their friends, neighbors, and social council favored them recycling their newspapers, therefore, the recyclers noted that they were more likely to conform to the beliefs of their community.

Another external factor that has been found to influence recycling behavior involves the convenience of the recycling program available to individuals. If a curbside recycling program is not available in the community, then individuals must find an alternative way to recycle their materials. This method usually involves transporting the recyclable material to a community dropoff center, which requires much more effort and has been found to be a significant barrier for active recycling behavior (Boldero, 1995; De Young, 1988-1989). However, the addition of a curbside recycling program in a community has been shown to increase recycling behavior (Vining & Ebreo, 1990). Therefore, each of these external factors should be considered when attempting to increase recycling behavior.

Internal factors

Internal factors for recycling involve those factors that exist inside the home that influence the motivation to recycle. Four internal factors have been found in previous research to encourage or discourage recycling behavior. The first internal factor that has been found to effect recycling behavior is social influence from family members. Vining and Ebreo (1990) defined this type of social influence as either the concern for the family's beliefs about recycling or the positive or negative social support from the members of the household for environmental behaviors.

A second factor found to determine recycling behavior is knowledge and education about recycling. De Young (1988-1989) suggests that to promote recycling, individuals should be

educated as to the extent of the waste problem in the United States. In addition, instead of assuming that each individual inherently knows why to recycle and how to recycle, each person should be taught the basics of recycling in order to increase the confidence level of the person practicing the recycling behavior. Boldero (1995) suggested that in order to increase positive environmental attitudes and increase recycling behavior, implementing simple recycling programs with which individuals can receive hands-on experience may increase environmental concern. Vining and Ebreo (1990) found that those with increased knowledge about recycling behavior as well as those who were more familiar with products that could be recycled were more likely to recycle. Vining and Ebreo (1990) also found that a community education program about recycling increased the concern for the environment and became a motive for recycling.

A third factor that has been found to be a significant factor in recycling behavior is concern for the environment (Vining et al., 1992; Vining & Ebreo, 1990). The research of Vining et al. (1992) supported previous research in that environmental altruism, or the concern for the welfare of the environment, was the highest rated motivational factor for recycling. Vining and Ebreo (1990) found that education through a community recycling program influenced the participants and resulted in greater environmental concern as well as recycling behavior.

A fourth factor found to be significant in discouraging recycling behavior is the perception of the recycling process as inconvenient or time-consuming. Due to this factor, one may not recycle despite having positive feelings toward the above factors. Vining and Ebreo (1990) found that an important reason not to recycle resulted from the time and trouble involved in preparing, storing, and transporting the materials. They also noted that even if an individual believes that recycling is important, the time and space required for recycling might override such beliefs. Vining et al., (1992) found that personal inconvenience and the available household storage were rated behind altruism in order of importance. Oskamp et al. (1991) found that the type of household an owner resides in could influence the owners' recycling behavior. They found that individuals living in houses were more likely to engage in recycling behavior than

individuals residing in rented housing, condominiums, and mobile homes. Perhaps this is due to the fact that the latter accommodations are small, resulting in limited space for multiple recycling bins (Boldero, 1995). Oskamp (1995a,b) suggested that recycling could be increased by having recycling containers more available as well as instituting a curbside pickup program.

Factors useful for design professionals

Each of these factors, both external and internal, were found to be significant with consumers concerning their recycling behavior. Architects, interior designers, and builders should consider many of these factors because these professionals are providing a product for the American consumer as well. These factors were considered when designing the research study. The first factor that is important to both professionals and consumers and should be considered in both groups is social influence. Both the consumer and the professional could be encouraged or discouraged by this factor if the community he or she is living in feels that in-home recycling centers are necessary or unnecessary.

A second factor worth considering is knowledge and education about the recycling process and products that encourage the recycling process. Design professionals are in a position to educate their clients about recycling and to suggest the promotion of this process through in-home recycling centers. Therefore, design professionals should be knowledgeable about recycling as well as how to incorporate recycling centers into their clients' home so the maximum amount of recycling can occur.

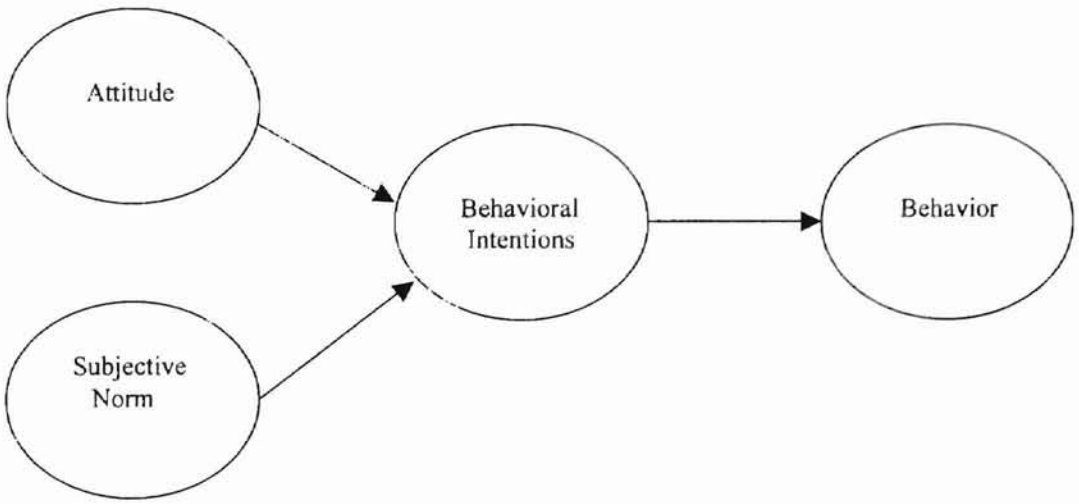
Concern for the environment is a third factor that could encourage both design professionals and consumers to promote and inquire about incorporating recycling behavior into new homes. If the design professional is adamant about a healthy environment, he or she could suggest recycling centers to their clients. In addition, if the consumer favors a healthy environment, he or she could inquire about how to include a recycling center into a new home to execute the recycling process inside a new home.

If a recycling center were incorporated into a new home, perhaps the center would make the recycling process less time-consuming and more convenient. This is the fourth factor that should be considered by the design professional as well as the consumer. Perhaps if a recycling center is readily available to the homeowner, the recycling process could take place with ease.

Each of these factors has been found to be important when studying recycling behavior in consumers. Therefore, design professionals must also be aware of these factors when providing an end product for a consumer, especially a product that could be beneficial to the environment. These four factors were considered when designing the study of the design professionals in phase two of the research.

Theoretical Framework

The theory of reasoned action (Ajzen & Fishbein, 1980) served as a framework for this study. Several studies have been conducted concerning recycling behavior using this model. The theory of reasoned action states that behavioral intentions are the result of a person's attitudes, a person's feelings about a behavioral act, a person's perceptions of a subjective norm, and a person's beliefs about others' views of the behavior (Schultz & Oskamp, 1996; Goldenhar & Connell, 1992-1993; Madden et al., 1992).



Path model for the theory of reasoned action (Madden et al., 1992)

Theory of Reasoned Action

Ajzen and Fishbein's (1980) theory of reasoned action serves to predict and understand a person's behavior. In order to predict a person's behavior, one must identify a certain behavior and measure the given behavior. After the behavior has been defined, the process of determining what leads to the performance of the behavior can be identified. According to the theoretical framework, behavioral intentions immediately precede a behavior, thus defining intention as a determinant of the final action. However, a person's intention includes a personal determinant and a social determinant that must be considered as well (Ajzen & Fishbein, 1980). Each of these concepts will be defined singularly in addition to the relation of the concepts to the complete theoretical framework.

Once a specific behavior of interest has been identified, the next step in the process is to measure the behavior. This step of the analysis involves four elements. The first element is the action, be it a single act or a set of actions. The target at which the action is directed is the second element of the analysis. The third element is the context in which the behavior occurs, and the fourth element is the time the behavior is performed (Ajzen & Fishbein, 1980).

The theory of reasoned action states that behavior can be predicted by a person's intention. Intention can be grouped into two categories. Choice intentions indicate that a person is more likely to perform one of the behaviors or alternatives suggested to him or her. In addition, it is expected that the person will actually perform the alternative he or she has selected. Behavioral intentions provide a measure of the likelihood that a person will perform a given behavior. However, the measure of behavioral intentions must correspond to the behavioral criterion of action, target, context, and time. In addition, the measure of intention will only accurately predict the behavior if the intention remains unchanged before the behavior is observed (Ajzen & Fishbein, 1980).

So far, predicting a behavior has been linked to accurately predicting one's behavioral intentions. However, predicting one's behavioral intentions involves obtaining a measure of a

person's attitude toward the given behavior and the person's subjective norm. Attitude is the first component in question and is defined as the person's own performance of the given behavior instead of to the performance of the behavior in general. Again, the attitude measure must correspond to the behavioral intention and behavior measures of action, target, context, and time. Subjective norm is the second component involved in accurately predicting a person's behavioral intention toward a behavior. For this theoretical framework, the term subjective norm is defined as a person's perception that most people that are important to him or her hold a favorable or unfavorable view of he or she performing the given behavior. The attitude and subjective norm components used to predict behavioral intentions are analyzed separately, and may or may not agree. However, the theory of reasoned action gives relative weights of importance to each of the components. The weights of the components are summed to provide a prediction of the intention (Azjen & Fishbein, 1980).

The theory of reasoned action uses measures of intention, attitude, and subjective norm to provide a prediction of a given behavior. This theory has provided a framework for previous research in the past for many types of behavior including recycling behavior. Findings from previous research as well as the theory of reasoned action were used to construct the framework of this study where only the path from attitude, behavioral intentions, and behavior were addressed.

Theoretical Framework and Recycling Behavior

Goldenhar and Connell (1992-1993) used the theory of reasoned action to understand and predict recycling behavior. They found that the intention to behave and previous behavior are important predictors of future behavior. They suggest that to increase the intention to recycle, interventions should occur in order to educate people about the importance of recycling. In addition, increasing the convenience of the behavior and/or providing simpler hands-on recycling

programs would be helpful to allow individuals the opportunity to foster pro-environmental behavior.

Boldero (1995) used the theory of reasoned action as well as the theory of planned behavior to predict the household recycling of newspapers. The theory of planned behavior expands on the theory of reasoned action by incorporating perceived behavioral control as an exogenous variable that has an effect on both behavioral intention as well as the resulting behavior (Madden et al., 1992). She noted that past researchers had found that behavior was more predictable if the intention was stable. However, this link may be broken if information or other events are introduced that change the initial intention (Madden et al., 1992). The intention-behavior link was also influenced by situational factors. Boldero noted that if one perceives recycling as inconvenient, this attitude could affect the intention and/or behavior. Boldero also noted differences between recyclers and non-recyclers. She reported that the subjective norms of recyclers were greater than non-recyclers. Non-recyclers had stronger attitudes relating to recycling being inconvenient and time-consuming. With the situational factors she studied, recyclers and non-recyclers differed on all four factors. Recyclers purchased a higher number of newspapers and rated their recycling program more positively than those who did not recycle. Non-recyclers believed recycling was not justified because they did not purchase a large amount of papers. Also, non-recyclers reported recycling to be difficult due to insufficient storage space. Boldero (1995) found that to increase recycling behavior, the issues of storage space and effort should be addressed so that people will be more motivated to recycle. She also suggested that education should be implemented that encourages people to recycle even the least amount, because the benefits will outweigh the inconvenience.

Schultz and Oskamp (1996) also combined the theory of reasoned action and the theory of planned behavior in relation to environmental concern and recycling. They found that when effort required for a behavior is low, it may result in those with low to moderate environmental concern to illicit the behavior.

The theory of reasoned action has been used to predict behavior in many fields. This theory has also been useful to predict recycling behavior based on an individual's attitudes, norms, past experience, and intention to perform recycling behaviors.

Summary

Due to the current state of the environment, humankind must employ proactive behaviors to maintain a quality of life on this planet. The amount of municipal solid waste (MSW) generated in the United States increases each year. As a result, the EPA has encouraged Americans to reduce, reuse, and recycle products to minimize the amount of MSW (Environmental Protection Agency, 2000, January 3). These processes benefit the environment by conserving natural resources, reducing energy to produce products from virgin materials, and reducing the amount of MSW deposited into landfills.

Previous research has examined many factors influencing human behavior and recycling. These factors can be categorized into external and internal factors. External factors include social influence and convenience. Previous researchers have found that one may be influenced to recycle if the individual views others in the community or neighborhood recycling, especially if the recycling containers are visible from the curbside (Vining et al., 1992; Vining & Ebreo, 1990; De Young, 1988-1989).

Convenient recycling methods such as curbside recycling programs have been shown to increase recycling behavior (Vining & Ebreo, 1990). Community drop-off centers provide another method of recycling materials, however, the effort of transporting materials to another site has been found to be an inconvenient barrier and has decreased recycling behavior (Boldero, 1995; De Young, 1988-1989).

Internal factors are those motivations inside the home that promote recycling behavior. Concern for the environment, or environmental altruism, has been found to be a significant factor for recycling materials (Vining et al., 1992). The level of knowledge acquired about recycling as

well as the recycling process has also been found to determine recycling behavior (Vining & Ebreo, 1990). Boldero (1995) and De Young (1988-1989) suggest education regarding the importance of recycling based on the current condition of the environment as well as hands-on programs in order to increase proactive behavior for the environment.

Convenient programs and methods must be incorporated into a community's recycling program, otherwise, individuals may refuse to recycle despite having positive environmental attitudes (Vining and Ebreo, 1990). Issues such as preparing, storing, and transporting recyclable materials should be considered in order to promote recycling in a community (Vining et al., 1992, Oskamp et al., 1991). Communities should insure that the recycling programs promote recycling, yet provide as much convenience to the citizens as possible. These issues have been studied using theoretical models such as Ajzen and Fishbein's theory of reasoned action, which states that behavioral intentions are the result of a person's attitudes, how a person feels about a behavioral act, and perceptions of a subjective norm, how a person notes others to view the behavior (Schultz & Oskamp, 1996; Goldenhar & Connell, 1992-1993; Madden et al., 1992). The theory of planned behavior expands on the theory of reasoned action by incorporating perceived behavioral control as an exogenous variable that has an effect on both behavioral intention as well as the resulting behavior (Madden et al., 1992).

Studies have found that when effort to recycle is decreased, individuals with low to moderate environmental concern may perform the behavior (Schultz & Oskamp, 1996). In addition, Boldero (1995) found that a behavior was more likely to be performed if the intention to perform the behavior was high. Also, those who performed the behavior also had a higher subjective norm than those not performing the behavior.

Several suggestions have been offered by previous researchers to increase the rate of recycling. These suggestions include educating individuals on the importance and method of recycling, increasing convenience of the recycling process including time, storage, and curbside

recycling programs. By providing effective programs and recycling methods, recycling behavior may increase and prolong a healthy environment for future generations.

CHAPTER III

METHODS

The purpose of this study was to determine the existence of in-home recycling centers in new home construction in specific areas in the states of Oklahoma and Minnesota. The objectives of this research were to determine the types of in-home recycling centers as well as the willingness of architects, interior designers, and contractors to incorporate in-home recycling centers into their projects. Based on the findings of this study, recommendations were made as to how to increase the incorporation of recycling centers in order to promote recycling behavior.

Description of the Sample

Phase 1

The sample used in this research consisted of on-site observations of new home construction in metropolitan areas of Tulsa and Oklahoma City. Through newspapers and advertisements, new editions of home construction were identified and surveyed. The observations included the following information for each home: 1) the location of the home; 2) the approximate square footage of the home; 3) the approximate price range of the home; and 4) the existence of an in-home recycling center in the home. In doing so, a percentage of homes containing in-home recycling centers would be determined. The instrument was developed for consistency in data collection during and between the on-site observations.

Phase 2

The sample used in this research consisted of a random sample of architects, interior designers, and contractors in the Tulsa and Oklahoma City areas of Oklahoma as well as in the

Minneapolis/St. Paul area of Minnesota. A proportional random sample of Oklahoma architects was selected through a membership list of the American Institute of Architects (AIA). An AIA membership list for the state of Oklahoma was acquired via the AIA web site. A total of 390 members in the greater Tulsa and Oklahoma City area were listed. Due to the large number of AIA members compared to the membership size of the American Society of Interior Designers (ASID) and National Association of Home Builders (NAHB), a proportionate sample of AIA members was taken to limit the skewing of data. The proportionate sample size of AIA members was comparable to the ASID and NAHB sample sizes, which translates into 37% of the original sample with 72 from the greater Tulsa area and 71 from the greater Oklahoma City area.

Likewise, a membership list for members of the Minnesota AIA was obtained through the AIA website. However, this membership list contained only firm names and did not contain specific names of architects. The 51 companies with e-mail addresses listed on the website were contacted in order to request contact names. Of the 51 companies contacted via e-mail, only 17 (33.3%) had responded by the scheduled time of the mailing. Of the firms that responded, 15 were from the Minneapolis area and 2 were from the St. Paul area. The individuals identified in Minneapolis and St. Paul were included in the survey. Other sources used to identify AIA architects identified firms, not individuals, and did not provide e-mail addresses. The other sources included internet searches and the yellowpages.com website. Individuals identified as architects, but not identified as AIA architects were not contacted. In summary, the distance from the state of Minnesota created an obstacle for identifying AIA architects in Minneapolis and St. Paul. In addition, the limited budget for this self-funded project was another obstacle. As very few 800 numbers were listed, electronic mail was chosen as the form of contact due to the established budget for the research project.

A sample of Oklahoma interior designers was selected through the American Society of Interior Designers (ASID). The sample was taken from the ASID Chapter Alpha Roster for Oklahoma updated on July 31, 2000. Of the 203 Oklahoma members, 90 were allied practitioners

and 113 were professional members. All of the members from the allied practitioners and the professional members who were identified as practicing in the greater Tulsa or Oklahoma City areas were selected for the survey, resulting in 67 members from the greater Tulsa area and 67 members from the greater Oklahoma City area.

Likewise, a membership list for the Minneapolis and St. Paul ASID chapter was obtained through a current member of the chapter. A proportionate random sample was selected from those members in the Minneapolis and St. Paul area so as not to skew the data of the Minnesota architect and home builder samples. Of the 135 total Minnesota ASID members, 20 interior designers were selected from the Minneapolis area and 22 interior designers were selected from the St. Paul area, translating to 31% of the total members.

Finally, a random sample of home builders was selected through membership lists from the Tulsa and Oklahoma City chapters of the National Home Builders Association (NHBA). For the Tulsa home builder population, a membership list was obtained from the office of the Home Builders Association of Greater Tulsa. All members listed in the Tulsa area with residential projects were selected, resulting in a total of 84 members. For the Oklahoma City home builder population, a membership list was obtained from the NHBA website listing members in the central Oklahoma area. All members listed in the Oklahoma City and Edmond area were selected, resulting in a total of 77 members.

A membership list for the Home Builders Association of the Twin Cities was obtained through the NAHB website. However, only some of the listings of home builders contained contact names. All of the 16 firms in the Minneapolis and St. Paul area with addresses and contact names were included in the sample. Additionally, all companies with e-mail addresses were contacted to identify specific individuals within the firm. A total of 25 companies were contacted via e-mail in order to request contact names. A total of 7 companies replied with contact names by the scheduled time of the mailing. Thus, a total of 22 members were included in the survey.

Instrument Development

Phase 1

The instrument for the first phase of data collection included spaces for the following information: 1) the location of the home; 2) square footage of the home; 3) price range of the home; and 4) presence of a recycling center in the home. If an in-home recycling center was present, a space to note the characteristics of the recycling center was provided.

Phase 2

The information gathered from phase one of this study was incorporated into the development of the instrument for the second phase of the study. In addition, Dillman's (1978) Total Design Method was used in the development process. The instrument was a self-administered questionnaire with items designed to elicit respondents' demographic characteristics and professional information, as well as their attitudes towards recycling, incorporating in-home recycling center, and their behavior of incorporating in-home recycling centers into new home construction. Open-ended questions were used to allow respondents to make additional comments about the information covered in the questionnaire and to address any additional issues of concern regarding in-home recycling centers and recycling behavior.

Data Collection

Phase 1: On-site Observations

After identifying areas of new home construction, the researcher traveled to selected metropolitan areas in Tulsa and Oklahoma City to administer the on-site observations survey. The same instrument was used for each site. To gather information concerning the amount of recycling centers existing in the state of Minnesota, the website Realtor.com was used to search for new homes in the Minneapolis and St. Paul metropolitan areas.

Realtor.com is a website offering information concerning all aspects of the moving process from locating a home to moving and so on. This website was used for Phase One of the research project to gather information on homes in the Minneapolis and St. Paul metropolitan areas of Minnesota. The home page of Realtor.com listed several options for locating property. First, the "find a home" link was chosen which then led to a page to choose the state and area in which one was interested. The state of Minnesota was entered which then led to a page displaying a map of the state. From this map, "Minneapolis and St. Paul" was chosen. This choice led to a page where individual areas could be selected. The first search was conducted using the choice of "Minneapolis and near suburbs" and the second search was conducted using the choice of "St. Paul and Ramsey County." Once the state and area were selected, criteria for the housing type was selected. First, "single family home(s)" was selected from the property type option. Under the general search criteria, options of price range, minimum number of bedrooms/bathrooms, and minimum square footage was selected. For each search, the same criteria was used: $150, 000 - $500,000, minimum of three bedrooms, minimum of 1 bathroom, and minimum square footage of 2000. Other preferences listed general home features where "newer home (0-5 years)" was selected as well as interior features where none of the features listed were selected. Examples of features in this section included options such as a fireplace, den/study, and basement. Recycling centers were not listed as an option in this section. Since a recycling center could be located in a garage, "one or more car garage" was selected from the exterior features listed. After entering the above criteria the search was conducted. For the Minneapolis and near suburbs search, a total of 246 homes were listed. For the St. Paul and Ramsey County search, a total of 208 homes were listed. For each of the searches, recycling centers were not listed for any of the homes. However, other features were listed in the home descriptions besides those features that could have been selected in the interior features criteria. These additional features included a jetted bathtub, master bathroom, sun room, and central vacuum system. Therefore, even though recycling centers were not listed as an option in the

interior features section, there was still a possibility that this option could have been displayed in the home description.

Phase 1: Analysis of On-site Observations

To understand the current situation for in-home recycling centers, the data observed from the Tulsa and Oklahoma City on-site observations were analyzed. These data are presented in Chapter 3, Methods, because the data were collected to assist in the development of the instrument that was used for the mailed survey described in phase two.

Following the collection of data from on-site observations of new home construction, the data were grouped by location and price range of the home. The data were analyzed based on the presence of an in-home recycling center and the characteristics of a home containing an in-home recycling center. These characteristics were noted as follows: (1) location of recycling center (i.e. room); (2) how the recycling center is contained (i.e. pull-out bin); (3) number of receptacles; (4) description of receptacles (i.e standard garbage bin, custom); (5) cubic feet of storage of the bin/recycling center.

A total of 66 new homes in the greater metropolitan areas of Tulsa and Oklahoma City were observed (see Table 1). Homes were located within city limits of Tulsa and surrounding suburbs and within the city limits of Oklahoma City and surrounding suburbs. A total of 38 (57.6%) homes were observed in the Tulsa area and 28 (42.4%) were observed in the Oklahoma City area. A total of 66 homes were observed. In the Tulsa area, 26 (76.5%) homes were located inside the city limits and 12 (37.5%) homes were located in suburbs. In the Oklahoma City area, 8 (23.5%) homes were located inside the city limits and 20 (62.5%) homes were located in suburbs.

Table 1 summarizes the price ranges of the homes observed in both metropolitan areas. Along with price ranges, the presence of an in-home recycling center was also documented in phase one of the study. Of the 28 homes observed in the Tulsa area, 5 homes contained an in-

home recycling center. All of the homes that contained an in-home recycling center were located in the Tulsa city limits and included the same characteristics. In all of these homes, the recycling centers were located in the kitchen, immediately to the left or right of the sink. In addition, the centers were designed as under-counter pull-out bins and contained pre-cut areas to accommodate two 45-quart waste baskets. The price range and characteristics of the homes that contained an in-home recycling center are as follows: 1) $270,000 with 2700 square feet and four bedrooms; 2) two homes priced at $284,000 with 3300 square feet and four bedrooms; 3) $320,000 with 3300 square feet and four bedrooms; and 4) $385,000 with 3900 square feet and five 5 bedrooms.

In the Oklahoma City area, one home contained an in-home recycling center. The home that contained an in-home recycling center was located in an Oklahoma City suburb. The recycling center was located in the kitchen, immediately to the right of the sink. Like the centers in the Tulsa area, the center was designed as an under-counter pull-out bin and contained two pre-cut areas to accommodate 45-quart waste baskets. The home that contained the in-home recycling center was priced at $238,500, included 2625 square feet and four bedrooms.

Phase 2

For the data collection of architects, interior designers, and contractors, the instrument was mailed to the selected respondents with a cover letter describing the purpose of the questionnaire and assuring the respondents of their privacy. The collection process followed Dillman's (1978) method of data collection. The respondents selected for participation received a pre-mail letter notifying them that they had been selected to participate in the study and also described the purpose of the study. A pre-mail postcard was mailed five days later, which informed the respondents that a questionnaire packet would arrive a few days later. The instrument was mailed three days later and was accompanied by a cover letter describing the purpose of the questionnaire and assuring the respondents of their privacy. Follow-up postcards

were mailed to the respondents four and eight days after the initial mailing of the questionnaires. The instruments were returned to the researcher for coding.

Data Analysis

Following the data collection process, the data from the survey were coded using an Excel File. This file was then imported into the SAS Statistical Package for further analysis. Before analysis, data were checked for coding and entry errors, which were identified and corrected.

A correlation analysis was used to analyze the relationships between the variables of attitude toward recycling and attitude toward the importance of in-home recycling centers. The recycling attitude of the respondents was measured by an individual's response to a series of Likert-type questions (#1-13) ranking the respondent's attitude toward various aspects of recycling (1 = strongly disagree, 7 = strongly agree).

Attitude towards in-home recycling centers was measured in the same manner as the recycling attitude. Respondents responded to a series of seven point Likert-type scale questions (#18-20) ranking the respondent's attitude toward the importance of an in-home recycling center in relation to convenience and encouragement of recycling behavior.

To measure the recycling awareness and behavior of the respondents, as series of questions addressed each of these factors. To address the factor of awareness, respondents were asked if they were aware of drop-off and curbside recycling programs in their respective areas (Questions #14 and 15). The responses were then measured by the frequency of "yes" responses and then were analyzed using chi-square analysis to determine significance. Additionally, to address the behavior factor, respondents were then asked if they participated in a recycling program and what types of materials they recycled (Questions #16 and 17). The responses were measured in the same manner as the awareness factor using frequency and chi-square analyses.

To analyze the paired attitudes between respondents' profession and by state chi-square analyses were conducted. A p-value was also calculated to determine if the difference between the professions and states were significant. Attitudes toward various aspects of recycling were used in the chi-square test analysis: (a) landfills reaching capacity (Questions #1-3), (b) importance of recycling various materials such as newspapers, aluminum, glass, plastic, and paper (Questions #4-8), (c) belief that the environment is helped by recycling each of these materials (Questions #9-13). In the same way, attitudes toward in-home recycling centers were used in the chi-square test analysis: (a) important to have an area to separate recyclable material (Question #18), (b) recycling center in the home would make separating recyclable material more convenient (Question #19), (c) recycling center in the home would encourage recycling by the occupants in the home (Question #20).

The subject of recycling centers related to the respondents' professions was measured by a series of questions. One question (Question #24) addressed whether respondents used "a set of questions of checklist of features to be included in the home design" (1 = never, 5 = always, 6 = "I do not have contact with the client," 7 = other). Another question (Question #27) addressed "how often to clients request a section of cabinetry in an area of a home that allows easy sorting of recyclables" (1 = never, 5 = always, 6 = other). Another question (Question #28) served to measure how often the respondents "proactively incorporate[d] a section of cabinetry in an area of a home that allows easy sorting of recyclables" (1= never, 5 = always, 6 = other). Responses 1 through 5 of these questions (#24, 27-28) were treated as a Likert-type scale statements and were analyzed using mean scores and chi-square analysis.

Open-ended responses were analyzed using content analysis to identify key terms. The key terms were grouped into categories, such as location of recycling centers and type of recycling center. Each category was assigned a numerical code for data analysis.

CHAPTER IV

TWO PERSPECTIVES OF IN-HOME RECYCLING CENTERS

MANUSCRIPT FOR PUBLICATION

JOURNAL TITLE: HOUSING AND SOCIETY

Tracy Parker

Dr. Cheryl A. Farr

Dr. Donna Branson

Mrs. Carol Bormann

Oklahoma State University

Introduction

Landfill depletion, global warming, and ozone depletion have become serious environmental concerns in the last several decades. With increased population, humankind must become more concerned with conserving the earth's resources in order to preserve the environment for future generations. The United States Environmental Protection Agency (EPA) reported that approximately 220 million tons of MSW were generated in 1998, a four million ton increase from 1997 (Environmental Protection Agency, 2000 April). This translates to each person generating approximately 4.46 pounds of MSW daily (Environmental Protection Agency, 2000 April). McCarty and Sherman, as quoted by Oskamp (1995a) reported that the United States makes up 5% of the world population, uses one-quarter of the available energy in the world, and creates more waste than any other nation.

Despite this increase, solutions for decreasing the amount of solid waste generated have been presented. After being advocated by the United States Environmental Protection Agency (EPA) in 1992, the process of reducing, reusing, and recycling products and materials has received great attention and support. One process in particular that researchers have addressed is recycling. Recycling not only reduces the amount of solid waste deposited into landfills, it also conserves our natural resources and reduces the amount of air and water pollution generated from manufacturing new products from virgin materials (Environmental Protection Agency, 2000 April).

Thirty years ago, Victor Papanek (Mackenzie, 1997) argued that a designer was in a powerful position and had two choices. These choices were to either create a better world or aid in increased destruction of the planet. His views were not popular with the design community at

that time, however, his words should be addressed now that these concerns are being recognized by people around the world (Mackenzie, 1997).

The purpose of this study was to identify the existence of in-home recycling centers in new home construction as well as the attitudes of design professionals in promoting such spaces in order to support recycling behavior of homeowners. The first phase of the project identified the types and prevalence of in-home recycling centers in new homes in specific areas of Oklahoma. Assessment of this phase included the location of the recycling center in relation to "waste generating" areas and adequate volume of the recycling center based on the number of bedrooms in the home. The second phase of the project identified professionals' views and awareness of in-home recycling centers in new home construction. Assessment of this phase included determination of the attitudes of the professionals toward environmental behavior as well as their role in implementing recycling centers into their projects.

The specific objectives were:

1. To identify the types and prevalence of each type of in-home recycling centers in homes in specific areas of Oklahoma.
2. To identify and compare the attitudes and beliefs of architects, interior designers, and home builders in Oklahoma and Minnesota toward environmental factors regarding recycling, recycling behavior, and in-home recycling centers.
3. To identify and compare the willingness of architects, interior designers, and home builders to promote and incorporate in-home recycling centers in new home construction in specific areas of Oklahoma and Minnesota.

Municipal Solid Waste

Municipal solid waste has steadily increased in the last three decades. Raymond De Young (1988-1989) reported that the amount of waste discarded by Americans was over 125 million tons in 1971 and increased to over 160 million tons in 1988. In 1998, the amount of

waste generated was 220 million tons (Environmental Protection Agency, 2000 April). In 1992, the EPA challenged Americans to produce less waste by incorporating the "3 R's" into their lives, now commonly know as "reduce, reuse, and recycle" (Environmental Protection Agency, 2000 April). The first part of this process is reducing which serves to use less packaging and products. The second part of this process involves reusing products several times, such as plastic and glass containers, instead of discarding the products into the garbage. The third part of this process is recycling discarded products or materials in order to create new products (Oskamp, 1995b).

Source reduction, or waste prevention, involves limiting the amount of products consumed and discarded and includes designing products and packaging that reduce the amount of materials used (Environmental Protection Agency, 2000 January 3). The Society of the Plastics Industry reported that the amount of plastic used for a one gallon HDPE milk container has decreased from 120 grams in the 1960's to 65 grams in the 1990's (Environmental Protection Agency, 2000 April). In addition, The Aluminum Association (2000b) reported that 22 cans were manufactured from one pound of aluminum in 1972 and increased to 32 cans manufactured from the same amount of aluminum in 1997 (Environmental Protection Agency, 2000 April). Source reduction is actually the preferred method for managing solid waste because it serves to reduce the amount of material used to manufacture a product initially (Environmental Protection Agency, 2000 January 3).

Reducing and reusing are important steps in reducing solid waste, because the more reducing and reusing of products occurs, the less recycling will have to be utilized (Oskamp, 1995b). Reusing involves the repeated use of products through repairing, donating, or selling the products. Reusing products is a more favorable approach to reducing waste than recycling, because reprocessing the product before manufacturing a new product is unnecessary. (Environmental Protection Agency, 2000 January 3).

Recycling involves separating, collecting, and processing used materials in order to manufacture a new product from a material that otherwise would have been deposited into a

landfill. Recycling reduces the amount of municipal solid waste deposited into landfills. In addition, recycling also conserves our natural resources and reduces the amount of air and water pollution generated from manufacturing new products (Environmental Protection Agency, 2000 April).

Boeck & Parker (1995), quote the Useless Stuff Report which reported that since the first Earth Day in 1970, the amount of solid waste recycled or composted increased from 7% to 22% from 1970 to 1993. The EPA (2000 April) reported that 28.2% of solid waste was recycled in 1998. The recycling of specific products such as aluminum, paper, and plastic has also increased significantly over the past thirty years. The Aluminum Association (2000a) reported that 1.5 billion cans (15.2%) were recycled in 1973 and increased to 63.9 billion cans (62.5%) recycled in 1999. In addition, the weight of the aluminum can has been reduced by 52% since 1972 and continues to be reduced (Aluminum Association, 2000).

The recycling of paper products has also increased in the past several decades. "Paper Recovery Statistics" (2000, August) cites the American Forest and Paper Association (AF&PA) as reporting the recovery rate for paper being 45% in 1999. AF&PA reported that 98,000 tons of recovered paper was used to produce paper in 1990, which increased to 150,000 tons in 1998. Manufacturing paper from recovered materials saves 60% of the energy required to manufacture paper from virgin materials. (Oskamp, 1995a,b).

The Earth Works Group offers two reasons that promote recycling which are cited by Oskamp (1995a,b) and Oskamp et al. (1991). First, recycling saves precious natural resources such as oil and bauxite. Carolina Pad reported that manufacturing one ton of paper from exclusively recycled paper scrap rather than virgin wood saves 17 trees, 7,000 gallons of water, 4,100 kilowatt hours of energy, and three cubic yards of landfill space (Hall & Ward, 1995 March 9). Earth Works Group also reported that producing aluminum products from recycled aluminum material results in a 95% reduction in the energy required to manufacture the same product from mined bauxite. Recycling also reduces air and water pollution by the same percentage (95%).

Second, the recycling of glass saves additional resources as stated by Earth Works Group. In addition, the manufacturing of glass from recycled materials rather than virgin glass saves 30% more energy, decreases air pollution by 20% and water pollution by 50% (Oskamp, 1995a,b; Oskamp et al., 1991).

Based on the amount of waste generated and recovered, the EPA (2000 April) reported a 28.2% recovery rate, or approximately 61 million tons of MSW in 1998. However, the EPA (2000 April) also estimated that residential waste generates between 55% and 65% of the total municipal solid waste. Many communities and individuals throughout the United States recycle, however, encouraging the majority of the U. S. population to regularly recycle household waste is critical. Recycling household waste must become a habitual activity to significantly impact the environment (De Young, 1988 - 1989). Knowledge of the recycling process allows people to understand what becomes of recycled materials after collection.

Recycling Process

Recycling is a three-step process that involves collecting and processing of used materials, manufacturing products containing the recycled content, and ultimately purchasing the products (Environmental Protection Agency, 2000 January 3). The first step of the recycling process involves collecting materials from communities through one of four methods such as drop-off sites, curbside recycling programs, buy back centers, or refund programs. The materials are then processed at material recovery facilities and sold to manufacturers to continue the recycling process (Environmental Protection Agency, 2000 April).

The second step of the recycling process involves the manufacturing of the processed material into a new product. The third step of the recycling process involves consumers purchasing products manufactured of recycled material. This step is also referred to as "green buying" and is defined as purchasing that is respectful of the environmental impact of the product

(Oskamp, 1995b). Each consumer, both individual and corporate, must contribute to each step of this process in order to benefit the environment. (Environmental Protection Agency, 2000 April).

Comparison of State Recycling Statistics

According to Biocycle's (Glenn, 1998 April) State of Garbage Survey, the percent of garbage recycled (including yard trimmings composting) has increased from eight percent in 1990 to 30 % in 1998. Much of this increase can be attributed to state recycling programs. The State of Garbage Survey (Glenn, 1998 April) listed recycling data for each of the fifty states as well as the District of Columbia. The recycling rates for the states ranged from the lowest rate of 5% in Wyoming to the highest rate of 48% in Washington. The number of states and recycling percentage rates are as follows: four states recycled between 0-9%; 11 recycled between 10-19% range; 16 states recycled between 20-29%; 11 states recycled between 30-39%; and 7 states recycled between 40-49%. The state of Oklahoma falls within the next to lowest category with a 12% recycling rate. However, Minnesota falls within the highest category with a 42% recycling rate (Glenn, 1998 April). Due to the large difference in recycling rates of these states, professionals from Oklahoma and Minnesota will be compared in this research study.

The State of Garbage Survey (Glenn, 1998 April) also listed statistics for the number of curbside programs and the population served with such programs for each state. The number of curbside programs listed for each state ranged from zero to 1, 472 curbside programs. The number of states and number of curbside programs are listed as follows: 12 states with 0-9 programs, 11 states with 10-49 programs, 6 states with 50-99 programs, 9 states with 100-199 programs, 2 states with 200-299 programs, 2 states with 300-399 programs, 2 states with 400-499 programs, 2 states with 500-599 programs, 1 state with 600-699 programs, 1 state with 700-799 programs, 1 state with 800-899 programs, zero states with 900-999 programs, and 1 state with 1000+ programs (Glenn, 1998 April). The state of Oklahoma falls within the lowest category with 7 curbside recycling programs serving a population of 522,000. Minnesota falls within the

fourth highest category with 731 curbside recycling programs serving a population of 3,520,000 (Glenn, 1998 April).

A direct relation between the number of curbside programs and state recycling rate was not found, however. Some of the states with the highest number of curbside programs did not necessarily have the highest recycling rate percentage. One must note that this survey (Glenn, 1998 April) did not include the number of drop-off sites in the state that would also account for the amount of garbage recycled in each of the states. Despite curbside recycling and other programs offered to the population in each state, many factors influence why people do or do not engage in recycling household waste. Researchers have studied many factors in order to determine the influences promoting or inhibiting human recycling behavior.

Factors Influencing Human Behavior and Recycling

Previous research has focused on what promotes recycling behavior in people. These studies have revealed many factors concerning the influences and motivations of those who recycle and those who do not recycle. These factors can be grouped into external factors and internal factors.

External factors

External factors for recycling involve those factors that exist outside the home that influence the motivation to recycle. Social influence from the community or neighborhood has been found to influence recycling behavior. (Vining et al., 1992; Vining & Ebreo, 1990; De Young, 1988-1989). Likewise, Boldero (1995) found that recyclers held stronger beliefs than non-recyclers that their friends, neighbors, and social council favored them recycling their newspapers, therefore, the recyclers noted that they were more likely to conform to the beliefs of their community.

Another external factor that has been found to influence recycling behavior involves the convenience of the recycling program available to individuals. Boldero (1995) and DeYoung (1988-1989) found that effort is a significant barrier for active recycling behavior. However, the addition of a curbside recycling program in a community has been shown to increase recycling behavior (Vining & Ebreo, 1990).

Internal factors

Internal factors for recycling involve those factors that exist inside the home that influence the motivation to recycle. The first internal factor that has been found to effect recycling behavior is social influence from family members. Vining and Ebreo (1990) defined this type of social influence as either the concern for the family's beliefs about recycling or the positive or negative social support from the members of the household for environmental behaviors.

A second factor found to determine recycling behavior is knowledge and education about recycling. De Young (1988-1989) suggests that to promote recycling, individuals should be educated as to the extent of the waste problem in the United States. Boldero (1995) suggested that in order to increase positive environmental attitudes and increase recycling behavior, implementing simple recycling programs with which individuals can receive hands-on experience may increase environmental concern. Vining & Ebreo (1990) found that those with increased knowledge about recycling behavior as well as those who were more familiar with products that could be recycled were more likely to recycle. Vining & Ebreo (1990) also found that a community education program about recycling increased the concern for the environment and became a motive for recycling.

A third factor that has been found to be a significant factor in recycling behavior is concern for the environment (Vining et al., 1992; Vining & Ebreo, 1990). The research of Vining et al. (1992) supported previous research in that environmental altruism, or the concern for the

welfare of the environment, was the highest rated motivational factor for recycling. Vining & Ebreo (1990) found that education through a community recycling program influenced the participants and resulted in greater environmental concern as well as recycling behavior.

A fourth factor found to be significant in discouraging recycling behavior is the perception of the recycling process as inconvenient or time-consuming. Vining and Ebreo (1990) found that an important reason not to recycle resulted from the time and trouble involved in preparing, storing, and transporting the materials. They also noted that even if an individual believes that recycling is important, the time and space required for recycling might override such beliefs. Vining et al., (1992) found that personal inconvenience and the available household storage were rated behind altruism in order of importance. Oskamp et al. (1991) found that the type of household an owner resides in could influence the owners' recycling behavior. Perhaps this is due to the fact that the latter accommodations are small, resulting in limited space for multiple recycling bins (Boldero, 1995).

Factors useful for design professionals

Each of these factors, both external and internal, were found to be significant with consumers concerning their recycling behavior. Architects, interior designers, and builders should consider many of these factors because these professionals are providing a product for the American consumer as well. These factors were considered when designing the research study.

Theoretical Framework

The theory of reasoned action (Ajzen & Fishbein, 1980) served as a framework for this study. Several studies have been conducted concerning recycling behavior using this model. The theory of reasoned action states that behavioral intentions are the result of a person's attitudes, a person's feelings about a behavioral act, a person's perceptions of a subjective norm, and a

person's beliefs about others' views of the behavior (Schultz & Oskamp, 1996; Goldenhar & Connell, 1992-1993; Madden et al., 1992).

Theory of Reasoned Action

Ajzen and Fishbein's (1980) theory of reasoned action serves to predict and understand a person's behavior. In order to predict a person's behavior, one must identify a certain behavior and measure the given behavior. After the behavior has been defined, the process of determining what leads to the performance of the behavior can be identified. According to the theoretical framework, behavioral intentions immediately precede a behavior, thus defining intention as a determinant of the final action. However, a person's intention includes a personal determinant and a social determinant that must be considered as well (Ajzen & Fishbein, 1980).

Theoretical Framework and Recycling Behavior

Goldenhar & Connell (1992-1993) used the theory of reasoned action to understand and predict recycling behavior. They found that the intention to behave and previous behavior are important predictors of future behavior. They suggest that to increase the intention to recycle, people should be educated about the importance of recycling and the recycling programs should be convenient.

Boldero (1995) used the theory of reasoned action as well as the theory of planned behavior to predict the household recycling of newspapers. She noted that past researchers had found that behavior was more predictable if the intention was stable. However, this link may be broken if information or other events are introduced that change the initial intention (Madden et al., 1992). The intention-behavior link was also influenced by situational factors. Boldero (1995) noted that if one perceives recycling as inconvenient, this attitude could affect the intention and/or behavior. Boldero (1995) also noted differences between recyclers and non-recyclers. She reported that the subjective norms of recyclers were greater than non-recyclers. Non-recyclers had stronger attitudes relating to recycling being inconvenient and time-consuming.

Boldero (1995) found that to increase recycling behavior, the issues of storage space, effort, and education should be addressed so that people will be more motivated to recycle.

Methods

The purpose of this study is to determine the existence of in-home recycling centers in new home construction in specific areas in the states of Oklahoma and Minnesota. The objectives of this research are to determine the types of in-home recycling centers as well as the willingness of architects, interior designers, and contractors to incorporate in-home recycling centers into their projects. Based on the findings of this study, recommendations will be made as to how to increase the incorporation of recycling centers in order to promote recycling behavior.

Description of the Sample

Phase 1

The sample used in this research consisted of on-site observations of new home construction in metropolitan areas of Tulsa and Oklahoma City. The observations included the following information for each home: 1) the location of the home; 2) the approximate square footage of the home; 3) the approximate price range of the home; and 4) the existence of an in-home recycling center in the home. The instrument was developed for consistency in data collection during and between the on-site observations.

Phase 2

The sample used in this research consisted of a random sample of architects, interior designers, and contractors in the Tulsa and Oklahoma City areas of Oklahoma as well as in the Minneapolis and St. Paul area of Minnesota. A proportionate random sample of Oklahoma architects was selected through a membership list of the American Institute of Architects (AIA) obtained from the AIA website. Due to the large number of AIA members listed, a proportionate sample of AIA members was taken to limit the skewing of data. A total of 72 architects from the

greater Tulsa area and 71 architects from the greater Oklahoma City area were selected randomly, resulting in a total of 37% of the members listed.

Likewise, a membership list for members of the Minnesota AIA was obtained through the AIA website. However, this membership list contained only firm names and did not contain specific names of architects. The 51 companies with e-mail addresses listed on the website were contacted in order to request contact names. Of the 51 companies contacted via e-mail, only 17 (33.3%) had responded by the scheduled time of the mailing. Of the firms that responded, 15 were from the Minneapolis area and 2 were from the St. Paul area. The individuals identified in Minneapolis and St. Paul were included in the survey. Other sources used to identify AIA architects identified firms, not individuals, and did not provide e-mail addresses. The other sources included internet searches and the yellowpages.com website. Individuals identified as architects, but not identified as AIA architects were not contacted. In summary, the distance from the state of Minnesota created an obstacle for identifying AIA architects in Minneapolis and St. Paul. In addition, the limited budget for this self-funded project was another obstacle. As very few 800 numbers were listed, electronic mail was chosen as the form of contact due to the established budget for the research project.

A sample of Oklahoma interior designers was selected through the American Society of Interior Designers (ASID). The sample was taken from the ASID Chapter Alpha Roster for Oklahoma updated on July 31, 2000. Of the 203 Oklahoma members, 90 were allied practitioners and 113 were professional members. All of the members from the allied practitioners and the professional members who were identified as practicing in the greater Tulsa or Oklahoma City areas were selected for the survey, resulting in 67 members from the greater Tulsa area and 67 members from the greater Oklahoma City area.

A membership list for the Minneapolis and St. Paul ASID chapter was obtained through a current member of the chapter. A proportionate random sample was selected from those members in the Minneapolis and St. Paul area so as not to skew the data of the Minnesota

architect and home builder samples. Of the 135 total Minnesota ASID members, 20 interior designers were selected from the Minneapolis area and 22 interior designers were selected from the St. Paul area.

Finally, a random sample of home builders was selected through membership lists from the Tulsa and Oklahoma City chapters of the National Home Builders Association (NHBA). For the Tulsa home builder population, a membership list was obtained from the office of the Home Builders Association of Greater Tulsa. All members listed in the Tulsa area with residential projects were selected, resulting in a total of 84 members. For the Oklahoma City home builder population, a membership list was obtained from the NHBA website listing members in the central Oklahoma area. All members listed in the Oklahoma City and Edmond area were selected, resulting in a total of 77 members.

A membership list for the Home Builders Association of the Twin Cities was obtained through the NAHB website. However, only some of the listings of home builders contained contact names. All of the 16 firms in the Minneapolis and St. Paul area with addresses and contact names were included in the sample. Additionally, all companies with e-mail addresses were contacted to identify specific individuals within the firm. A total of 25 companies were contacted via e-mail in order to request contact names. A total of 7 companies replied with contact names by the scheduled time of the mailing. Thus, a total of 22 members were included in the survey.

Instrument Development

Phase 1

The instrument for the first phase of data collection included spaces for the following information: 1) the location of the home; 2) square footage of the home; 3) price range of the home; and 4) presence of a recycling center in the home. If an in-home recycling center was present, a space to note the characteristics of the recycling center was provided. To understand

the current situation for in-home recycling centers, the data observed from the Tulsa and Oklahoma City on-site observations were analyzed. These data are presented in Chapter 3, Methods, because the data were collected to assist in the development of the instrument that was used for the mailed survey described in Phase 2.

Phase 2

The information gathered from Phase 1 of this study as well as Dillman's (1978) Total Design Method was incorporated into the development of the instrument for the second phase of the study. The instrument was a self-administered questionnaire with items designed to elicit respondents demographic characteristics and professional information, as well as their attitudes towards recycling, incorporating in-home recycling center, and their behavior of incorporating in-home recycling centers into new home construction. Open-ended questions were used to allow respondents to make additional comments about the information covered in the questionnaire and to address any additional issues of concern regarding in-home recycling centers and recycling behavior.

Data Collection

Phase 1: On-site Observations

After identifying areas of new home construction from newspaper advertisements in each of the respective cities, the researcher traveled to selected metropolitan areas in Tulsa and Oklahoma City to administer the on-site observations survey. The same instrument was used for each site. To gather information concerning the amount of recycling centers existing in the state of Minnesota, the website Realtor.com was used to search for new homes in the Minneapolis and St. Paul metropolitan areas.

Realtor.com is a website offering information concerning all aspects of the moving process from locating a home to moving and so on. This website was used for Phase One of the

research project to gather information on homes in the Minneapolis and St. Paul metropolitan areas of Minnesota. The home page of Realtor.com listed several options for locating property. First, the "find a home" link was chosen which then led to a page to choose the state and area in which one was interested. The state of Minnesota was entered which then led to a page displaying a map of the state. From this map, "Minneapolis and St. Paul" was chosen. This choice led to a page where individual areas could be selected. The first search was conducted using the choice of "Minneapolis and near suburbs" and the second search was conducted using the choice of "St. Paul and Ramsey County." Once the state and area were selected, criteria for the housing type was selected. First, "single family home(s)" was selected from the property type option. Under the general search criteria, options of price range, minimum number of bedrooms/bathrooms, and minimum square footage was selected. For each search, the same criteria was used: $150, 000 - $500,000, minimum of three bedrooms, minimum of 1 bathroom, and minimum square footage of 2000. Other preferences listed general home features where "newer home (0-5 years)" was selected as well as interior features where none of the features listed were selected. Examples of features in this section included options such as a fireplace, den/study, and basement. Recycling centers were not listed as an option in this section. Since a recycling center could be located in a garage, "one or more car garage" was selected from the exterior features listed. After entering the above criteria the search was conducted. For the Minneapolis and near suburbs search, a total of 246 homes were listed. For the St. Paul and Ramsey County search, a total of 208 homes were listed. For each of the searches, recycling centers were not listed for any of the homes. However, other features were listed in the home descriptions besides those features that could have been selected in the interior features criteria. These additional features included a jetted bathtub, master bathroom, sun room, and central vacuum system. Therefore, even though recycling centers were not listed as an option in the interior features section, there was still a possibility that this option could have been displayed in the home description.

Phase 1: Analysis of On-site Observations

Following the collection of data from on-site observations of new home construction, the data were grouped by location and price range of the home. The data were analyzed based on the presence of an in-home recycling center and the characteristics of a home containing an in-home recycling center. These characteristics were noted as follows: (1) location of recycling center (i.e. room); (2) how the recycling center is contained (i.e. pull-out bin); (3) number of receptacles; (4) description of receptacles (i.e standard garbage bin, custom); (5) cubic feet of storage of the bin/recycling center.

A total of 66 new homes in the greater metropolitan areas of Tulsa and Oklahoma City were observed. Homes were located within city limits of Tulsa and surrounding suburbs and within the city limits of Oklahoma City and surrounding suburbs. A total of 38 (57.6%) homes were observed in the Tulsa area and 28 (42.4%) were observed in the Oklahoma City area. A total of 66 homes were observed. In the Tulsa area, 26 (76.5%) homes were located inside the city limits and 12 (37.5%) homes were located in suburbs. In the Oklahoma City area, 8 (23.5%) homes were located inside the city limits and 20 (62.5%) homes were located in suburbs.

Along with price ranges of the homes, the presence of an in-home recycling center was also documented in phase one of the study. Of the 28 homes observed in the Tulsa area, 5 homes contained an in-home recycling center. All of the homes that contained an in-home recycling center were located in the Tulsa city limits and included the same characteristics. In all of these homes, the recycling centers were located in the kitchen, immediately to the left or right of the sink. In addition, the centers were designed as under-counter pull-out bins and contained pre-cut areas to accommodate two 45-quart waste baskets. The price range and characteristics of the homes that contained an in-home recycling center are as follows: 1) $270,000 with 2700 square feet and four bedrooms; 2) two homes priced at $284,000 with 3300 square feet and four

bedrooms; 3) $320,000 with 3300 square feet and four bedrooms; and 4) $385,000 with 3900 square feet and five 5 bedrooms.

In the Oklahoma City area, one home contained an in-home recycling center. The home that contained an in-home recycling center was located in an Oklahoma City suburb. The recycling center was located in the kitchen, immediately to the right of the sink. Like the centers in the Tulsa area, the center was designed as an under-counter pull-out bin and contained two pre-cut areas to accommodate 45-quart waste baskets. The home that contained the in-home recycling center was priced at $238,500, included 2625 square feet and four bedrooms.

Phase 2

For the data collection of architects, interior designers, and contractors, the instrument was mailed to the selected respondents with a cover letter describing the purpose of the questionnaire and assuring the respondents of their privacy. The collection process followed Dillman's (1978) method of data collection. The respondents selected for participation received a pre-mail letter notifying them that they had been selected to participate in the study and also described the purpose of the study. A pre-mail postcard was mailed five days later, which informed the respondents that a questionnaire packet would arrive a few days later. The instrument was mailed three days later and was accompanied by a cover letter describing the purpose of the questionnaire and assuring the respondents of their privacy. Follow-up postcards were mailed to the respondents four and eight days after the initial mailing of the questionnaires. The instruments were returned to the researcher for coding.

Data Analysis

Following the data collection process, the data from the survey were coded using an Excel File. This file was then imported into the SAS Statistical Package for further analysis.

Before analysis, data were checked for coding and entry errors, which were identified and corrected.

A correlation analysis was used to analyze the relationships between the variables of attitude toward recycling and attitude toward the importance of in-home recycling centers. The recycling attitude of the respondents was measured by an individual's response to a series of Likert-type questions (#1-13) ranking the respondent's attitude toward various aspects of recycling (1=strongly disagree, 7=strongly agree).

Attitude towards in-home recycling centers was measured in the same manner as the recycling attitude. Respondents responded to a series of seven point Likert-type scale questions (#18-20) ranking the respondent's attitude toward the importance of an in-home recycling center in relation to convenience and encouragement of recycling behavior.

To measure the recycling awareness and behavior of the respondents, a series of questions addressed each of these factors. To address the factor of awareness, respondents were asked if they were aware of drop-off and curbside recycling programs in their respective areas (Questions #14 and 15). The responses were then measured by the frequency of "yes" responses and then were analyzed using chi-square analysis to determine significance. Additionally, to address the behavior factor, respondents were then asked if they participated in a recycling program and what types of materials they recycled (Questions #16 and 17). The responses were measured in the same manner as the awareness factor using frequency and chi-square analyses.

To analyze the paired attitudes between respondents' profession and by state chi-square analyses were conducted. A p-value was also calculated to determine if differences between the professions and states were significant. Attitudes toward various aspects of recycling were used in the chi-square test analysis: (a) landfills reaching capacity (Questions #1-3), (b) importance of recycling various materials such as newspapers, aluminum, glass, plastic, and paper (Questions #4-8), (c) belief that the environment is helped by recycling each of these materials (Questions #9-13). In the same way, attitudes toward in-home recycling centers were used in the chi-square

test analysis: (a) important to have an area to separate recyclable material (Question #18), (b) recycling center in the home would make separating recyclable material more convenient (Question #19), and (c) recycling center in the home would encourage recycling by the occupants in the home (Question #20).

The subject of recycling centers related to the respondents' professions was measured by a series of questions. One question (Question #24) addressed whether respondents used "a set of questions of checklist of features to be included in the home design" (1=never, 5=always, 6="I do not have contact with the client," 7=other). Another question (Question #27) addressed "how often clients request a section of cabinetry in an area of a home that allows easy sorting of recyclables" (1=never, 5=always, 6=other). Another question (Question #28) served to measure how often the respondents "proactively incorporate[d] a section of cabinetry in an area of a home that allows easy sorting of recyclables" (1=never, 5=always, 6=other). Responses 1 through 5 of these questions (#24, 27-28) were treated as a Likert-type scale statements and were analyzed using mean scores and chi-square analysis.

Open-ended responses were analyzed using content analysis to identify key terms. The key terms were grouped into categories, such as location of recycling centers and type of recycling center. Each category was assigned a numerical code for data analysis.

RESULTS AND DISCUSSION

Characteristics of the Respondents

Of the 544 survey packets mailed, 437 were sent to architects, interior designers, and home builders in Oklahoma and 107 were sent to architects, interior designers, and home builders in Minnesota. A total of 27 survey packets were returned due to either an incorrect address or an expired forwarding order. Of the 160 surveys returned, 134 were returned by Oklahoma professionals and 26 were returned by Minnesota professionals. Three surveys from Oklahoma

professionals were unusable; therefore, a total of 157 surveys were used for this study. The overall response rate was 30.5%.

Several tables present the demographic characteristics of the total respondents by profession and by state. Table 1 presents a comparison of the respondents by profession. Architects made up 28.7% (n=45) of the total respondents. Approximately 86% of architects had attained either a bachelor's or master's degree. A majority of the architects (76.5%) had practiced as a professional between 11-40 years. Interior designers made up 41.4% (n=65) of the total respondents. Approximately 90% of the interior designers had attained a bachelor's or master's degree. The majority of interior designers (66.2%) had been a practicing professional between 1-20 years. Home builders made up 29.9% (n=47) of the respondents. The largest percentage of home builders (40.4%) had attained a bachelor's degree with the next highest percentage (29.8%) completing some college. The majority of home builders (70.2%) had been practicing professionals between 20-40 years.

Insert Table 1 here

Table 2 presents a comparison of the respondents by state. The majority of Oklahoma respondents (76.5%) held a bachelor's or master's degree. Likewise, the majority of respondents from Minnesota (80.3%) also held these two degrees. The length of professional practice for the majority of Oklahoma respondents (78.5%) ranged from 1-30 years. Likewise, the majority of Minnesota respondents had a similar length of professional practice with the majority (80.8%) ranging from 1-30 years.

Insert Table 2 here

Table 3 presents professional characteristics of the sample by profession. Over 50% of architects reported status of either owner or partner of the current company or firm with which they were employed. The majority of architects (68.9%) were employed with their company between 1-20 years. Likewise, a majority of interior designers (43.1%) reported being an owner of the current company with which they were employed. The majority (84.6%) of interior designers were employed with their current company for 1-20 years. Home builders held a majority of upper management positions (44.7%) as well as ownership (36.2%) of the company with which they were currently employed. A split majority occurred among the home builder population with 34.0% being employed between 0-10 years, while 31.9% had been employed between 21-30 years with their current company.

Insert Table 3 here

Table 4 presents professional characteristics of the sample by state. The majority of each group of respondents from Oklahoma (52. 7%) and Minnesota (42.3%) held ownership status within the current company with which they were employed. In addition, the majority of each group of respondents from Oklahoma (40.5%) and Minnesota (50.0%) had 1-10 years of employment with the current company.

Insert Table 4 here

Involvement with various types of residential and other types of projects was identified and is presented by profession in Table 5. A large percentage of architects (56.8%), interior designers (66.1%), and home builders (93.6%) were involved in a single-family residential

project within the last year. However, the largest percentage of projects for architects (72.73%) and interior designers (69.35%) were commercial and/or retail in nature. Within the last five years, architects (59.1%) interior designers (67.2%), and home builders (91.5%) reported being involved in single family residential projects. However, within the last five years, architects (84.1%) and interior designers (79.7%) had the highest percentage of projects within the commercial and/or retail area. Overall, home builders had the most amount of residential business with 93.6% reporting having between 76-100% of residential projects. Interior designers had a split majority with 35.4% reporting between 76-100% residential business and 38.5% reporting only 0-25% of residential business. Architects had the lowest percentage of residential business with 68.9% reporting only 0-25% of residential business.

Insert Table 5 here

Involvement with various types of residential and other types of projects completed in the last year and the last five years was identified and are reported by state in Table 6. A majority of respondents from both Oklahoma (64.9%) and Minnesota (96.2%) reported having at least one single-family residential project within the last year. Likewise, a majority of respondents from Oklahoma (65.7%) and Minnesota (100. 0%) both reported having at least one single-family residential project within the last five years. In all, the majority of respondents from Oklahoma (43.5%) and Minnesota (65.4%) reported having between 76-100% of residential business.

Insert Table 6 here

Recycling Attitudes and Beliefs About Landfills and Recycling

The general recycling attitudes and beliefs of the respondents by profession were identified and analyzed by profession (see Table 7) and by state (see Table 8). Aspects of recycling were identified in terms of attitude toward landfill capacity, attitude toward the importance of recycling materials, and the belief that recycling materials helps the environment. The highest possible score was a 7, indicating strong agreement; the lowest possible score was a 1, indicating strong disagreement.

To answer the research question addressing the difference in attitudes and beliefs towards the state of landfills in the United States between architects, interior designers, and home builders, a series of statements were presented to the respondents concerning this issue and are presented in Table 7. The overall mean scores for all respondents combined are presented in Table 8. The belief that landfills were in danger of reaching maximum capacity had a mean score of 5.03 for all professions (see Table 8). Interior designers (5.34) and architects (5.00) each had higher mean scores than home builders (4.64). The concern that landfills are reaching maximum capacity had a mean score of 5.35 for all professionals (see Table 8). Interior designers (5.62) and architects (5.40) each had a higher mean score than home builders (4.94). The belief that recycling would keep landfills from reaching capacity had a mean of 5.15 for all professionals (see Table 8). Interior designers had the highest mean of all groups of professionals with a mean score of 5.46, while architects and home builders had mean scores of 4.96 and 4.91 respectively (see Table 7).

Insert Table 7 here

Insert Table 8 here

To address the research question regarding the difference in attitudes and beliefs towards the importance of recycling materials among and between architects, interior designers, and home builders is presented by profession and state in Table 7. Respondents were asked to rate their agreement or disagreement with a series of statements addressing their attitudes toward the importance of recycling materials such as newspapers, other types of paper, aluminum, glass, plastic, and paper. The highest possible score was a 7, indicating strong agreement; the lowest possible score was a 1, indicating strong disagreement. Interior designers had the highest mean scores and lowest standard deviation concerning the importance of recycling each of the materials listed (see Table 7). Each of the mean scores for interior designers ranged from a 6.25 on the importance of recycling other types of paper to a 6.34 on the importance of recycling aluminum. Architects had the next highest mean scores on each of the materials listed ranging from 6.02 for glass to 6.27 aluminum. Home builders had the lowest mean scores and highest standard deviation on each of the materials listed with scores ranging from 5.57 for other types of paper to 5.70 for aluminum and plastic. A significant difference was identified between architects, interior designers, and home builders concerning attitudes toward the importance of recycling other types of paper and is noted in Table 7.

Likewise, the respondents' beliefs that "the environment is helped by recycling materials" are presented by profession in Table 7 and were parallel to the attitudes toward the importance of recycling addressed previously. Interior designers held the highest mean scores (6.11 to 6.25) and lowest standard deviation on each of the items addressed. Home builders held the lowest mean scores (5.51 to 5.74) and the highest standard deviation on each of the items addressed.

Data were also analyzed by state concerning the difference in attitudes and beliefs towards the state of landfills in the United States in Table 8. Respondents from Minnesota had a higher mean score than respondents from Oklahoma pertaining to the belief that landfills were in danger of reaching maximum capacity with the means scores of 5.43 and 4.95 respectively. Minnesota respondents (5.54) also had a higher mean score than Oklahoma respondents (5.31)

with the concern that landfills are reaching maximum capacity. Respondents from Minnesota had a slightly higher mean score than respondents from Oklahoma pertaining to the belief that recycling would keep landfills from reaching capacity with means of 5.19 and 5.15 respectively. However, there were no statistical differences between the states.

Data were analyzed by state regarding the respondents' attitudes toward the importance of recycling newspapers, other types of paper, aluminum, glass, plastic, and paper (see Table 8). Respondents from Minnesota had the highest mean scores and lowest standard deviation on the importance of recycling each of the materials listed with scores ranging from 6.38 and 6.50. These scores indicate that the level of agreement regarding the importance of recycling each of the materials listed was strong. Oklahoma respondents had fairly strong attitudes toward the importance of recycling newspaper, other types of paper, glass, paper, and plastic with mean scores ranging from 5.94 to 6.05.

Data were analyzed by state regarding the respondents' beliefs that "the environment is helped by recycling materials" (see Table 8). Minnesota respondents held slightly stronger beliefs toward the statements regarding that the environment is helped by recycling the previously listed materials and held the highest mean scores (6.19 to 6.27) and lowest standard deviation on each of the materials listed. However, Oklahoma respondents held the lowest mean scores (5.87 to 6.04) on each of the items addressed.

Attitudes Toward In-Home Recycling Centers

Three separate tables present the difference in attitudes and beliefs towards the impact of in-home recycling centers among and between architects, interior designers, and home builders. The mean scores were calculated, analyzed and are presented in these three tables. The highest possible score was a 7, indicating strong agreement; the lowest possible score was a 1, indicating strong disagreement.

The mean scores of the attitudes toward the statement, "It is important to have an area in the home to separate recyclable material" are presented in Table 9. Interior designers (5.58) had the highest mean score regarding this statement. Architects and home builders followed with mean scores of 5.24 and 4.63 respectively. Significant differences were identified between comparison groups by profession (X^2=21.7931, p=0.0399) as well as by profession and state (X^2=42.0586, p = 0.0708).

Insert Table 9 here

The mean scores and chi-square analysis of respondents attitude toward the statement, "A recycling center would make separating recyclable material more convenient" is presented in Table 10. Again, interior designers had the highest mean score (6.08), indicating a high level of agreement. Architects (5.47) and home builders (5.34) followed with mean scores of 5.47 and 5.34 respectively. Table 10 also presents significant differences identified between comparison groups by profession (X^2=24.1847, p=0.0192) and by profession and state (X^2=46.8209, p=0.0259).

Insert Table 10 here

Respondents attitudes toward the statement, "A recycling center in the home would encourage recycling by the occupants in the home" are presented in Table 11. Interior designers had the highest mean score with 6.09. Architects and home builders followed with mean scores of 5.51 and 5.17 respectively. Significant differences were identified between each of the comparison groups by profession (X^2=22.7551, p=0.0299), by state (X^2=4.5021, p=0.0691), and by profession and state (X^2=41.5230, p=0.0786).

Insert Table 11 here

These three tables also compare respondents' attitudes toward various aspects of in-home recycling centers by state. Minnesota respondents had higher mean scores on 2 of the 3 statements. Regarding the importance of an in-home recycling center and the separation of recyclable material, Minnesota respondents had a higher mean score than Oklahoma respondents with scores of 5.38 and 5.17 respectively (see Table 9). However, Oklahoma respondents had a slightly higher mean score than Minnesota respondents when presented with the convenience factor of an in-home recycling center with mean scores of 5.69 and 5.65 respectively (see Table 10). Finally, Minnesota respondents had a higher mean score than Oklahoma respondents regarding the relationship between an in-home recycling center and encouragement of the home's occupants to recycle with mean scores of 5.77 and 5.63 respectively (see Table 11).

Recycling Program Awareness

The research question addressing the awareness of recycling programs in the Tulsa and Oklahoma City areas of Oklahoma by architects, interior designers, and home builders is summarized in Table 12. Among all Oklahoma respondents, 56.2% (n=73) were aware of a drop-off recycling program in his or her respective city. In Oklahoma, interior designers had the highest percentage of awareness (n=33, 63.5%) followed by architects (n=20, 55.6%) and home builders (n=20, 47.6%). However, among all professions in Oklahoma, a much higher percentage of respondents (n=104, 80.6%) were aware of the curbside recycling program in his or her respective city. Architects had the highest percentage of awareness (n=31, 88.6%) of a curbside recycling program, followed by interior designers (n=45, 86.5%) and home builders (n=28, 66.7%). Significant differences (X^2=7.8159, p=0.0201) were identified between architects,

interior designers, and home builders regarding their awareness of a curbside recycling program and are also presented in Table 12.

Insert Table 12 here

Recycling Behavior

The degree to which architects, interior designers, and home builders were participating in recycling programs in Tulsa and Oklahoma City is summarized in Table 13. Overall, 61.5% (n=80) of the Oklahoma respondents from Tulsa and Oklahoma City reported participating in some type of recycling program. However, 36.9% (n=48) of the respondents from Oklahoma did not participate in any type of recycling program. In Oklahoma, architects reported the highest rate of participation (25.0%, n=9) in the drop-off recycling program, which was followed by interior designers (17.31%, n=9) and home builders (11.9%, n=5). Recycling percentages were much higher for curbside recycling programs in Oklahoma. Interior designers reported the highest rate of participation (44.2%, n=23) in a curbside program, which was followed by architects (33.3%, n=12) and home builders (30.9%, n=13). In Oklahoma, home builders had the highest percentage (52.4%, n=22) of non-participation in a recycling program, followed by interior designers (32.7, n=17%) and architects (25.0%, n=9).

Insert Table 13 here

The frequency and chi-square analysis of the materials recycled by Oklahoma respondents participating in a recycling program is presented in Table 14. Newspaper was recycled at the highest rate (61.53%) by all Oklahoma professionals combined. Of the three

groups of Oklahoma professionals, architects had the highest rate (69.4%, n=25) of recycling newspaper, followed by interior designers (63.5%, n=33) and home builders (52.4%, n=22). Significant differences were identified between groups of professionals and the recycling of other types of paper (X^2=6.983, p=0.031), glass (X^2=5.060, p=0.080), and aluminum (X^2=6.079, p=0.048).

Insert Table 14 here

Minnesota respondents were questioned about their participation in a recycling program in the Minneapolis and St. Paul area. Although not statistically significant (X^2=1.040, p = 0.5945), 25 of the 26 (96.15%) Minnesota professionals surveyed reported participating in a recycling program. When asked "for what reason do you participate in this recycling program," a majority of the Minnesota respondents (n=23, 92.00%) specified they participated in order to reduce the amount of waste going to landfills. Only 3 of the 25 respondents (12.00%) indicated that the recycling program they participated in was mandatory.

Features of the Home Design

The mean scores regarding the incorporation of in-home recycling centers by design professionals are presented in Table 15. This table summarizes the question of whether design professionals use a set of questions or checklist of features to be included in the home design of a client. The question was arranged as a Likert-type scale responses ranging from 1=never; 2=rarely, 3=occasionally, 4=regularly, and 5=always. Additional responses included 6="I do not have contact with the client" and 7=other. However, only respondents reporting a 1-5 were analyzed into the mean score. As a whole, all respondents had a mean score of 3.34, indicating that respondents used a checklist of questions concerning the features of the home design slightly

more than occasionally. When data were analyzed by profession, architects had the highest mean score of 3.71 followed by home builders and interior designers with mean scores of 3.65 and 2.82 respectively. When the data were analyzed with all professions grouped by state, respondents from Minnesota had a slightly higher mean score than respondents from Oklahoma with mean scores of 3.60 and 3.28 respectively.

Insert Table 15 here

Of those respondents indicating that they used a checklist of questions concerning features to be included in the home design, additional questions were posed to determine if one of those questions concerned the incorporation of an in-home recycling center into the home. Overall, 37.5% (39 of 104) of respondents from Oklahoma and Minnesota reported including a question that concerned the incorporation of a recycling center into the cabinetry of a home. By profession, interior designers (17 of 35, 48.6%) and architects (15 of 32, 46.9%) had the highest frequency and percentage of including a question concerning an in-home recycling center followed by home builders (7 of 38, 18.4%). By state, respondents from Minnesota had a much higher frequency and percentage of including a question regarding the incorporation of a built-in recycling center than those from Oklahoma with 80.9% (17 of 21) and 26.2% (22 of 84) respectively.

Respondents were also asked whether they include a question to their clients concerning the incorporation of an area or space designed to hold free-standing containers to allow for easy sorting of recyclables. When data were analyzed as a whole, 41 of 106 (38.7%) of respondents reported including a question that concerned the incorporation of such an area or space. By profession, architects (17 of 33, 51.5%) and interior designers (14 of 38, 40.0%) had the highest frequency and percentage followed by home builders (10 of 38, 26.3%). By state, respondents

from Minnesota had a higher percentage and frequency of including questions regarding the incorporation of an area or space to hold free-standing containers to allow for recycling than respondents from Oklahoma with 60.0% (12 of 20) and 33.7% (29 of 86) respectively.

Client Request of an In-Home Recycling Center

The research question addressing how often clients of the respondents request an in-home recycling center is summarized and presented Table 16. The question was arranged as a Likert-type scale with 1=never and 5=always. An additional response included 6=other. However, only responses of 1-5 were analyzed into the mean score. As a whole, all respondents had a mean score of 2.06, indicating clients only rarely requested the incorporation of an in-home recycling center into their homes. When data were analyzed by both states by profession, interior designers reported clients requesting such centers with the highest mean score of 2.31 followed by architects and home builders with mean scores of 2.14 and 1.73 respectively. When the data were analyzed with all professions grouped by state, respondents from Minnesota reported clients requesting in-home recycling centers with a mean score of 3.32. Each group of professionals from Minnesota had mean scores ranging between 3-4, indicating that clients requested such centers occasionally to rarely. However, respondents from Oklahoma reported clients requesting in-home recycling centers between never or rarely with a mean score of 1.76.

Insert Table 16 here

Incorporation of In-Home Recycling Centers by Professionals

The answer to the research question regarding the proactive incorporation of in-home recycling centers by architects, interior designers, and home builders is summarized and

presented in Table 17. The question was arranged as a Likert-type scale with 1=never, 5=always, and 6=other. Only responses of 1-5 were analyzed into the mean score. As a whole, all respondents had a mean score of 1.99, indicating professionals only rarely incorporated in-home recycling centers into their home designs. When data were analyzed by profession, architects and interior designers reported incorporating such centers with the mean scores of 2.24 and 2.09 respectively followed by home builders with a mean score of 1.69. When the data were analyzed by state, respondents from Minnesota reported incorporating in-home recycling centers at a higher rate with a mean score of 3.50, which meant that the respondents incorporated in-home recycling centers into their designs occasionally to regularly. In addition, architects, interior designers, and home builders from Minnesota each had a mean score between the range of 3-4. However, respondents from Oklahoma reported incorporating in-home recycling centers at a much lower rate with a mean score of 1.66, which meant that the respondents incorporated in-home recycling centers never to rarely. Architects, interior designers, and home builders from Oklahoma each had a mean score between 1-2.

Insert Table 17 here

The percentage of projects containing an in-home recycling center reported by the respondents by profession and by state is presented in two separate tables. When grouped by profession, the largest percentages of all three professions reported incorporating recycling centers into home designs zero percent of the time. The next largest percentages for each group reported incorporating recycling centers into home designs only 1-25% of the time (see Table 18).

Insert Table 18 here

The percentage of projects containing an in-home recycling center reported by the respondents by state is presented in Table 19. The largest percentage of Minnesota professionals (56.5%, n=13) reported incorporating recycling centers into home designs between 51-100% of the time. However, the largest percentage of Oklahoma professionals (66.4%, n=79) reported incorporating recycling centers into home designs zero percent of the time (see Table 19).

Insert Table 19 here

Additional questions about the incorporation of in-home recycling centers by architects, interior designers, and home builders from Oklahoma and Minnesota concerned the types of homes into which these centers were designed as well as features of the centers. Of the respondents incorporating in-home recycling centers into home designs, the largest percentage (37 of 77, 48.05%) were incorporated into entirely custom home designs. The next highest percentages were incorporated into "all homes regardless of type" (16 of 77, 20.78%), "semi-custom homes" (12 of 77, 15.58%), and "model homes" (7 of 77, 9.09%).

The locations of the centers included the kitchen, pantry, garage, utility room, and laundry room. Most of the centers were located under the counter in pull-out containers, while others were free-standing containers. The number of containers or receptacles ranged from 1-5 with most centers containing 2-3 containers.

Conclusions and Implications

Results of the observations from phase one of this study revealed that only a small percentage of the homes observed in the Tulsa area (5 of 38, 13.16%) and the Oklahoma City area (1 of 28, 3.57%) contained in-home recycling centers, or cabinetry with areas for two or more bins to assist in separating recyclable material. Each of the homes that contained an in-home recycling center contained two pre-cut areas to accommodate two standard waste containeres. Since both Tulsa and Oklahoma City have areas with commingled curbside recycling programs, these types of in-home recycling centers would be adequate. One bin could be used to collect all recyclable material while the other bin could be used for perishable and/or non-recyclable material.

The framework for phase two of this study was Ajzen and Fishbein's theory of reasoned action, which serves to predict and understand a person's behavior. To do so, a person's behavioral intention must be determined which itself is dependent upon a person's attitude toward the given behavior and the person's subjective norm (Ajzen & Fishbein, 1980). For this study, only the factor of attitude was explored in the relationship to behavioral intention and ultimately to a predicted behavior.

Overall, the respondents' attitudes toward the importance of recycling materials as well as the belief that recycling such materials would benefit the environment was fairly strong. Although above the neutral range, the attitudes regarding the state of landfills and the belief that they are reaching maximum capacity were not as strong. Perhaps this is due to the more global aspect of this issue as well as the respondents not having exposure to the amount of garbage being transported to landfills daily.

In addition, the attitudes and beliefs regarding in-home recycling centers were addressed. Overall, each group of professionals agreed that having such an area would make separating recyclable material easier and more convenient. In addition, architects, interior designers, and

home builders also agreed that an in-home recycling center would encourage the occupants in the home to separate recyclable material. The agreement with each of these factors emphasizes the convenience factor of recycling behavior. These findings also support the previous studies of Vining et al. (1992) and Vining and Ebreo (1990), which found that convenience was a significant factor in recycling behavior. Having the convenience and accessibility of an in-home recycling center would perhaps serve to motivate occupants in the home to participate in a recycling program, thus serving to reduce the amount of waste going to the nation's landfills.

Although not a specific factor in the theory of reasoned action, the aspects of awareness of and participation in recycling programs in the respective cities of the professionals were addressed. These aspects were addressed due to the previous research of Vining and Ebreo (1990) finding that knowledge and education about recycling let to a higher rate of recycling behavior. Only Oklahoma professionals were questioned concerning their awareness of such programs, because it was unknown which programs were available in the Minneapolis and St. Paul area. Each group of professionals in Oklahoma had a higher awareness of the curbside recycling program than the drop-off program in their respective cities, which could be attributed to the convenience of this particular program. However, the increased awareness could also be due to the visibility of the bins at the curbside in the city's neighborhoods. Although 80% of Oklahoma professionals were aware of the curbside recycling program in their respective cities, only 36.9% actually participated in this program. In addition, 56% of Oklahoma professionals were aware of the drop-off recycling program, however, only 17.8% actually participated in this program. It is interesting to note that each of these percentages of participation are higher than the overall recycling rate of 12% for the state of Oklahoma reported in the State of Garbage Survey (Glenn, 1988, April). The aspect of participation was addressed among the Minnesota professionals. A much higher rate of participation existed among the Minnesota professionals with 25 of the 26 respondents (96.15%) participating in a recycling program. Again, this rate of recycling is much higher than the reported 42% Minnesota recycling rate (Glenn, 1988, April).

be noted that these high percentages could be a result of a non-representative sample of the Minnesota design professional population.

The behavioral intention factor of the theory of reasoned action was addressed to determine whether the three groups of design professionals used a set of questions regarding the features to be included in the home design. A specific feature addressed was the incorporation of an in-home recycling center, or a section of cabinetry that allows easy sorting of recyclable material. Of those professionals using a set of questions, interior designers and architects had a higher frequency than home builders of such a question. Minnesota professionals reported asking their clients about incorporating such an area 80% of the time compared to Oklahoma professionals asking this question only 26% of the time. The high recycling rate of Minnesota as a state as well as the high rate of recycling by the Minnesota respondents may contribute to this high percentage.

The actual incorporation of in-home recycling centers may be due to two factors. First, the client could be proactive by requesting the inclusion of an in-home recycling center into the home design. Second, the professionals could be proactive and incorporate an in-home recycling center into his or her design without a request from the client. Professionals were asked how often clients requested an in-home recycling center or space to separate recyclable materials. Oklahoma professionals reported their clients rarely asking for such an area. Minnesota professionals reported their clients requesting such an area occasionally. Again, the high recycling rate in Minnesota could prompt clients to request such an area in their home for increase convenience of recycling. However, since the recycling rate is low in Oklahoma, there would naturally be a decreased need for an in-home recycling center for recycling. Finally, Oklahoma professionals reported rarely incorporating in-home recycling centers into their projects. However, Minnesota professionals reported incorporating in-home recycling centers occasionally or regularly.

Of the respondents incorporating in-home recycling centers into home designs, the largest percentage (37 of 77, 48.05%) of recycling centers were incorporated into entirely custom home designs. The next highest percentages were incorporated into "all homes regardless of type" (16 of 77, 20.78%), "semi-custom homes" (12 of 77, 15.58%), and "model homes" (7 of 77, 9.09%). This information is important due to a majority of home builders constructing model homes or other types of homes that have been previously specified and contain minimal, if any, upgraded features. However, a majority of custom homes usually begin with the consultation of an architect or interior designer. These types of homes frequently contain a number of unique features designed exclusively for the homeowner. If home builders fail to receive input from a homeowner regarding desired features to be added to the design, the builder may be unaware that such a demand is present for a feature such as an in-home recycling center. In addition, if such a feature is not mandatory or demanded by consumers as a regular feature in a home, architects, interior designers, and home builders could remain unaware of such a feature until it is regulated by the state or demanded by the consumers.

Regarding Minnesota professionals, this study seems to support previous assertions of the theory of reasoned action that behavior can be predicted by behavioral intention and attitude. The measures on behavioral intention and attitude were high. However, regarding Oklahoma professionals, this study does not support the theory of reasoned action, because attitudes regarding environmental issues were strong, the behavioral intention and resulting behavior of incorporating in-home recycling centers into their design projects was low. The critical step appears to be between the actual behavior and the behavioral intention. If the behavior does not exist, then the previous factors cannot contribute to predicting the resulting behavior.

Implications

Based on the findings of this study, there are several implications for future research including those related to public policy and education. First, although only three of the 26

Minnesota respondents indicated that the recycling program in which they participated was mandatory, several areas in Minnesota have mandatory recycling programs. These government mandates for these areas of Minnesota perhaps contribute to the high recycling rate of this state. In order to increase recycling rates in other states, legislators should develop effective lobbies in order to develop recycling programs that are convenient for the citizens of their particular state. Also, those individuals concerned with the need of their state to recycle should also develop effective lobbies, perhaps in association with their state legislators, in order to put such programs into place.

Second, since knowledge and education of recycling has been shown to increase recycling behavior, groups such as educators, professionals, and legislators should by informed about factors that increase recycling behavior as well as those programs that have the highest rate of participation. If educators are informed, they can in turn pass their knowledge to their students before they enter the workplace. In addition, if professionals such as architects, interior designers, and home builders are better educated on the issues of recycling as well as the types of products that would increase the recycling behavior of others, they would be better equipped to provide consumers with such knowledge and products. Also, if legislators received knowledge and education concerning factors related to recycling, they would be better equipped to present their case to their respective states. Finally, if the general public were educated on the facts of recycling and the products available to them that would make recycling materials more convenient, perhaps a demand would be created for such products, which would then generate a market for such products.

Recommendations for Future Research

Based on this study, there are additional avenues and suggestions for future research that will increase the understanding of the rate of incorporation of in-home recycling centers by design professionals:

1. The instrument could be revised to include a study of the factor of subjective norm in relation to behavioral intention, specifically to understand relationship of social influence from professional peers to the behavior of incorporating certain features into home designs such as in-home recycling centers.

2. A study of consumers' attitudes toward aspects of recycling within the home and the relationship of in-home recycling centers and actual recycling behavior in order to complete the triangle between designer, builder, and consumer.

3. Replication of the study among design professionals of other geographic areas or other professional organizations that would prove beneficial to understanding recycling behavior and aspect to increase such behavior within the home.

Because recycling attitudes and the incorporation of in-home recycling centers has been found to have different rates between groups of professionals, further research into increasing environmental concern, recycling awareness, and the products for increasing recycling behavior within the home would benefit those groups of professionals with low rates of concern and awareness.

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Table 1

Comparison of the Sample by Profession

	Respondents					
	Architects (n = 45, 28.7%)		Interior Designers (n = 65, 41.4%)		Home Builders (n = 47, 29.9%)	
	n	%	n	%	n	%
Years as a Practicing Professional						
0-10 years	5	11.11	24	36.92	6	12.77
11-20 years	13	31.11	19	29.23	7	14.89
21-30 years	11	24.44	18	27.69	22	46.81
31-40 years	9	20.00	1	1.51	11	23.40
41-50 years	5	8.89	0	0.00	1	2.13
51-60 years	1	2.22	1	1.54	0	0.00
No Response[a]	1	2.22	2	3.08	0	0.00
Education						
High School	0	0.00	0	0.00	6	12.77
Some college	4	8.89	6	9.23	14	29.79
Associate's degree	1	2.22	0	0.00	2	4.26
Bachelor's degree	29	64.44	46	70.77	19	40.43
Master's degree	10	22.22	13	20.00	4	8.51
Doctorate degree	1	2.22	0	0.00	1	2.12
No Response[a]	0	0.00	0	0.00	1	2.12

[a]The "No Response" refers to those who chose not to answer the item and were calculated as a separate percentage.

Note: The Totals for all professionals is the same as the totals for both states and can be found in Table 2.

Table 2

Comparison of the Sample by State

	Respondents					
	Oklahoma (n = 131, 83.4%)		Minnesota (n = 26, 16.6%)		Total (n = 157, 100.0%)	
	n	%	n	%	n	%
Profession						
Architect	37	28.24	7	26.92	44	28.04
Interior Designer	51	39.93	13	50.00	64	40.76
Home Builder	40	30.53	5	19.23	45	28.66
Architect/Interior Designer	2	1.52	0	0.00	2	1.27
Interior Designer/Home Builder	1	0.08	1	3.84	2	1.27
Years as a Practicing Professional						
0-10 years	30	22.90	5	19.23	35	22.29
11-20 years	34	25.95	5	19.23	39	24.84
21-30 years	40	30.53	11	42.31	51	32.48
31-40 years	19	14.50	2	7.69	21	13.38
41-50 years	6	4.58	0	0.00	6	3.82
51-60 years	0	0.00	2	7.69	2	1.27
No Response[a]	2	1.52	1	3.85	3	1.91
Education						
High School	5	3.85	1	3.75	6	3.82
Some college	22	16.92	2	7.40	24	15.28
Associate's degree	2	1.54	1	3.70	3	1.91
Bachelor's degree	76	58.01	18	69.23	94	59.87
Master's degree	24	18.46	3	11.11	27	17.20
Doctorate degree	1	0.76	1	3.70	2	1.27
No Response[a]	1	0.76	0	0.00	1	0.63

[a]The "No Response" refers to those who chose not to answer the item and were calculated as a separate percentage.

Table 3

Professional Characteristics of the Sample by Profession

	Respondents					
	Architects (n = 45, 28.7%)		Interior Designers (n = 65, 41.4%)		Home Builders (n = 47, 29.9%)	
	n	%	n	%	n	%
Status within current company/firm						
Owner/Sole Proprietor	9	20.00	28	43.08	17	36.17
Partner/Principal	16	35.56	3	4.62	2	4.26
Upper Management	7	15.56	6	9.23	21	44.68
Management	6	13.33	7	10.76	3	6.38
Architect/ID[a]/ HB[b]	5	11.11	19	29.23	3	6.38
Broker	0	0.00	0	0.00	1	2.13
No Response[c]	2	4.44	2	3.07	0	0.00
Years within current company/firm						
0-10 years	22	48.89	34	52.31	16	34.04
11-20 years	9	20.00	21	32.31	5	10.64
21-30 years	7	15.56	8	12.31	15	31.91
31-40 years	3	6.67	0	0.00	11	23.40
41-50 years	2	4.44	0	0.00	0	0.00
51-60 years	1	2.22	0	0.00	0	0.00
No Response[c]	1	2.22	2	3.07	0	0.00

[a]ID = Interior Designer

[b]HB = Home Builder

[c]The "No Response" refers to those who chose not to answer the item and were calculated as a separate percentage.

Note: The Totals for all professionals is the same as the totals for both states and can be found in Table 3.

Table 4

Professional Characteristics of the Sample by State

	Respondents					
	Oklahoma (n = 131, 83.4%)		Minnesota (n = 26, 16.6%)		Total (n = 157, 100.0%)	
	n	%	n	%	n	%
Status within current company/firm						
Owner/Sole Proprietor	43	52.67	11	42.31	54	34.39
Partner/Principal	19	14.50	2	7.69	21	13.37
Upper Management	28	21.37	6	23.08	34	21.65
Management	15	11.45	1	3.84	16	10.19
Architect/ID[a]/ HB[b]	22	16.79	5	19.23	27	17.18
Broker	1	7.63	0	0.00	1	0.63
No Response[c]	3	2.29	1	3.84	4	2.54
Years within current company/firm						
0-10 years	53	40.46	13	50.00	72	45.85
11-20 years	31	23.66	6	23.08	35	22.29
21-30 years	30	22.90	5	19.23	30	19.10
31-40 years	13	9.92	1	3.85	14	8.92
41-50 years	2	1.52	0	0.00	2	1.27
51-60 years	0	0.00	1	3.85	1	0.64
No Response[fc]	2	1.52	1	3.85	3	0.19

[a]ID = Interior Designer

[b]HB = Home Builder

[c]The "No Response" refers to those who chose not to answer the item and were calculated as a separate percentage.

Table 5

Description of Project Characteristics of the Sample by Profession

	Respondents					
	Architects (n = 45, 28.7%)		Interior Designers (n = 65, 41.4%)		Home Builders (n = 47, 29.9%)	
	n	%	n	%	n	%
Type of projects within last year						
Residential, Single-Family	25	56.82	41	66.13	44	93.62
Residential, Multi-Family	11	25.00	8	12.90	9	19.15
Commercial/Retail	32	72.73	43	69.35	7	14.89
Institutional	22	50.00	12	19.35	0	0.00
Hospitality	13	29.55	14	22.58	0	0.00
Other	16	36.36	4	6.45	2	4.26
Type of projects within last 5 years						
Residential, Single-Family	26	59.09	43	67.19	43	9.15
Residential, Multi-Family	15	34.09	14	21.88	10	21.28
Commercial/Retail	37	84.09	51	79.69	10	21.28
Institutional	29	65.91	19	29.69	0	0.00
Hospitality	19	43.18	20	31.25	1	2.13
Other	17	38.64	5	7.81	2	4.25
Amount of residential business						
0-25%	31	68.89	25	38.46	0	0.00
26-50%	4	8.89	4	6.15	1	2.13
51-75%	2	4.44	12	18.46	2	4.25
76-100%	7	15.56	23	35.38	44	93.62

Note: The Totals for all professionals is the same as the totals for both states and can be found in Table 6.

Table 6

Description of Project Characteristics of the Sample by State

	Respondents					
	Oklahoma (n = 131, 83.4%)		Minnesota (n = 26, 16.6%)		Total (n = 157, 100.0%)	
	n	%	n	%	n	%
Type of projects within last year						
Residential, Single-Family	85	64.89	25	96.15	110	70.16
Residential, Multi-Family	18	13.74	9	34.62	28	17.83
Commercial/Retail	68	51.90	14	53.84	82	52.33
Institutional	31	23.66	3	11.54	34	21.65
Hospitality	24	18.32	3	11.54	27	17.19
Other	21	16.03	1	3.84	22	14.01
No Response[a]	7	5.34	0	0.00	7	4.46
Type of projects within last 5 years						
Residential, Single-Family	86	65.65	26	100.00	112	71.34
Residential, Multi-Family	27	20.61	12	46.15	39	24.84
Commercial/Retail	68	51.90	19	73.08	98	62.42
Institutional	43	32.82	5	19.23	48	30.57
Hospitality	35	26.72	5	19.23	40	25.47
Other	21	16.03	3	11.53	24	15.28
No Response[a]	5	3.81	0	0.00	5	3.18
Amount of residential business						
0-25%	54	41.22	2	7.69	56	35.67
26-50%	6	4.50	3	11.54	9	5.73
51-75%	12	9.10	4	15.38	16	10.19
76-100%	55	43.51	17	65.38	74	47.13
No Response[a]	2	1.53	0	0.00	2	1.27

[a]The "No Response" refers to those who chose not to answer the item and were calculated as a separate percentage.

Table 7

Mean Scores of Attitudes Toward Various Aspects of Recycling Among all Respondents by Profession

	Respondents					
	Architects (n=45, 28.7%[a])		Interior Designers (n=65, 41.4%[b])		Home Builders (n=47, 29.9%[c])	
Aspect of Recycling	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Believe landfills are reaching capacity.	5.00	1.522	5.34	1.121	4.64	1.845
Concerned landfills are reaching capacity.	5.40	1.499	5.62	1.234	4.94	1.938
Believe recycling will keep landfills from reaching capacity.	4.96	1.809	5.46	1.238	4.91	1.804
It is important to recycle:						
Newspapers	6.13	1.342	6.26	0.957	5.64	1.712
**Paper (Other types)	6.22	1.380**	6.25	0.919**	5.57	1.729**
Aluminum	6.27	1.338	6.34	0.906	5.70	1.667
Glass	6.02	1.454	6.32	0.937	5.64	1.712
Plastic	6.18	1.370	6.34	0.940	5.70	1.756
Believe environment is helped by recycling:						
Newspapers	6.04	1.476	6.11	1.017	5.55	1.803
Paper (Other types)	6.09	1.474	6.20	0.939	5.51	1.816
Aluminum	6.13	1.307	6.17	0.993	5.70	1.731
Glass	6.00	1.261	6.18	0.983	5.55	1.803
Plastic	6.18	1.353	6.25	0.969	5.74	1.823

[a]Percent is based on the total respondents identified as architects.

[b]Percent is based on the total respondents identified as interior designers.

[c]Percent is based on the total respondents identified as home builders.

[d]Strongly disagree = 1; strongly agree = 7

Note: The total mean scores of attitudes toward various aspects of recycling by profession is the same as by state and appears in Table 8.

**$p \leq 0.5$ ($X^2 = 18.6494$; $p = 0.0449$)

Table 8

Mean Scores of Attitudes Toward Various Aspects of Recycling Between all Respondents by State

	Respondents					
	Oklahoma (n=131, 83.4%[a])		Minnesota (n=26, 16.6%[b])		Total (n=157, 100.0%[c])	
Aspect of Recycling	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Believe landfills are reaching capacity.	4.95	1.523	5.43	1.361	5.03	1.504
Concerned landfills are reaching capacity.	5.31	1.555	5.54	1.630	5.35	1.564
Believe recycling will keep landfills from reaching capacity.	5.15	1.603	5.19	1.650	5.15	1.606
It is important to recycle:						
Newspapers	5.96	1.389	6.42	1.064	6.04	1.349
Paper (Other types)	5.97	1.403	6.38	1.098	6.04	1.363
Aluminum	6.05	1.355	6.50	1.070	6.13	1.319
Glass	5.94	1.418	6.50	1.070	6.03	1.379
Plastic	6.05	1.408	6.38	1.134	6.10	1.369
Believe environment is helped by recycling:						
Newspapers	5.87	1.490	6.19	1.096	5.92	1.434
Paper (Other types)	5.90	1.482	6.27	1.079	5.96	1.427
Aluminum	5.97	1.386	6.27	1.116	6.02	1.347
Glass	5.89	1.412	6.23	1.107	5.94	1.369
Plastic	6.038	1.437	6.27	1.115	6.08	1.389

[a]Percent is based on the total respondents from Oklahoma.

[b]Percent is based on the total respondents from Minnesota.

[c]Percent is based on the total respondents from Oklahoma and Minnesota.

[d]Strongly disagree = 1; strongly agree = 7

Table 9

Mean Scores and Chi-square Analysis of Attitudes Toward In-Home Recycling Centers Among All Respondents

Comparison Groups	n[a]	%	Mean	Std. Dev.	X^2	p
"It is important to have an area in the home to separate recyclable material."						
Both States by Profession					21.7931	0.0399**
Architects	45	28.66	5.24	1.261		
Interior Designers	65	41.40	5.58	1.333		
Home Builders	47	29.94	4.63	1.451		
All Professions by State					4.1864	0.6515
Oklahoma	131	83.43	5.16	1.420		
Minnesota	26	16.54	5.38	1.358		
By Profession & State[c]					42.0586	0.0708*
Architects/OK	37	23.57	5.27	1.367		
Architects/MN	8	5.10	5.12	0.991		
Interior Designers/OK	52	33.12	5.65	1.282		
Interior Designers/MN	13	8.28	5.30	1.548		
Home Builders/OK	42	26.75	4.47	1.383		
Home Builders/MN	5	3.18	6.00	1.414		

[a]n = 157

[b]Strongly disagree = 1; strongly agree = 7

[c]OK = Oklahoma; MN = Minnesota

*$p \leq 0.1$

**$p \leq 0.5$

Table 10

Mean Scores and Chi-Square Analysis of Attitudes Toward Convenience of an In-Home Recycling Center Among All Respondents

Comparison Groups	n[a]	%	Mean	Std. Dev.	X^2	p
"A recycling center in the home would make separating recyclable material more convenient."						
Both States by Profession					24.1847	0.0192**
Architects	45	28.66	5.47	1.471		
Interior Designers	65	41.40	6.09	1.229		
Home Builders	47	29.94	5.34	1.403		
All Professions by State					6.7095	0.3486
Oklahoma	131	83.43	5.68	1.353		
Minnesota	26	16.54	5.65	1.573		
By Profession & State[c]					46.8209	0.0259**
Architects/OK	37	23.57	5.56	1.444		
Architects/MN	8	5.10	5.00	1.603		
Interior Designers/OK	52	33.12	6.17	1.079		
Interior Designers/MN	13	8.28	5.69	1.702		
Home Builders/OK	42	26.75	5.19	1.401		
Home Builders/MN	5	3.18	6.60	0.547		

[a]n = 157

[b]Strongly disagree = 1; strongly agree = 7

[c]OK = Oklahoma; MN = Minnesota

**$p \leq 0.5$

Table 11

Mean Scores of Attitudes Toward In-Home Recycling Centers and Recycling Behavior Among All Respondents

Comparison Groups	n[a]	%	Mean	Std. Dev.	X^2	p
"A recycling center in the home would encourage recycling by the occupants in the home."						
Both States by Profession					22.7551	0.0299**
Architects	45	28.66	5.51	1.440		
Interior Designers	65	41.40	6.09	1.141		
Home Builders	47	29.94	5.17	1.464		
All Professions by State					4.5021	0.0691*
Oklahoma	131	83.43	5.62	1.366		
Minnesota	26	16.54	5.76	1.478		
By Profession & State[c]					41.5230	0.0786*
Architects/OK	37	23.57	5.54	1.445		
Architects/MN	8	5.10	5.37	1.505		
Interior Designers/OK	52	33.12	6.19	0.971		
Interior Designers/MN	13	8.28	5.69	1.702		
Home Builders/OK	42	26.75	5.00	1.448		
Home Builders/MN	5	3.18	6.60	0.547		

[a]n = 157

[b]Strongly disagree = 1; strongly agree = 7

[c]OK = Oklahoma; MN = Minnesota

*$p \leq 0.1$

**$p \leq 0.5$

Table 12

Frequency and Chi-square of Awareness of Recycling Programs Among All Oklahoma Respondents by Profession

Aspect of Awareness	Respondents: Architects n[a]	%	Interior Designers n[b]	%	Home Builders n[c]	%	Total n[d]	%	X^2	p
Aware of the drop-off recycling program in Oklahoma City/Tulsa?										
Yes	20	55.56	33	63.46	20	47.62	73	56.15	2.3757	0.3049
No	16	44.44	19	36.54	22	52.38	57	43.85	2.3757	0.3049
Aware of the curbside recycling program in Oklahoma City/Tulsa?										
Yes	31	88.57	45	86.54	28	66.67	104	80.62	7.8159	0.0201**
No	4	11.43	7	13.46	14	33.33	25	19.38	7.8159	0.0201**

[a]n = 36; 1 No response; Percent is based on the total respondents identified as Oklahoma architects.

[b]n = 52; Percent is based on the total respondents identified as Oklahoma interior designers.

[c]n = 42; Percent is based on the total respondents identified as Oklahoma home builders.

[d]n = 130; Percent is based on the total respondents from the state of Oklahoma.

**$p \leq 0.5$

Table 13

Frequency and Chi-square Analysis of Participation in Recycling Programs Among All Oklahoma Respondents by Profession

Aspect of Participation	Respondents: Architects n[a]	%	Interior Designers n[b]	%	Home Builders n[c]	%	Total n[d]	%	X^2	p
Participation in any type of recycling program in Tulsa/OKC?									15.1543	0.1265
Drop-off program	9	25.00	9	17.31	5	11.90	23	17.69		
Curbside program	12	33.33	23	44.23	13	30.95	48	36.92		
Both programs	5	13.89	2	3.85	2	4.76	9	6.92		
Neither program	9	25.00	17	32.69	22	52.38	48	36.92		
Other	1	2.78	1	1.92	0	0.00	2	1.54		

[a]n = 36; 1 No response; Percent is based on the total respondents identified as Oklahoma architects.

[b]n = 52; Percent is based on the total respondents identified as Oklahoma interior designers.

[c]n = 42; Percent is based on the total respondents identified as Oklahoma home builders.

[d]n = 130; 1 No response; Percent is based on the total respondents from the state of Oklahoma.

Table 14

Frequency and Chi-square Analysis of Materials Recycled Among All Oklahoma Respondents by Profession

	Respondents									
	Architects (n=37, 28.2%)		Interior Designers (n=52, 39.7%)		Home Builders (n=42, 32.1%)		Total (n=131, 100.0%)			
Material Recycled	n	%	n	%	n	%	n	%	X^2	p
Newspaper[a]									2.520	0.284
Yes	25	69.44	33	63.46	22	52.38	80	61.53		
No	11	30.56	19	36.54	20	47.62	50	38.47		
Paper (other types)									6.983	0.031**
Yes	19	51.35	16	31.37	10	23.81	45	34.62		
No	18	48.65	35	68.63	32	76.19	85	65.38		
Aluminum									5.060	0.080*
Yes	26	70.27	28	54.90	19	45.24	73	56.15		
No	11	29.73	23	45.10	23	54.76	57	43.85		
Glass									6.079	0.048**
Yes	23	62.16	28	54.90	15	35.71	66	50.77		
No	14	37.84	23	45.10	27	64.29	64	49.23		
Plastic									1.710	0.425
Yes	22	59.46	28	54.90	19	45.24	69	53.08		
No	15	40.54	23	45.10	23	54.76	61	46.92		

[a]1 No Response for Oklahoma Architect.

*$p \leq .10$

**$p \leq .05$

Table 15

Mean Scores Regarding the Use of a Checklist of Questions Concerning a Home Design by All Professionals

Comparison Groups	n	%[a]	Mean	Std. Dev.
Total	129	100.00	3.34	1.395
Both States by Profession				
Architects	34	26.35	3.71	1.142
Interior Designers	51	39.53	2.82	1.452
Home Builders	44	34.11	3.65	1.346
All Professions by State				
Oklahoma	104	80.62	3.28	1.410
Minnesota	25	19.38	3.60	1.322
By Profession & State				
Architects/OK	27	20.93	3.70	1.234
Architects/MN	7	5.43	3.71	0.756
Interior Designers/OK	38	29.46	2.71	1.412
Interior Designers/MN	15	11.62	3.15	1.573
Home Builders/OK	39	30.23	3.54	1.374
Home Builders/MN	5	2.33	4.60	0.548

[a]Percent is based on the total respondents responding to the question.

[b]Never = 1; Always = 5

Table 16

Mean Scores Regarding the Clients Request of an In-Home Recycling Center

Comparison Groups	n	%[a]	Mean	Std. Dev.
Total	128	100.00	2.06	1.018
Both States by Profession				
Architects	35	27.34	2.14	0.912
Interior Designers	49	38.28	2.31	1.084
Home Builders	44	34.38	1.73	0.949
All Professions by State				
Oklahoma	103	80.47	1.76	0.785
Minnesota	25	19.53	3.32	0.900
By Profession & State				
Architects/OK	28	21.88	1.82	0.612
Architects/MN	7	5.46	3.43	0.787
Interior Designers/OK	36	28.13	2.00	0.926
Interior Designers/MN	13	10.16	3.15	1.068
Home Builders/OK	39	30.47	1.49	0.683
Home Builders/MN	5	3.90	3.60	0.548

[a]Percent is based on the total respondents responding to the question.

[b]Never = 1; Always = 5

Table 17

Mean Scores Regarding Proactive Incorporation of In-Home Recycling Centers by All Professionals

Comparison Groups	n	%[a]	Mean	Std. Dev.
Total	132	100.00	1.99	1.169
Both States by Profession				
Architects	34	25.76	2.24	1.156
Interior Designers	53	40.15	2.09	1.260
Home Builders	45	34.09	1.69	1.019
All Professions by State				
Oklahoma	108	81.81	1.66	0.888
Minnesota	24	18.19	3.50	1.103
By Profession & State				
Architects/OK	27	20.45	1.78	0.751
Architects/MN	7	5.30	4.00	0.577
Interior Designers/OK	40	30.30	1.73	1.037
Interior Designers/MN	13	9.85	3.23	1.235
Home Builders/OK	41	31.06	1.51	0.810
Home Builders/MN	4	3.03	3.50	1.291

[a]Percent is based on the total respondents responding to the question.

[b]Never = 1; Always = 5

Table 18

Percentage of Projects Containing an In-Home Recycling Center Reported by Both States by Profession

	Respondents					
	Architects		Interior Designers		Home Builders	
	n[a]	%	n[b]	%	n[c]	%
Percentage						
0%	18	46.15	30	51.72	32	69.57
1 – 25%	11	28.21	16	27.59	10	21.74
26 – 50%	4	10.26	3	2.17	3	6.52
51 – 75%	3	7.69	6	10.34	0	0.00
76 – 100%	3	7.69	3	5.17	1	2.17

[a]n = 39; Percent is based on the respondents identified as architects.

[b]n = 58; Percent is based on the respondents identified as interior designers.

[c]n = 46; Percent is based on the respondents identified as home builders.

Note: The total frequencies percentage of projects containing an in-home recycling center by profession is the same as by state and appears in Table XX.

Table 19

Percentage of Projects Containing an In-Home Recycling Center Reported by All Professionals by State

	Respondents					
	Oklahoma		Minnesota		Total	
	n[a]	%	n[b]	%	n[c]	%
Percentage						
0%	79	66.39	1	4.35	70	55.94
1 – 25%	31	26.05	5	21.74	37	25.87
26 – 50%	6	5.04	4	17.39	10	6.99
51 – 75%	1	0.84	8	34.78	9	6.29
76 – 100%	2	1.68	5	21.74	7	4.90

[a]n = 119; Percent is based on the respondents from Oklahoma.

[b]n = 23; Percent is based on the respondents from Minnesota.

[c]n = 142; Percent is based on the respondents from both Oklahoma and Minnesota.

CHAPTER V

DISCUSSION AND RECOMMENDATIONS

The purpose of this study was two-fold. In the first phase of this study, on site-observations were made of new home construction in metropolitan areas of Tulsa and Oklahoma City. The second phase of this study served to identify the attitudes and beliefs of architects, interior designers, and home builders toward environmental issues, the level of awareness and participation in recycling programs, and the promotion and incorporation of in-home recycling centers into the professionals' home designs.

Results of the observations from phase one of this study revealed that only a small percentage of the homes observed in the Tulsa area (5 of 38, 13.16%) and the Oklahoma City area (1 of 28, 3.57%) contained in-home recycling centers, or cabinetry with areas for two or more bins to assist in separating recyclable material. Each of the homes that contained an in-home recycling center contained two pre-cut areas to accommodate two standard waste containers. Since both Tulsa and Oklahoma City have areas with commingled curbside recycling programs, these types of in-home recycling centers would be adequate for homeowners. One bin could be used to collect all recyclable material while the other bin could be used for perishable or non-recyclable material.

The framework for this study was Ajzen and Fishbein's theory of reasoned action, which serves to predict and understand a person's behavior. To do so, a person's behavioral intention must be determined which itself is dependent upon a person's attitude toward the given behavior and the person's subjective norm (Ajzen & Fishbein, 1980). For this study, only the factor of

attitude was explored in the relationship to behavioral intention and ultimately to a predicted behavior.

Overall, the respondents' attitudes toward the importance of recycling materials as well as the belief that recycling such materials would benefit the environment was fairly strong. Although above the neutral range, the attitudes regarding the state of landfills and the belief that they are reaching maximum capacity were not as strong. Perhaps this is due to the more global aspect of this issue as well as the respondents not having exposure to the amount of garbage being transported to landfills daily.

In addition, the attitudes and beliefs regarding in-home recycling centers were addressed. Overall, each group of professionals agreed that having such an area would make separating recyclable material easier and more convenient. In addition, architects, interior designers, and home builders also agreed that an in-home recycling center would encourage the occupants in the home to separate recyclable material. The agreement with each of these factors emphasizes the convenience factor of recycling behavior. These findings also support the previous studies of Vining et al. (1992) and Vining and Ebreo (1990) which found that convenience was a significant factor in recycling behavior. Having the convenience and accessibility of an in-home recycling center would perhaps serve to motivate occupants in the home to participate in a recycling program, thus serving to reduce the amount of waste going to the nation's landfills.

Although not a specific factor in the theory of reasoned action, the aspects of awareness of and participation in recycling programs in the respective cities of the professionals were addressed. These aspects were addressed due to the previous research of Vining and Ebreo (1990) finding that knowledge and education about recycling let to a higher rate of recycling behavior. Only Oklahoma professionals were questioned concerning their awareness of such programs, because it was unknown which programs were available in the Minneapolis and St. Paul area. Each group of professionals in Oklahoma had a higher awareness of the curbside recycling program than the drop-off program in their respective cities. This increased awareness

of the curbside recycling program could be contributed to the convenience of this particular program. However, the increased awareness could also be due to the visibility of the bins at the curbside in the neighborhoods of the respondents. Although 80% of Oklahoma professionals were aware of the curbside recycling program in their respective cities, only 36.9% actually participated in this program. In addition, 56% of Oklahoma professionals were aware of the drop-off recycling program, however, only 17.8% actually participated in this program. It is interesting to note that each of these percentages of participation are higher than the overall recycling rate of 12% for the state of Oklahoma reported in the State of Garbage Survey (Glenn, 1998 April). The aspect of participation was also addressed among the Minnesota professionals. A much higher rate of participation existed among the Minnesota professionals with 25 of the 26 respondents (96.15%) participating in a recycling program. Of these respondents, only three respondents reported that the recycling program in which they participated in was mandatory. This rate of recycling is much higher than the reported 42% Minnesota recycling rate (Glenn, 1998, April). However, it should be noted that these high percentages could be a result of a non-representative sample of the Minnesota design professional population.

The behavioral intention factor of the theory of reasoned action was addressed to determine whether the three groups of design professionals used a set of questions regarding the features to be included in the home design. A specific feature addressed was the incorporation of an in-home recycling center, or a section of cabinetry that allows easy sorting of recyclable material. Of those professionals using a set of questions, interior designers and architects had a higher frequency that home builders of such a question. Minnesota professionals reported asking their clients about incorporating such an area 80% of the time compared to Oklahoma professionals asking this question only 26% of the time. The high recycling rate of Minnesota as a state as well as the high rate of recycling by the Minnesota respondents may contribute to this high percentage.

The actual incorporation of in-home recycling centers may be due to two factors. First, the client of the design professional could request that an in-home recycling center be incorporated into the home design. Second, the design professional could proactively incorporate an in-home recycling center into his or her design. Professionals were asked how often clients requested an in-home recycling center or space to separate recyclable materials. Oklahoma professionals reported their clients rarely asking for such an area. Minnesota professionals reported their clients requesting such an area occasionally. Again, the high recycling rate in Minnesota could prompt clients to request such an area in their home for increase convenience of recycling, especially if the recycling program was mandatory. However, since the recycling rate is low in Oklahoma, there would naturally be a decreased need for an in-home recycling center for recycling. As for the respondents proactively incorporating in-home recycling centers into their designs, Minnesota professionals reported a much higher rate of incorporation than Oklahoma professionals. The largest percentage of Minnesota professionals (56.5%, n=13) reported incorporating in-home recycling centers into home designs between 51-100% of the time. However, the largest percentage of Oklahoma professionals (66.4%, n=79) reported incorporating recycling centers into home designs zero percent of the time.

Of the respondents incorporating in-home recycling centers into home designs, the largest percentage (37 of 77, 48.05%) of recycling centers were incorporated into entirely custom home designs. The next highest percentages were incorporated into "all homes regardless of type" (16 of 77, 20.78%), "semi-custom homes" (12 of 77, 15.58%), and "model homes" (7 of 77, 9.09%). This information is important due to a majority of home builders constructing model homes or other types of homes that have been previously specified and contain minimal, if any, upgraded features. However, a majority of custom homes usually begin with the consultation of an architect or interior designer. These types of homes frequently contain a number of unique features designed exclusively for the homeowner. If home builders fail to receive input from a homeowner regarding desired features to be added to the design, the builder may be unaware that

such a demand is present for a feature such as an in-home recycling center. In addition, if such a feature is not mandatory or demanded by consumers as a regular feature in a home, architects, interior designers, and home builders could remain unaware of such a feature until it is regulated by the state or demanded by the consumers.

Regarding Minnesota professionals, this study seems to support previous assertions of the theory of reasoned action that behavior can be predicted by behavioral intention and attitude. The measures on behavioral intention and attitude were high. However, regarding Oklahoma professionals, this study does not support the theory of reasoned action, because attitudes regarding environmental issues were strong, the behavioral intention and resulting behavior of incorporating in-home recycling centers into their design projects was low. The critical step appears to be between the actual behavior and the behavioral intention. If the behavior does not exist, then the previous factors cannot contribute to predicting the resulting behavior.

Implications

Based on the findings of this study, there are several implications for future research including those related to public policy and education. First, although only three of the 26 Minnesota respondents indicated that the recycling program in which they participated was mandatory, several areas in Minnesota have mandatory recycling programs. These government mandates for these areas of Minnesota perhaps contribute to the high recycling rate of this state. In order to increase recycling rates in other states, legislators should develop effective lobbies in order to develop recycling programs that are convenient for the citizens of their particular state. Also, those individuals concerned with the need of their state to recycle should also develop effective lobbies, perhaps in association with their state legislators, in order to put such programs into place.

Second, since knowledge and education of recycling has been shown to increase recycling behavior, groups such as educators, professionals, and legislators should by informed

about factors that increase recycling behavior as well as those programs that have the highest rate of participation. If educators are informed, they can incorporate the subject of sustainable design into their curriculum at a higher rate so that their students will be better informed of such information before they enter the workplace. In addition, if professionals such as architects, interior designers, and home builders are better educated on the issues of recycling as well as the types of products that would increase the recycling behavior of others, they would be better equipped to provide consumers with such knowledge and products. Also, if legislators received knowledge and education concerning factors related to recycling, they would be better equipped to present their case to their respective states. Finally, if the general public was educated on the facts of recycling and the products available to them that would make recycling materials more convenient, perhaps a demand would be created for such products, which would then generate a market for such products.

Recommendations for Future Research

Based on this study, there are additional avenues and suggestions for future research that will increase the understanding of the rate of incorporation of in-home recycling centers by design professionals:

1. The instrument could be revised to include a study of the factor of subjective norm in relation to behavioral intention, specifically to understand relationship of social influence from professional peers to the behavior of incorporating certain features into home designs such as in-home recycling centers.

2. A study of consumers' attitudes toward aspects of recycling within the home and the relationship of in-home recycling centers and actual recycling behavior in order to complete the triangle between designer, builder, and consumer.

3. Replication of the study among design professionals of other geographic areas or other professional organizations that would prove beneficial to understanding recycling behavior and aspect to increase such behavior within the home.

4. A modification of Dillman's (1978) Total Design Method to allow a longer period of time between the pre-mailing letter and the pre-mailing postcard so that incorrect addresses have time to be returned and corrected. Another recommendation to this method would be to eliminate the pre-mailing postcard in order to reduce costs, especially for a self-funded research project. In addition, a recommendation to allow for a longer period of time between the follow-up postcards in order to allow for analysis of return rate after such mailing to determine a reminder postcard would actually increase the overall response rate for the study.

5. To gain contacts so that membership lists of professional organizations could be obtained without a fee and to subsequently allow a higher initial mailing of surveys.

Because recycling attitudes and the incorporation of in-home recycling centers has been found to have different rates between groups of professionals, further research into increasing environmental concern, recycling awareness, and the products for increasing recycling behavior within the home would benefit those groups of professionals with low rates of concern and awareness.

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APPENDICES

APPENDIX A

OKLAHOMA INSTRUMENT

Cover Letter Mailed with Survey

OSU

College of Human Environmental Sciences
Department of Design, Housing and Merchandising
431 Human Environmental Sciences
Stillwater, Oklahoma 74078-6142
405-744-5035

June 21, 2001

<<fname>> <<lname>>
<<organization name>>
<<address>>
<<city>>, <<st>> <<zip>>

Dear <<title>> <<lname>>,

In 1998, the Environmental Protection Agency reported that each person generates approximately 4.46 pounds of municipal solid waste daily. To combat the staggering amount of municipal solid waste transported to the landfills, recycling programs have been implemented throughout the nation to intercept these used materials and create new products. Despite curbside and drop-off recycling programs, Oklahoma ranks among the lowest in recycling with only a 12% recycling rate. Although many factors have been addressed as to why people do or do not recycle, one reoccurring factor has been convenience. Previous research has shown that if consumers have a convenient area in their home with which to recycle, they are more likely to recycle. You have been selected from a group of your professional peers for participation in an in-home recycling center research study. This study will address recycling and the incorporation of areas within the home, specifically a section cabinetry that allows sorting of recyclable materials.

Enclosed you will find the comprehensive questionnaire developed for this study. Although your participation is voluntary, your participation is important. If you choose not to participate, there will be no penalty now or in the future. The results of this research will provide information that can be used to motivate and educate design professionals as well as the public to incorporate in-home recycling centers into homes in order to increase the recycling rate in the state of Oklahoma. Please return the questionnaire as soon as possible. Postage has been affixed to the questionnaire for your convenience.

I would like to assure you that your responses will be confidential. A numerical code has been assigned to each person sent a survey. Except for mailing this questionnaire, names are kept separately in a locked file. All findings will be reported as aggregate data, and no individual will be identified in any manner. Only the numerical code is used for data entry and analysis; no names will be used. The number found on the last page of the questionnaire is for tracking purposes only. Please do not remove or mark through the number. Remember, this number is on the page that will be removed. Upon completion of the research, the questionnaires will be destroyed. If you have any questions concerning confidentiality, you can contact me at (405) 624-4664, the project director at (405) 744-9522, or the Office of Research Compliance at (405) 744-5700. The Office of Research Compliance is located on the Oklahoma State University Campus at 203 Whitehurst, Stillwater, Oklahoma 74078.

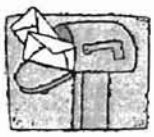
This questionnaire will take approximately 20-30 minutes to complete. An area at the end of the questionnaire is available for requesting a one-page summary of the results of this study. This page will be removed from the questionnaire before analysis. Thank you for your participation.

Sincerely,

Tracy L. Parker
OSU Graduate Student

Cheryl A. Farr, Ph.D.
Project Director

Follow-Up Postcard 1



Have you mailed your recycling survey?

If you have already completed and returned the survey, please accept my sincere thanks. If not, please complete and mail the survey TODAY!

The information you provide regarding recycling and in-home recycling centers is important to the state of the environment. If you did not receive the survey, or have misplaced the survey, please contact me by phone at (405) 744-9522 or through email at mustang66tlp@yahoo.com and request that a questionnaire packet be mailed to you.

Sincerely,

Tracy L. Parker
Cheryl A. Farr, Ph. D.

Follow-Up Postcard 2

Your opinion is important to us!

We really care about your information. Your input is important so as to understand the recycling and in-home recycling centers in the state of Oklahoma.

If you have already completed and returned the survey, please accept my sincere thanks. If not, please complete and mail the survey TODAY!

If you did not receive the survey, or have misplaced the survey, please contact me by phone at (405) 744-9522 or via email at mustang66tlp@yahoo.com and request that a questionnaire packet be mailed to you.

Sincerely,

Tracy L. Parker
Cheryl A. Farr, Ph. D.

IN-HOME RECYCLING CENTER

RESEARCH SURVEY

Research Team
from the
Department of Design, Housing and Merchandising
College of Human Environmental Sciences
Oklahoma State University

Cheryl A. Farr, Ph.D.
Department of Design, Housing and Merchandising, OSU
Project Director
(405) 744-5035

Instructions: Circle ONE number that most closely corresponds to how strongly you agree or disagree with each statement. Remember: circling 1 means that you **strongly disagree** with the statement: circling 7 means you **strongly agree** with the statement: circling 4 would indicate that you are **neutral** and neither agree or disagree.

Example:

	Strongly Disagree						*Strongly Agree*
It is important to drive the speed limit	*1*	*2*	*3*	*4*	*5*	*6*	*7*

(Note: Circling the number 5 would imply that you moderately agree that driving the speed limit is important.)

	Strongly Disagree						Strongly Agree
1. I believe the landfills in the United States are in danger of reaching maximum capacity.	1	2	3	4	5	6	7
2. I am concerned about landfills reaching maximum capacity.	1	2	3	4	5	6	7
3. I believe that recycling materials will keep the landfills from reaching maximum capacity.	1	2	3	4	5	6	7
4. It is important to recycle newspapers.	1	2	3	4	5	6	7
5. It is important to recycle aluminum.	1	2	3	4	5	6	7
6. It is important to recycle glass.	1	2	3	4	5	6	7
7. It is important to recycle plastic.	1	2	3	4	5	6	7
8. It is important to recycle paper.	1	2	3	4	5	6	7
9. I believe that the "environment" is helped by recycling newspapers.	1	2	3	4	5	6	7
10. I believe that the "environment" is helped by recycling aluminum.	1	2	3	4	5	6	7
11. I believe that the "environment" is helped by recycling glass.	1	2	3	4	5	6	7
12. I believe that the "environment" is helped by recycling plastic.	1	2	3	4	5	6	7
13. I believe that the "environment" is helped by recycling paper.	1	2	3	4	5	6	7

The following questions concern recycling and "recycling centers." A recycling center is defined as a planned, built-in space for receptacles that allow the separation of household recyclable materials such as aluminum, plastic, and glass located where recyclable materials would be generated (i.e. kitchen, pantry).

Instructions: Circle the number to indicate the answer that best corresponds to each question.

14. Are you aware of the drop-off recycling program in [enter city]? (Circle the number)

    1 YES
    2 NO

15. Are you aware of the curbside recycling program in [enter city]? (Circle the number)

    1 YES
    2 NO

16. Do you participate in any type of recycling program in [enter city]? (Circle the number)

    1 YES, THE DROP-OFF RECYCLING PROGRAM
    2 YES, THE CURBSIDE RECYCLING PROGRAM
    3 YES, I PARTICIPATE IN BOTH PROGRAMS
    4 NO, I DO NOT PARTICIPATE IN EITHER OF THESE PROGRAMS

17. Do you recycle any of the following materials? (Circle **ALL** that apply)

    1 NEWSPAPER
    2 ALUMINUM
    3 GLASS
    4 PAPER
    5 PLASTIC
    6 OTHER (Please indicate)_____
    7 I DO NOT RECYCLING ANY OF THESE PRODUCTS

Instructions: Circle ONE number that most closely corresponds to how strongly you agree or disagree with each statement. Remember: circling 1 means that you **strongly disagree** with the statement: circling 7 means you **strongly agree** with the statement: circling 4 would indicate that you are **neutra**l and neither agree or disagree.

	Strongly Disagree						Strongly Agree
18. It is important to have an area in the home to separate recyclable material.....	1	2	3	4	5	6	7
19. A recycling center in the home would make separating recyclable material more convenient.....	1	2	3	4	5	6	7
20. A recycling center in the home would encourage recycling by the occupants in the home.....	1	2	3	4	5	6	7

Instructions: Circle the number to indicate the answer that best corresponds to each question.

21. Do you have a recycling center in your home? (Circle the number)

1 NO → 21a. Do you wish you had a recycling center in your home?

1 YES
2 NO

(Please skip to question #24.)

2 YES

22. Which of the following options best describes the reason you have a recycling center in your home? (Circle **ALL** that apply)

1 TO SEPARATE RECYCLABLE MATERIAL
2 FOR CONVENIENCE
3 OTHER (Please indicate) _____

23. Which of the following best describes the recycling center in your home or homes you [design/build]? (Please circle the BOX under the heading of the location of the recycling center in your home or homes you [design/build].

KITCHEN	UTILITY ROOM	BASEMENT
FREE-STANDING -one free-standing container	FREE-STANDING -one free-standing container	FREE-STANDING -one free-standing container
FREE-STANDING -multiple free-standing containers -How many containers? _____	FREE-STANDING -multiple free-standing containers -How many containers? _____	FREE-STANDING -multiple free-standing containers -How many containers? _____
UNDER COUNTER -one free-standing container	UNDER COUNTER -one container in a pull-out cabinet	UNDER COUNTER -one container in a pull-out cabinet
UNDER COUNTER -multiple free-standing containers -How many containers? _____	UNDERCOUNTER -multiple containers in a pull-out cabinet -How many containers? _____	UNDERCOUNTER -multiple containers in a pull-out cabinet -How many containers? _____
UNDER COUNTER -one container in a pull-out cabinet		
UNDER COUNTER -multiple containers in a pull-out cabinet -How many containers? _____		
PANTRY -one free-standing container		
PANTRY -multiple free-standing containers -How many containers? _____		

GARAGE	OTHER
FREE-STANDING -one free-standing container	Location in home: _____ Type of container: (Circle one.) 1. Free-standing 2. Under counter 3. Other _____ Number of containers _____
FREE-STANDING -multiple free-standing containers containers -How many containers? _____	
UNDER COUNTER -one container in a pull-out cabinet	**Comments or clarification about location/description of your recycling center.**
UNDERCOUNTER -multiple containers in a pull-out cabinet -How many containers? _____	

The following questions concern the subject of recycling centers related to your profession. Remember, a recycling center is defined as a planned, built-in space for receptacles that allow the separation of household recyclable materials such as aluminum, plastic, and glass located where recyclable materials would be generated (i.e. kitchen, pantry).

Instructions: For questions #24-28 & 30-31, circle the number to indicate the answer that best corresponds to each question.

24. When speaking with a client, how often do you use a set of questions or checklist of features to be included in the home design?

1 NEVER **(Please go to question #27.)**
2 RARELY
3 OCCASIONALLY
4 REGULARLY
5 ALWAYS
6 I DO NOT HAVE CONTACT WITH THE CLIENT **(Please go to question #28.)**
7 OTHER_____

25. Does one of the questions (in question #24) concern the incorporation of recycling centers into their homes (a section of cabinetry that allows easy sorting of recyclables)?

1 YES
2 NO

26. Does one of the questions (in #24) concern the including of an area or space designed to hold free-standing containers to allow for easy sorting of recyclables?

1 YES
2 NO

27. How often do clients request a section of cabinetry in an area of a home that allows easy sorting of recyclables?

1 NEVER
2 RARELY
3 OCCASIONALLY
4 REGULARLY
5 ALWAYS
6 OTHER_____

28. How often do you proactively incorporate a section of cabinetry in an area of a home that allows easy sorting of recyclables?

1 NEVER **(Please go to question #30.)**
2 RARELY
3 OCCASIONALLY
4 REGULARLY
5 ALWAYS
6 OTHER_____

29. If yes in question #28, describe the area in as much detail as possible (Please include design, number of receptacles, area of the home it is located in, etc.)

_____

_____

_____

30. Approximately what percentage of your designs contain the incorporation of a recycling center? (Please circle number)

1 0% **(Please go to question #32.)**
2 1-25%
3 26-50%
4 51-75%
5 75-100%

GO TO NEXT PAGE 

31. Of the percentage indicated in question #30, which of the following incorporated an in-home recycling center? (Please circle **ALL** that apply.)

1 MODEL HOMES
2 SEMI-CUSTOM HOMES
3 ENTIRELY CUSTOM HOMES
4 ALL HOMES REGARDLESS OF TYPE
5 OTHER_____

Finally, these questions concern yourself and your profession for statistical purposes.

32. Your position within the firm/company with which you are currently employed._____

33. Years with the firm/company with which you are currently employed._____

34. Years as a practicing professional._____

35. I am a(n): (Please circle number)

1 ARCHITECT
2 INTERIOR DESIGNER
3 HOME BUILDER

36. Within the **past year**, my projects have included (Circle **ALL** that apply)

1 RESIDENTIAL, SINGLE-FAMILY
2 RESIDENTIAL, MULTI-FAMILY
3 COMMERCIAL/RETAIL
4 INSTITUTIONAL
5 HOSPITALITY
6 OTHER (Please indicate)_____

37. Within the **past five years**, my projects have included (Circle **ALL** that apply)

1 RESIDENTIAL, SINGLE-FAMILY
2 RESIDENTIAL, MULTI-FAMILY
3 COMMERCIAL/RETAIL
4 INSTITUTIONAL
5 HOSPITALITY
6 OTHER (Please indicate)_____

38. What percentage of your business is residential? (Please circle number)

1 0-25%
2 26-50%
3 51-75%
4 76-100%

39. Highest education level/degree **completed**: (Please circle the highest level/degree)

HIGH SCHOOL	1 yr.	2 yrs.	3 yrs.	4 yrs.	5+ yrs.
COLLEGE	1 yr.	2 yrs.	3 yrs.	4 yrs.	5+ yrs.
ASSOCIATES DEGREE					
BACHELORS DEGREE					
MASTERS DEGREE					
DOCTORAL DEGREE					

Please use this space to make any additional comments concerning any if the items addressed in this questionnaire.

_____

_____

_____

Thank you for your participation in this survey. Your time and information is greatly appreciated. If you would like to receive a one-page summary of the results of this survey, please check the appropriate box below.

I would like to receive a one- page summary of the results of this survey.

☐ YES ☐ NO

If YES, please attach a business card or provide your name and address in the space below.**

****In order to insure your confidentiality, this page will be removed from the questionnaire and will be used only for mailing the summary.**

Thank you for your time.
Your participation in this research is greatly appreciated.

LAST PAGE. PLEASE MAIL TODAY!

APPENDIX B

MINNESOTA INSTRUMENT

Cover Letter Mailed with Survey

OSU

College of Human Environmental Sciences
Department of Design, Housing and Merchandising
431 Human Environmental Sciences
Stillwater, Oklahoma 74078-6142
405-744-5035

June 21, 2001

<<fname>> <<lname>>
<<organization name>>
<<address>>
<<city>>, <<st>> <<zip>>

Dear <<title>> <<lname>>,

To combat the staggering amount of municipal solid waste transported to the landfills, recycling programs have been implemented throughout the nation to intercept these used materials and create new products. According to a recent study, Minnesota was reported to have a 42% recycling rate, one of the highest in the nation. However, despite curbside and drop-off recycling programs, Oklahoma ranks among the lowest in recycling with only a 12% recycling rate. Obviously, the attitudes of residents and effective recycling programs have attributed to Minnesota's impressive recycling rate. You have been selected from a group of your professional peers for participation in an in-home recycling center research study. This study will address recycling and the incorporation of areas within the home, specifically a section cabinetry that allows sorting of recyclable materials. The results of this research will hopefully educate the design professionals and public in the state of Oklahoma to the factors that contribute to a high recycling rate among Minnesotans.

Enclosed you will find the comprehensive questionnaire developed for this study. Although your participation is voluntary, your participation is important. If you choose not to participate, there will be no penalty not or in the future. Please return the questionnaire as soon as possible. Postage has been affixed to the questionnaire for your convenience.

I would like to assure you that your responses will be confidential. A numerical code has been assigned to each person sent a survey. Except for mailing this questionnaire, names are kept separately in a locked file. All findings will be reported as aggregate data and no individual will be identified in any manner. Only the numerical code is used for data entry and analysis; no names will be used. The number found on the last page of the questionnaire is for tracking purposes only. Please do not remove or mark through the number. Remember, this number is on the page that will be removed from the questionnaire. Upon completion of the research, the questionnaires will be destroyed. If you have any questions concerning confidentiality, you can contact me at (405) 624-4664, the project director at (405) 744-9522, or the Office of Research Compliance at (405) 744-5700. The Office of Research Compliance is located on the Oklahoma State University Campus at 203 Whitehurst, Stillwater, Oklahoma 74078.

This questionnaire will take approximately 20-30 minutes to complete. An area at the end of the questionnaire is available for requesting a one-page summary of the results of this study This page will be removed from the questionnaire before analysis. Thank you for your participation.

Sincerely,

Tracy L. Parker
OSU Graduate Student

Cheryl A. Farr, Ph.D.
Project Director

Follow-Up Postcard 1

Have you mailed your recycling survey?

If you have already completed and returned the survey, please accept my sincere thanks. If not, please complete and mail the survey TODAY!

The information you provide regarding recycling and in-home recycling centers is important to the state of recycling and implementation of in-home recycling centers in the state of Minnesota. If you did not receive the survey, or have misplaced the survey, please contact me by phone at (405) 744-9522 or through email at mustang66tlp@yahoo.com and request that a questionnaire packet be mailed to you.

Tracy L. Parker
Cheryl A. Farr, Ph. D.

Follow-Up Postcard 2

Your opinion is important to us!

We really care about your information. Your input is important so as to understand the high rate of recycling in Minnesota. We would also like to find out about the implementation of in-home recycling centers in homes in Minnesota. This information will be useful to design professionals and the residents of Oklahoma to increase the recycling rate in this state.

If you have already completed and returned the survey, please accept my sincere thanks. If not, please complete and mail the survey TODAY!

If you did not receive the survey, or have misplaced the survey, please contact me by phone at (405) 744-9522 or via email at mustang66tlp@yahoo.com and request that a questionnaire packet be mailed to you.

Sincerely,

Tracy L. Parker
Cheryl A. Farr, Ph. D.

IN-HOME RECYCLING CENTER

RESEARCH SURVEY

Research Team

from the

Department of Design, Housing and Merchandising
College of Human Environmental Sciences
Oklahoma State University

Cheryl A. Farr, Ph.D.
Department of Design, Housing and Merchandising, OSU
Project Director
(405) 744-5035

Instructions: Circle ONE number that most closely corresponds to how strongly you agree or disagree with each statement. Remember: circling 1 means that you **strongly disagree** with the statement: circling 7 means you **strongly agree** with the statement: circling 4 would indicate that you are **neutral** and neither agree or disagree.

Example:	*Strongly Disagree*						*Strongly Agree*
It is important to drive the speed limit	*1*	*2*	*3*	*4*	*5*	*6*	*7*

(Note: Circling the number 5 would imply that you moderately agree that driving the speed limit is important.)

	Strongly Disagree						Strongly Agree
1. I believe the landfills in the United States are in danger of reaching maximum capacity.	1	2	3	4	5	6	7
2. I am concerned about landfills reaching maximum capacity.	1	2	3	4	5	6	7
3. I believe that recycling materials will keep the landfills from reaching maximum capacity	1	2	3	4	5	6	7
4. It is important to recycle newspapers	1	2	3	4	5	6	7
5. It is important to recycle aluminum	1	2	3	4	5	6	7
6. It is important to recycle glass	1	2	3	4	5	6	7
7. It is important to recycle plastic	1	2	3	4	5	6	7
8. It is important to recycle paper	1	2	3	4	5	6	7
9. I believe that the "environment" is helped by recycling newspapers	1	2	3	4	5	6	7
10. I believe that the "environment" is helped by recycling aluminum	1	2	3	4	5	6	7
11. I believe that the "environment" is helped by recycling glass	1	2	3	4	5	6	7
12. I believe that the "environment" is helped by recycling plastic	1	2	3	4	5	6	7
13. I believe that the "environment" is helped by recycling paper	1	2	3	4	5	6	7

The following questions concern recycling and "recycling centers." A recycling center is defined as a planned, built-in space for receptacles that allow the separation of household recyclable materials such as aluminum, plastic, and glass located where recyclable materials would be generated (i.e. kitchen, pantry).

Instructions: Circle the number to indicate the answer that best corresponds to each question.

14. Do you participate in the recycling program in the Minneapolis/St. Paul area? (Circle the number.)

    1 YES **(Please continue to question #15.)**
    2 NO **(Please go to question #18)**

15. If yes, for what reason do you participate in this recycling program?)? (Circle **ALL** that apply.)

    1 IT IS MANDATORY THAT I PARTICIPATE IN THIS PROGRAM
    2 IN ORDER TO REDUCE THE AMOUNT OF WASTE GOING TO LANDFILLS.
    3 OTHER (Please indicate)_____

16. What type(s) of recycling programs are available in the Minneapolis/St. Paul area? (Circle **ALL** that apply.)

    1 CURBSIDE RECYCLING PROGRAM
    2 DROP-OFF RECYCLING PROGRAM
    3 DEPOSITE RECYCLING PROGRAM
    4 OTHER (Please indicate)_____

17. What types of materials are collected in the recycling programs listed in question #16? (Circle **ALL** that apply)

    1 NEWSPAPER
    2 ALUMINUM
    3 STEEL
    4 GLASS
    4 PAPER
    6 PLASTIC
    7 OTHER (Please indicate)_____

Instructions: Circle ONE number that most closely corresponds to how strongly you agree or disagree with each statement. Remember: circling 1 means that you **strongly disagree** with the statement: circling 7 means you **strongly agree** with the statement: circling 4 would indicate that you are **neutral** and neither agree or disagree.

	Strongly Disagree						Strongly Agree
18. It is important to have an area in the home to separate recyclable material.....	1	2	3	4	5	6	7
19. A recycling center in the home would make separating recyclable material more convenient.....	1	2	3	4	5	6	7
20 A recycling center in the home would encourage recycling by the occupants in the home.....	1	2	3	4	5	6	7

Instructions: Circle the number to indicate the answer that best corresponds to each question.

21. Do you have a recycling center in your home? (Circle the number)

1 NO → 21a. Do you wish you had a recycling center in your home?

1 YES
2 NO

(Please skip to question #24.)

2 YES ↓

22. Which of the following options best describes the reason you have a recycling center in your home? (Circle **ALL** that apply)

1 TO SEPARATE RECYCLABLE MATERIAL
2 FOR CONVENIENCE
3 OTHER (Please indicate)_____

23. Which of the following best describes the recycling center in your home or homes you [design/build]? (Please circle the BOX under the heading of the location of the recycling center in your home or homes you [design/build].

KITCHEN	UTILITY ROOM	BASEMENT
FREE-STANDING -one free-standing container	FREE-STANDING -one free-standing container	FREE-STANDING -one free-standing container
FREE-STANDING -multiple free-standing containers -How many containers? _____	FREE-STANDING -multiple free-standing containers -How many containers? _____	FREE-STANDING -multiple free-standing containers -How many containers? _____
UNDER COUNTER -one free-standing container	UNDER COUNTER -one container in a pull-out cabinet	UNDER COUNTER -one container in a pull-out cabinet
UNDER COUNTER -multiple free-standing containers -How many containers? _____	UNDERCOUNTER -multiple containers in a pull-out cabinet -How many containers? _____	UNDERCOUNTER -multiple containers in a pull-out cabinet -How many containers? _____
UNDER COUNTER -one container in a pull-out cabinet		
UNDER COUNTER -multiple containers in a pull-out cabinet -How many containers? _____		
PANTRY -one free-standing container		
PANTRY -multiple free-standing containers -How many containers? _____		

GARAGE	OTHER
FREE-STANDING -one free-standing container	Location in home:_____ Type of container: (Circle one.) 1. Free-standing 2. Under counter 3. Other _____ Number of containers_____
FREE-STANDING -multiple free-standing containers containers -How many containers? _____	
UNDER COUNTER -one container in a pull-out cabinet	**Comments or clarification about location/description of your recycling center.**
UNDERCOUNTER -multiple containers in a pull-out cabinet -How many containers?_____	

The following questions concern the subject of recycling centers related to your profession. Remember, a recycling center is defined as a planned, built-in space for receptacles that allow the separation of household recyclable materials such as aluminum, plastic, and glass located where recyclable materials would be generated (i.e. kitchen, pantry).

Instructions: For questions #24-28 & 30-31, circle the number to indicate the answer that best corresponds to each question.

24. When speaking with a client, how often do you use a set of questions or checklist of features to be included in the home design?

1 NEVER (**Please go to question #27.**)
2 RARELY
3 OCCASIONALLY
4 REGULARLY
5 ALWAYS
6 I DO NOT HAVE CONTACT WITH THE CLIENT **(Please go to question #28.)**
7 OTHER_____

25. Does one of the questions (in question #24) concern the incorporation of recycling centers into their homes (a section of cabinetry that allows easy sorting of recyclables)?

1 YES
2 NO

26. Does one of the questions (in #24) concern the including of an area or space designed to hold free-standing containers to allow for easy sorting of recyclables?

1 YES
2 NO

27. How often do clients request a section of cabinetry in an area of a home that allows easy sorting of recyclables?

1 NEVER
2 RARELY
3 OCCASIONALLY
4 REGULARLY
5 ALWAYS
6 OTHER_____

28. How often do you proactively incorporate a section of cabinetry in an area of a home that allows easy sorting of recyclables?

1 NEVER **(Please go to question #30.)**
2 RARELY
3 OCCASIONALLY
4 REGULARLY
5 ALWAYS
6 OTHER_____

29. If yes in question #28, describe the area in as much detail as possible (Please include design, number of receptacles, area of the home it is located in, etc.)

_____

_____

_____

30. Approximately what percentage of your designs contain the incorporation of a recycling center? (Please circle number)

1 0% **(Please go to question #32.)**
2 1-25%
3 26-50%
4 51-75%
5 75-100%

31. Of the percentage indicated in question #30, which of the following incorporated an in-home recycling center? (Please circle **ALL** that apply.)

1 MODEL HOMES
2 SEMI-CUSTOM HOMES
3 ENTIRELY CUSTOM HOMES
4 ALL HOMES REGARDLESS OF TYPE
5 OTHER_____

Finally, these questions concern yourself and your profession for statistical purposes.

32. Your position within the firm/company with which you are currently employed._____

33. Years with the firm/company with which you are currently employed._____

34. Years as a practicing professional._____

35. I am a(n): (Please circle number)

1 ARCHITECT
2 INTERIOR DESIGNER
3 HOME BUILDER

36. Within the **past year**, my projects have included (Circle **ALL** that apply)

1 RESIDENTIAL, SINGLE-FAMILY
2 RESIDENTIAL, MULTI-FAMILY
3 COMMERCIAL/RETAIL
4 INSTITUTIONAL
5 HOSPITALITY
6 OTHER (Please indicate)_____

37. Within the **past five years**, my projects have included (Circle **ALL** that apply)

1 RESIDENTIAL, SINGLE-FAMILY
2 RESIDENTIAL, MULTI-FAMILY
3 COMMERCIAL/RETAIL
4 INSTITUTIONAL
5 HOSPITALITY
6 OTHER (Please indicate)_____

38. What percentage of your business is residential? (Please circle number)

1 0-25%
2 26-50%
3 51-75%
4 76-100%

39. Highest education level/degree **completed**: (Please circle the highest level/degree)

HIGH SCHOOL	1 yr	2 yrs.	3 yrs.	4 yrs.	5+ yrs.
COLLEGE	1 yr	2 yrs.	3 yrs.	4 yrs.	5+ yrs.
ASSOCIATES DEGREE					
BACHELORS DEGREE					
MASTERS DEGREE					
DOCTORAL DEGREE					

Please use this space to make any additional comments concerning any if the items addressed in this questionnaire.

_____

_____

_____

Thank you for your participation in this survey. Your time and information is greatly appreciated. If you would like to receive a one-page summary of the results of this survey, please check the appropriate box below

I would like to receive a one- page summary of the results of this survey.

☐ YES ☐ NO

If YES, please attach a business card or provide your name and address in the space below.**

****In order to insure your confidentiality, this page will be removed from the questionnaire and will be used only for mailing the summary.**

Thank you for your time.
Your participation in this research is greatly appreciated.

LAST PAGE. PLEASE MAIL TODAY!

APPENDIX C

INTERNAL REVIEW BOARD APPROVAL

Oklahoma State University
Institutional Review Board

Protocol Expires: 5/21/02

Date: Tuesday, May 22, 2001 IRB Application No HE0163

Proposal Title: TWO PERSPECTIVES OF IN-HOME RECYCLING CENTERS

Principal Investigator(s):

Tracy Parker
514 N. Knoblock #6
Stillwater, OK 74075

Cheryl A. Farr
431 HES
Stillwater, OK 74078

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

Dear PI :

Your IRB application referenced above has been approved for one calendar year. Please make note of the expiration date indicated above. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved projects are subject to monitoring by the IRB. If you have questions about the IRB procedures or need any assistance from the Board, please contact Sharon Bacher, the Executive Secretary to the IRB, in 203 Whitehurst (phone: 405-744-5700, sbacher@okstate.edu).

Sincerely,

Carol Olson

Carol Olson, Chair
Institutional Review Board

VITA 2

Tracy L. Parker

Candidate for the Degree of

Master of Science

Thesis: TWO PERSPECTIVES OF IN-HOME RECYCLING CENTERS

Major Field: Design, Housing, and Merchandising

Biographical:

Personal Data: Born in Tulsa, Oklahoma, August 7, 1976, the daughter of Don and Jean Parker. Will marry Michael A. Lewis, March 23, 2002 and reside in the Oklahoma City, Oklahoma area.

Education: Graduated from Charles Page High School, Sand Springs, Oklahoma in May, 1994; Attended Oklahoma Baptist University, Shawnee, Oklahoma from 1994 to 1996; Received Bachelor of Science degree in Biological Sciences from Oklahoma State University, Stillwater, Oklahoma, in May 1998; Completed the Requirements for the Master of Science degree at Oklahoma State University in December, 2001.

Professional Experience: Graduate Assistant, Department of Design, Housing, and Merchandising, Oklahoma State University, January 1999 to May, 2001; Interior Design Intern, Sheri Mayer Williams Interiors, Inc., May 1999 to August 1999; Interior Design Intern, McKinney Aerospace, McKinney, Texas, May 2000 to August 2000; Aircraft interior Designer, Capital Aviation, Inc., Bethany, Oklahoma, July 2001 to present.