PREFERENCES FOR UNIVERSAL DESIGN FEATURES IN APPAREL RETAIL STORES BY OLDER FEMALE APPAREL CUSTOMERS

DISSERTATION
Presented in Partial Fulfillment of the Requirements for The Degree of Doctor of Philosophy in the Graduate School of The Ohio State University

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**

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ABSTRACT

Contrary to popular belief, older adults are interested in participating in shopping activities. However, changes in both physical and cognitive abilities may limit or prevent an older individual from doing so if the retail store is not designed to accommodate their needs. Universal Design features can be implemented into a retail store to address these functional issues.

Although Universal Design creates an accommodating and aesthetically-pleasing environment to people of all ages (Null, 1989), this research study focused on senior women. The purpose was to learn what Universal Design features are preferred in a brick-and-mortar apparel store, so that retailers can provide a more approachable shopping environment for older adults. The research 1) explored the preference of Universal Design features (value contrast, no pattern, focal point, continuous floor material, open spaces between fixtures on the selling floor, and wide aisles), 2) assessed if groups of Universal Design features influence approach behaviors based on preferences of pairs of photographs, 3) developed an instrument survey that can be used in future research, and 4) created a model integrating approach-avoidance theory (Mehrabian & Russell, 1974), the ecological model of aging/person environment fit theory (Lewin, 1935), and Universal Design features in a retail store.
This study consisted of a convenience sample of 127 participants recruited from senior organizations throughout Columbus, Ohio. The instrument consisted of the Universal Design Retail Preference Survey (UDRPS), and a demographic questionnaire. The UDRPS consisted of 24 pairs of black-and-white photographs of Universal Design features and open-ended questions that were asked in order to collect feedback on photograph preferences. A power point presentation was presented simultaneously at the data collection. Seven pilot studies were also conducted.

Major results indicated that participants selected Universal Design most of the time (73.6%), and were concerned the most with spatial issues, such as narrow aisles, and lack of open spaces. A K-means cluster analysis classified participants into three groups based on preferences of photographs and demographic characteristics. Implications for retailers are to use 1) 60 inch wide aisles and open floor spaces, and 2) informative focal points with strong value contrast.
Dedicated to my husband, John…

Your endless and incredible support, patience, and continuous encouragement has followed me through this academic journey from the very beginning. I thank you immensely.
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CHAPTER 1

INTRODUCTION

To be successful in the apparel marketplace can be interpreted as understanding your customer. This is one of the seven rules in marketing (Schermerhorn, 2005). Surprisingly, not all apparel retailers appear to abide to this rule wholeheartedly as many are neglecting to realize that demographic consumer populations differ in functional and cognitive abilities.

Understanding Your Customer

Shopping for apparel is a popular activity among women, ages fifty-five and older. Their continuing desire to be involved in apparel shopping purchases, their financial means, and the rapid expected growth of their demographic segment, should persuade retailers to design stores in ways to address needs arising from declining functional abilities that occur during the normal aging process. Normal aging includes disabilities, such as the decline of vision and loss of mobility (Morgan & Kunkel, 2001).

Solomon and Rabolt (2004) suggested that a retailer should “figure out how to communicate with members of an age group in their own language” (p. 178). They can do this by identifying and understanding their customers’ needs and responding to the demands of the market (Chu & Lam, 2002;
Le Pechoux, Little & Istook, 2002). Understanding these needs will set them apart from other retailers and provide them with a competitive advantage (Chu & Lam, 2002). Therefore, it should behoove retailers targeting older women to invest in the well-being of their customers and sustain their business by creating captivating and comfortable shopping environments where these customers would want to spend time.

Contrary to popular belief, the elderly population has substantial financial means to spend on apparel goods (Moye & Giddings, 2002). The authors also suggested that older adults are no different than other consumer groups in that they are also interested in many products and services.

A review of the research also indicated that the senior cohort is expected to grow rapidly in the near future. According to Sutherland (2005), the American population group of 55 and older, is expected to grow the fastest over the next decade. Hoke (2005) also confirmed that by 2050, persons “age 65 and over will compose about 15 percent of the world’s population, up from about seven percent today” (p. 1).

Purchasing Decisions

According to Etzel, Walker and Stanton (1997), customers’ purchasing decisions are based on their “level of involvement” (p. 112) in a buying situation. In other words, a customer should be able to “collect and evaluate information about the purchase decision” (Etzel, Walker & Stanton, p. 112) without getting discouraged and having a feeling as if they want to exit the situation.
Chu and Lam (2002) explained that a shopping environment appropriately suited towards its customers influences a pleasurable and memorable experience which will keep them coming back. Solomon and Rabolt (2004) suggested that a company should build loyalty and maintain relationships with their customers. Therefore, to do this, retailers should design their stores so that older customers are at ease with their surroundings.

*Ideal Shopping Environments For Older Women*

Based on approach-avoidance theory (Mehrabian & Russell, 1974), an individual will want to spend time, or “approach” an environment where she feels “happy, or satisfied” (Donovan & Rossiter, 1982, p. 38). Donovan and Rossiter (1982) also mentioned that feeling “active” (p. 38) also leads to approach behaviors. For example, in a retail store, to be active may be defined as the ability to function in the apparel environment, whether it is through locating a department or appropriate sizes of clothing, observing a way in which a mannequin is dressed or clothes are merchandised, or even walking between fixtures without tripping or bumping into obstructive objects.

This ideal shopping environment would project a comfortable and safe place to shop. In a retail environment, having a limited vision ability may influence the way in which a retail customer may observe a product. For example, the individual may miss the product entirely or she might misconstrue the style or its function. However, by implementing adaptive features to a retail environment, individuals will be able to function more easily. This concept is known as “Universal Design.”
Universal Design can be defined as an environment that is accessible and aesthetically-pleasing to people of all ages and abilities (Null, 1989). With the implementation of Universal Design, declining abilities of older women would be accommodated and they would want to return again and again. These Universal Design features can assist the customer in being able to adjust to the retail environment by providing a less difficult approach.

Purpose Of The Study

The purpose of this study is to provide apparel retailers with information on how to create a Universally-Designed retail store environment: specifically, to learn what Universal Design features apparel retailers can implement in order to create both an aesthetically-pleasing and accessible environment, where women ages 55 and older may continue to shop as they age.

Implications Of The Study

A career and experiences in both the apparel retail industry and academia have inspired the author of this dissertation to ponder what more retail stores can do to encourage older women to continue participating in shopping activities, whether they be for buying essential products, or merely for pleasurable hobbies. Shopping is essential to our independence as it enables us to maintain a healthy life by purchasing food and apparel necessities. Willis (1996) explained that shopping is considered to be an Instrumental Activity of Daily Living (IADL), which is crucial for being independent. This research investigates what can be
done to encourage older adults to continue participating in shopping activities. It is important that our American society realizes that growing older does not necessarily mean that we need to give up shopping.

This discussion leads the researcher to wonder what and how Universal Design features in a retail store, such as signage, flooring, and space, impact the shopping behaviors of women ages 55 and older. The findings of this dissertation will contribute to other Universal Design research to explore what retailers can do to provide an environment that can be easily accessible and aesthetically-pleasing.

Universal Design connotes an environment made for people of all ages and abilities (Null, 1989). However, this study will focus on older adults, and specifically women, as a review of the literature resolved that there is a lack of research on Universal Design in retail environments. In fact, most of the research focuses on residential interiors. Additionally, minimal academic research appears to exist on the shopping preferences of the senior population.

Another reason for this study is based on the fact that the baby boomer population is beginning to reach retirement age (Sutherland, 2005). The researcher has observed that in our American culture, we are constantly reminded through media advertisements relating to age-defying beauty products, pharmaceutical medicine, and accessibly-designed products that this generation is getting older. The baby boomer theme is evident everywhere.

According to Novelli (2002), marketers in the past have assumed that people over the age of 50 lost interest in activities that they once enjoyed. In
other words, marketers assumed that these individuals were simply just getting old. However, the boomer population has changed this assumption and the overall definition of “senior.”

Novelli (2002) discussed how the baby boomer generation does not focus on age but instead on living a fulfilling life. In essence, they are filled with energy, and now many of them will have extra leisure time to spend on activities (Novelli, 2002), like shopping.

The baby boomer population is also wealthy compared to other demographic groups- “they have 77% of the financial assets and 57% of the discretionary income” (Novelli, 2002, p. 2). Therefore, perhaps it can be stated that the baby boomers are unveiling a “new” retirement age where being sixty years old is like living like they are forty years old. Thus, it is time for retailers in the marketplace to prepare for this change by creating apparel stores to build loyalty with this next wave of influential seniors (Oates, Shufeldt & Vaught, 1996).

Linking the future baby boomer retirees with the existing aging population speaks strongly to retailers, as they need to address how they will accommodate more frail people in their stores. As the research shows that both demographic segments have the interest and financial means to shop (Novelli, 2002; Moye & Giddings, 2002), it would be wise for retailers to take the initiative to implement Universal Design.
Objectives

The objectives of this study were:

- To explore what Universal Design features (value contrast, no pattern, focal point, continuous floor material, open spaces between fixtures on the selling floor, and wide aisles) are preferred and not preferred in an apparel retail store by women, ages 55 and older
- To assess if Universal Design features influence approach behaviors based on respondents’ preferences of pairs of photographs
- To develop a survey instrument that can be used in future research to analyze preferences for Universal Design features
- To create a model integrating 1) approach-avoidance theory, 2) the ecological model of aging/person-environment fit theory, and 3) Universal Design features accessible in an apparel retail store

Limitations

This research study was limited to older women, ages 55 and older, living in senior residential communities including independent living facilities, and/or active in senior social groups. It was assumed that these women were still physically active and continued to participate in retail shopping activities. This study was also limited to older, female residents of the Midwest.
Definition Of Terms

- **Activities of Daily Living (ADLs):** A measurement or evaluation of an individual’s accomplishments of daily rituals or life patterns (Morgan & Kunkel, 2001)

- **Universal Design:** The philosophy that people of all ages and abilities can function optimally and independently in an environment (Null, 1989)

- **Approach Behaviors:** Choosing to enter or stay in an environment based on pleasurable surroundings (Mehrabian & Russell, 1974)

- **Avoidance Behaviors:** Choosing to leave an environment based on non-pleasurable surroundings (Mehrabian & Russell, 1974)

- **Environmental Press:** Characteristics or tools in an environment that help a particular need (Lawton, 1982).
CHAPTER 2

REVIEW OF LITERATURE

This chapter provides a review of 1) the aging process including the decline in functional cognitive and physical abilities, 2) functional characteristics of a retail store environment, including ADA guidelines and Universal Design features 3) older female shopper demographics, 4) a review of the theoretical frameworks pertaining to the study, and 5) a conclusion. This chapter also includes a photo review of current practices in retail stores, which will be used to illustrate points. These photographs were taken by the author of this dissertation.

The Aging Process

The way in which an individual’s body reacts/responds to aging is related to genes, biology, race, gender and socioeconomic status (Quadagno, 2005). However, good nutrition, regular exercise and progressive medicine also contribute to this process (Caldwell, 2003; Moschis, 2003). Moschis (2003) explained that across the world, there are approximately 600 million people living who are over the age of 60. He also stated that the human life span has grown 30 years in the twentieth century. According to the U.S. Census Bureau (2000),
21% of the population today is aged 55 or older. This same report showed that approximately 50.9% of the U.S. population is female, and 23.2% of the female population is age 55 and older. In USA Today (2006), it was referenced that the oldest age group in America (85 and older) consists of 3.4 million women, while men as a group include 1.5 million. Additionally, in a Deloitte research study, Pak and Kambil (2005) indicated that among individuals in the world, those ages 88 and older, are growing the fastest.

**Components Of Successful Aging**

According to Rowe and Kahn (1998), to age successfully means to prevail in the following components: “1) avoiding disease and disability; 2) maintaining high mental and physical function; and 3) continuing to engage actively in life, through productivity and strong interpersonal relationships” (p. 29). These authors stated that this information was based on a grant funded by the MacArthur Foundation to improve knowledge about the overall aging of Americans.

Rowe and Kahn (1998) also acknowledged that this project took place over the span of ten years, and that the researchers were from many medical disciplines including, geriatrics, sociology, psychology, biology, and neuroscience. They indicated that one of the purposes of the MacArthur Foundation research was to investigate and clarify information and misconceptions about aging, and to provide a fresh and positive outlook (p. xi-xiv).

**Changes In Cognitive And Physical Abilities**
Although levels of changes differ for every individual, aging persons will eventually experience some degree of cognitive or physical impairment in their lifetime (Pak & Kambil, 2005). Quadagno (2005), Cavanaugh and Blanchard-Fields (2002), and Morgan and Kunkel (2001) stated that these physical changes can be measured by levels of Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL) competently performed. The authors indicated that ADLs include basic self-care activities such as getting out of bed, going to the bathroom, brushing one’s hair and teeth, getting dressed, and walking. They explained that IADLs include shopping, paying bills, light housework, running errands and taking medicine and talking on the phone. Therefore, shopping is a critical life skill for successful aging not only for social engagement but for being able to purchase basic items, such as food and apparel.

Without being able to shop for these basic items, an individual must rely on someone else. Thus, the individual is not able to function independently on her own, or to hunt and gather for herself, so-to-speak. Therefore, to summarize, Willis (1996) explained that the level of IADLs competently performed determine if an individual is capable to function independently. He also reaffirmed that one of the biggest fears in older adults is losing independence.

Fricke and Unsworth (2001) explored the use of time and the importance of IADLs in older adults in Australia. They asked 33 participants to record time and discuss their feelings on tasks that are performed in their everyday lives. In addition, these researchers explored the importance of the perception of IADLs in
occupational therapists. They reported that their participants spent much of their
time at home, and half of their day was spent on IADLs. Their findings showed
that participants spent most of their time reading, driving and other forms of
transportation, and talking on the telephone. Perhaps these participants stated
transportation because this allows them the ability to be independent and
conduct shopping activities.

Cavanaugh and Blanchard-Fields (2002) defined IADLs as activities that
require some intellectual capabilities, including the tasks mentioned earlier.
Raina, Wong, and Massfeller (2004) sampled adults ages 55 and older with
vision and hearing disabilities and found that disabilities in vision and hearing
may restrict more IADLs than ADLs, since IADLs are intellectually task-oriented.
However, the authors found that vision had more of an impact on these activities.

ADLs and IADLs both determine how capable an individual is of being
independent (Morgan & Kunkel, 2001). In other words, the succession of daily
activities in a person’s life depends on how well he or she functions both
cognitively and physically. In a retail store, thus pertaining to this dissertation,
shopping activities are based on IADLs but also ADLs because an individual
needs to be able to walk (or maneuver through the store in a wheelchair or
walker) and get dressed when trying clothes on in a dressing room.

Sherman, Schiffman and Mathur (2001) suggested that age helps us to
project an individual’s cognitive and physical needs but it should not stereotype
every person in the senior population. According to Kennett, Moschis and
Bellenger (1995), this type of aging, or normal aging, is known as “biophysical”
These authors stated that biophysical aging affects the way in which an individual cognitively processes information in daily activities.

Cognitive decline corresponds to mental abilities or intellectual functioning such as in loss of memory, minimal concentration, disorientation or confusion (Quadagna, 2005; Morgan & Kunkel, 2001). Cross (1981) suggested that older adults in general take more time to absorb, process, and comprehend the information than to react. Also, individuals experience a decline in functional abilities at different times; therefore age cannot be classified or categorized chronologically (Moschis, 2003).

D’Astous (2002) explained that the cognitive part of the aging process might affect the perception of visual cues and stimuli. For example, a busy environment, such as a department store with multiple fixtures, may cause sensory over stimulation and confusion. In looking at 281 shoppers consisting of both women and men, he resolved that “women are more irritated than men by displeasing features” (p. 154). He also found that age may be a determining factor in a shopper’s irritability. Cognitive impairment might affect an individual’s ability to understand and remember external retail design cues associated with signage, lighting or color (Hunt, 1991). A person with declining cognitive abilities may also have difficulties in a retail environment because he or she may overlook important product information.

Rowe and Kahn (1998) explained that normal aging also involves a “steady decline” (p. 100) in physical abilities. The authors described the weakening and shrinking of muscles, loss of balance, and slow-walking as
“sarcopenia” (p. 100), and stated that this process actually begins in middle age. Physical impairment often relates to muscle and bone strength and dexterity and affects the functioning of an individual’s mobility or balance in general (Pak & Kambil, 2005; Morgan & Kunkel, 2001). Additionally, a decline in physical and ambulatory mobility may be a result of health problems, such as osteoporosis or stroke (Crews, 2005). An individual who experiences loss in mobility may turn to the help of a wheelchair or a walker.

Other physical issues include declining vision. According to Orr (1992), it is difficult to know for sure how many people over the age of 65 suffer from vision problems. The author stated that researchers suspect the current data are underrepresented due to difficulties in collecting accurate information. Mitchell (1992) suggested that the decline of physiological senses occur differently for every individual. Although Robson, Nicholson, and Barker (1997) indicated that most older adults suffer from some form of vision problem which can affect reading and visualizing objects. Orr (1997) and Rosenblum (1992) and American Association of Retired Persons (AARP) (1987) explained the general conditions that may occur to the average older adult:

- **Cataracts** – progressive clouding of the eye lens which usually occurs in one eye at a time; eventually color blindness may occur
- **Diabetic retinopathy** – damaged blood vessels supporting the retina
- **Glaucoma** – intraocular pressure in the eye contributes to optic nerve damage; loss of field of vision or total blindness may occur
• Age-related macular degeneration – a slow loss of reading and distance vision; loss of front vision allowing only for side or peripheral vision

Snyder (1978) also described other general aging issues which include a yellowing and thickening lens, tired muscles, sensitivity to glare or light, and depth perception.

Store Environment: Functional

There are various characteristics that affect how a store affects peoples’ changing functional needs. Store designers are advised to use the Americans for Disability Act (ADA) requirements and Universal Design recommendations to accommodate these needs. ADA and Universal Design are often mistaken for the same thing, when both should be used together (Mace, n.d.).

ADA Guidelines Versus Universal Design

Although Universal Design is not mandated by law, the concept does advocate both aesthetic and adaptable features for everyone (Null, 1989). ADA, on the other hand, is composed of federal guidelines that address mandatory guidelines and building codes (Mace, n.d.). He explained that the ADA requirements are based on accessibility; they are design guidelines for public environments which acknowledge challenges to access for individuals with disabilities through the use of spatial measurements and requirements. He also indicated that Universal Design is instead “consumer market driven” and is suitable for all individuals, encouraging everyone to be independent. Knecht
(2004) clearly defined the two philosophies as, “Accessibility is a mandate; universal design is a movement” (p. 1).

**ADA Guidelines**

The Americans with Disabilities Act (ADA) was initiated to ensure that persons with disabilities can exist comfortably in interior and exterior environments (Kaufman-Scarborough, 2001) through easy accessibility. Dobkin and Peterson (1999) stated that ADA was first passed in 1990, and its guidelines for public spaces were created in 1991. ADA simply states that “Public accommodations must comply with basic nondiscrimination requirements that prohibit exclusion, segregation, and unequal treatment” (U.S. Department of Justice, 2005). Leibrock and Terry (1999) explained that ADA promotes minimum standards, which unifies individuals into groups based on levels of physical capabilities. The authors suggested that unlike Universal Design, these standards are not really meeting the needs of everyone because they focus on already disabled persons.

According to the U.S. Department of Justice (2005), a civil rights violation can be issued if businesses fail to comply with these ADA guidelines. This document also stated, “public accommodations must remove barriers in existing buildings where it is easy to do so without much difficulty or expense, given the public accommodation's resources.” In 2004, the Office of Massachusetts Attorney General Tom Reilly, provided retailers with a letter drawing attention to ADA (Moore, 2004). The author suggested that retail stores are public spaces, therefore required to abide by ADA Guidelines.
Kaufman-Scarborough (1998) and her students conducted interviews of 22 retailers to investigate how familiar they were with ADA Guidelines. They concluded that only 16 out of the 22 retailers had familiarity with ADA, and most of the responses were unspecified. For example, Kaufman-Scarborough (1998) stated, “they provided relatively vague replies (“allowing disabled persons to have access”) or responding in terms of some structural requirement such as special parking spaces, easy-opening doors, wheelchair access and ramps, and wide aisles” (p. 101). It should be noted however that she did find that “64% of the retailers reported that they do have policies in force” (p. 101).

The U.S. Small Business Administration & U.S. Department of Justice (1999) stated, that “the Americans with Disabilities Act (ADA) is a Federal civil rights law that prohibits the exclusion of people with disabilities from everyday activities, such as buying an item in a store…” (p. 1). The U.S. government has established particular guidelines that developers of public spaces need to follow. The ADA guidelines that are critical for the design of a retail store include: accessible entrances, 36 inch wide doors, and open spaces of at least 3 feet x 3 feet, 36 inch high and 36 inches long sales counters, adequate and readable signage, and aisles of 36 inches wide” (The U.S. Small Business Administration & U.S. Department of Justice, 1999). The U.S. Department of Justice (2001) also indicated that stores should provide the customer help with locating products and reading prices. Kaufman-Scarborough (2001) stated that accessibility for individuals with disabilities should not only be about maneuverability in and out of the environment. She also suggested that ADA should instead also be about
providing an environment where the individual can and would prefer to shop. This is where the aesthetic and adaptability of Universal Design enters into the picture.

*Universal Design*

Although Universal Design is often linked to senior citizens, the concept is used to describe an environment that is accessible and aesthetically-pleasing to people of all ages and abilities (Null, 1989). The concept suggests that the implementation of Universal Design should be inconspicuous, or “subtle” (Armstrong, 2005) so that the features of the environment do not stand out and not appear to be suitable only for people with physical disabilities. Universal Design features should not discriminate against individuals with disabilities (Leibrock & Terry, 1999). Pynoos and Regnier (1997) developed a research framework which suggested that an adapted (or Universally-Designed) home environment should offer an older adult 1) privacy, 2) social interaction, 3) control/choice/autonomy, 4) aesthetics/appearance, 5) personalization, 6) orientation/wayfinding, 7) safety/security, 8) accessibility and functioning, 9) stimulation/challenge, 10) sensory aspects, 11) adaptability, and 12) familiarity. These principles can also be applied to Universal Design and implemented into spaces other than residential interiors.

Leibrock and Terry (1999) described Universal Design as offering “simplicity, invisibility, maximum, not minimum design, integration, elimination of disability, affordability, expansion of the market” (p. ix-xi). In other words, these authors explained that Universal Design should be easy-to-use, aesthetically-pleasing,
exceeding ADA compliances, non-isolating, barrier-free, cost-efficient, and accommodating to everyone.

Ron Mace (n.d.), the original founder of the Center for Universal Design at North Carolina State University, explained that, “Universal design is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.” This center was first developed in 1989 from a research grant from the National Institute on Disability and Rehabilitation Research (NIDRR), a part of the US Department of Education (Connell, Jones, Mace, Mueller, Mullik, Ostroff, Sanford, Steinfeld, Story, & Vanderheiden, 1997). Mace and these other Universal Design researchers at the Center for Universal Design developed seven principles “to evaluate existing designs, guide the design process and educate both designers and consumers about the characteristics of more usable products and environments.” These principles advocate that environments or products should be usable by everyone regardless of their physical or cognitive ability (Connell et al., 1997). The main point of these following seven principles is to address the fact that Universal Design can make life simpler for everyone (Connell et al., 1997). These seven principles of Universal Design include:
• Principle 1: Equitable Use- useful for everyone
• Principle 2: Flexibility in Use- accommodating many abilities
• Principle 3: Simple and Intuitive Use- easy to interpret by everyone
• Principle 4: Perceptible Information- presents information effectively
• Principle 5: Tolerance for Error- do not cause additional problems
• Principle 6: Low Physical Effort- does not cause one to get tired
• Principle 7: Size and Space for Approach and Use- allows maneuverability for all people (Connell et al., 1997).

Store design and older adults.

As the American population ages and begins to change lifestyles, Universal Design is becoming more desirable for older adults (Dobkin & Peterson, 1999). Universal Design features enable aging individuals to function optimally, comfortably and independently even as they face functional disabilities (Null, 1989). Day and Calkins (2002) explained that the design of an environment helps individuals maintain quality of life because it encourages them to continue participating in enjoyable daily activities even as they age.

Dobkin and Peterson (1999) explained how many physical environments were historically designed for the young adult male, thus creating obstacles for other members of the population. Perhaps this was because earlier in time there was not as much of a need for adaptable environments, as there were less of an older population (Crews, 2005). Today the situation is different; therefore,
designers of residential interiors and public interiors need to address older adults, and their declining functional abilities that occur during the aging process (Null, 1989).

A majority of the literature on Universal Design indicates how the concept can help an individual can reside in their home while growing older. This concept is often known as aging in place (Novelli, 2002). Armstrong (2005) explained that environments with Universal Design features provide spaces that are easily accessible and adaptable to changing functional abilities, such as a loss of vision, mobility, or arthritis. Some of these design features include: lever door knobs, non-slip and non-glare flooring, D-shaped drawer pulls, rocker switch panel light switches, 18 – 48 inches high electric outlets and switches, 32-34 inches high counters, lever faucets, safety devices and emergency systems, low thresholds, handrails, extra lighting, accessible showers and kitchens, handheld shower head, shower seats, grab bars, low cabinets, ramps, 60 inches wide turning space, swinging doors, and color contrasted walls and doors, and color contrasted and large-sized button controls (Crews & Zavotka, 2006; Knox, 2006, Armstrong, 2001; Connell et al., 1997; Price, n.d.; The Ohio State University Extension, n.d.; Universal Design Characteristics, n.d.). Investing in Universal Design features will prevent additional injury while providing an independent and fulfilling life (Knox, 2006). Spanbroek (2005) concluded that inadequate interior design of the home restricts individuals from living alone. The same can be said for public spaces; inadequate public spaces, such as retail stores, prohibit an individual from shopping independently.
Design of retail environments.

Dobkin and Peterson (1999) suggested that Universal Design features can also be implemented in public places, such as retail stores, restaurants, libraries, or banks. Limited research currently exists specifically on Universal Design and retail stores; however, other retail store environment literature is more plentiful.

Fayek and Heuberger (1998) developed a framework for research in the design of retail spaces. They selected six areas of retail environments which can help a retailer in reaching desired profitability of retail sales, which included, “access from the exterior, space plan, department identity, visual merchandising, fixturing, and codes” (p. 14). According to these researchers, all of these categories must acknowledge both the “design concept and function” (p. 14). The four areas of retail, according to Fayek and Heuberger, primarily discussed throughout this dissertation included: 1) space plan, 2) department identity, 3) visual merchandising, 4) fixturing, and 5) codes. The authors’ design categories were merged with concepts used in this dissertation research:
• Space plan: accessible aisles and traffic patterns throughout a store (open spaces on the selling floor)

• Department identity: signage or focal points indicating various locations of a store

• Visual merchandising: promoting the product through value contrast, focal points, and no pattern

• Codes: following Universal Design recommendations and ADA requirements

Although many shopping environments are geared to particular age groups, retailers should know that older adults are a heterogeneous group (Moschis, 2003). Therefore, older adults should not be stereotyped as having the same needs. Retailers should design their stores to appeal to consumers of all ages and abilities.

Creating a successful adaptive environment in retail stores requires the application of design features that accommodate the customer’s needs, instead of using materials that cause the individual to attempt to adapt to the surroundings (Hunt, 1991). Markin, Lillis and Narayana (1976) stated that “Retail store designers, planners, and merchandisers shape space, but that space in turn affects and shapes customer behavior” (p. 43). Therefore, retailers need to
understand how to shape the space so that they can positively influence their customers’ purchasing intents.

In exploring the social-psychological significance of space, Markin, Lillis and Narayana (1976) described an ideal retail environment. These authors stated, “If an environment is perceived as desirable, nonhostile, comfortable, and hence rewarding, we are inclined to perceive the activities which transpire in that environment as also desirable, rewarding, and reinforcing” (p. 48). This statement supports the concept of Universal Design which suggests that features in an environment should be comfortable or simple and easy-to-use (Leibrock and Terry, 1999).

According to Brigham (2005), a current trend in retailing is to focus on more specific customers’ needs and create spaces that cater appropriately. The author stated that retail stores no longer only want to sell products, but they want to provide “great customer therapy” (p. 1). To do this, however, retailers need to understand how they can effectively reach their customers despite what demographic group they belong to. Brigham (2005) also explained that design features such as product fixtures, lighting and store merchandising are crucial in creating retail environments, but there are issues that the retailer should first review:
• “Who is our target guest? Do we have several different target groups?
• What are we selling them - beyond the products and services in the store? What are our guests' aspirations in life? What do they really care about? How can we fulfill some fundamental and meaningful needs they have?
• What emotional responses do we want to elicit in them?
• What does our client’s brand stand for?
• What are the characteristics of this brand that make it unique, and define its personality – specifically?” (p. 3).

This dissertation will focus on “Who is our target guest?”, “How can we fulfill some fundamental needs they have?”, and “What emotional response do we want to elicit from them?” Brigham (2005) described all of these issues as part of the “strategic action plan” (p. 23) in creating the retail space. Additionally, he explained that understanding their customer helps the store in developing their brand strategy, which will help them in creating a more successful retail environment.

An example of a present day retail store focusing on the needs of their customers is Target. Target appears to have created a physical store environment that uses adequate signage (with visible font), bright lighting, wide
aisles, available salespersons, and open spaces. Perhaps this indicates why Target has such a loyal following of people of all age groups.

Bloemer and de Ruyter (1997) resolved that customers will likely return to a store on repeated occasions (and be loyal) if they are satisfied with the store. Although their study was based on both males and females, 62% of the sample was female, and 7% of all the participants were above the age of 55. These individuals who are satisfied with their shopping experiences may also tell their friends or family members. Lumpkin and Greenberg (1982) surveyed both older men and women and found that older adults use word-of-mouth advertising to gain insightful store information. Leventhal (1997) also stated that word-of-mouth is a common communication link among the older population.

*Universal Design features catering to older adults in retail environments.*

Declining cognitive and physical abilities affect the performance of daily life activities, or shopping in this case. Retailers can address these issues by creating an environment where they can give their aging customers the tools of Universal Design to function optimally in order to enable them to continue participating in shopping activities. Thus, they can then maintain the life to which they are accustomed.

Numerous Universal Design features, such as the ones listed below, exist to help individuals with disabilities function optimally in an environment. Hiatt (1991) stated that optimal design includes (p. 126):
• Variety, (such as multiple colors and sizes) however, the environment should also look “put together”

• Visual cues, (such as value contrast, no pattern, continuous flooring, open spaces between fixtures on the selling floor and wide aisles)

• Directional cues, (such as focal point, continuous floor material, and wide aisles)

In relation to Hiatt’s (1991) explanation of optimal design, the following text describes Universal Design features that are critical to this dissertation:

*Value or color contrast.*

Features displaying a contrast in colors may help an individual better visualize an area of a store. The color of walls, counters, merchandise tables or fixtures, signage, and flooring are all examples of how contrast can help a retail customer with impaired vision (see Figure 1). Both Universal Design recommendations (Null, 1989) and ADA Guidelines (U.S. Department of Justice, 2001) indicate using color contrast in public spaces. Their recommendation includes using white on black (Universal Design Characteristics, n.d.).

The purpose of color or value contrast is to make an object stand out. McClanahan and Carll-White (n.d.) conducted focus group studies on women
and their color discrimination abilities using colored chips presented on color boards. These researchers stated that their control group “included 23 women, ages 20-29, and 64 women aged 55 and older” (p. 8). They also reported that the finding that related to value contrast showed that all groups indicated a preference for a lighter background with darker colors in the foreground.

Snyder (1978) suggested that an individual’s perception is affected by color as the person may not be able to navigate successfully, or “visually sort through” (p. 45) the environment. In a design guide, Robson, Nicholson, and Barker (1997) also explained that color contrast is used by individuals who may be slightly blind in order to see things more effectively in the environment. They also explained that objects, such as doors or light switches, can be better identified and differentiated through contrasting colors or hues.

Null (1989) described her involvement with a Universal Design educational program that redesigned a kitchen using contrast between dark-colored light switch plates, light walls, and colored placemats. In addition, Leibrock and Terry (1999) stated that using contrasting colors on the walls and floors help an individual in interpreting the room’s edges.
Robson, Nicholson, and Barker (1997) also explained how the use of pattern, such as swirling designs, in an environment can cause confusion for people with declining vision. Leibrock and Terry (1999) also explained that pattern and texture influence over stimulation. They recommended using solid, plain surfaces so that the object, whether it is a wall, a table, or a counter, can be easily recognized and visualized.

Although pattern is sometimes used for emphasis in design environments (Allen & Stimpson, 1992), it may influence depth perception causing confusion. Perhaps vertical patterned surfaces may cause depth perception, although this could not be confirmed. An extremely visually-impaired person, for example, may think he or she is seeing objects floating in the air, when in reality they are
seeing a pattern. Therefore, pattern should be used not at all, or in very limited amounts (see Figure 2).

Figure 2: Example of no pattern

*Focal point.*

A focal point is often used to draw attention or to emphasize some aspect of the store, such as a sign, a path, merchandise on a wall, or a fixture, and sometimes color contrast is used to draw attention to it (Allen & Stimpson, 1992). See Figure 3. A focal point cue enables communication to a person from afar, where she may be able to obtain directional advice or wayfinding information about various parts of the retail store. Individuals who may benefit
from focal points include those who may need more direction due to declining cognitive, mobility and vision abilities.

Allen and Stimpson (1992) explained how a well-designed focal point should be dominating but still allow the eye to see other characteristics of the environment to notice the product or signage that is being emphasized. McIntosh (n.d.) provided some insight as to what questions to ask when developing a focal point:

- “Where do you want your viewer to look? Is there one main feature you want them to notice?”
- “Where will the eye travel through the display”
- “Is there one main feature you want them to notice?” (p. 1)

Figure 3: Example of focal point consisting of the poster and price
Continuous floor material.

Flooring is an important feature in retail design as it has been proven that various floor materials can lead to falls (Dickinson, Shroyer, & Elias, 2000). A person with declining vision might perceive multiple or patterned floor surfaces or patterns to be a step or steps, which might also cause a person to lose her balance and slip (Leibrock & Terry, 1999). They suggested eliminating contrasting or even textured floor materials to avoid perception of floor elevation. In addition to using continuous flooring materials, Grayson (1997) suggested using, “nonslip floor material, either fixed rugs or wall-to-wall carpet with tightly woven low-height pile, twelve-inch-high baseboard of carpet” (p. 63) to eliminate falls.

There have been different findings on types of flooring to use in environments to prevent falls. Donald, Pitt, Armstrong, and Shuttleworth (2000) investigated carpet and vinyl to see which one was better among older adults. The authors studied fifty-four patients in an elderly care rehabilitation ward and found that there were 10 falls on carpet and 1 on vinyl. Dickinson, Shroyer, and Elias (2000) reported that older adults active walking on carpeted surfaces appeared to walk slower and be more hesitant than when they were walking on vinyl. According to these authors, the speed at which one walks is conceived as gait speed.

Willmot (1986) found the opposite finding in his study; older adults were more confident when they walked on carpet, thus walking faster, although it should be noted that Willmot’s study consisted of frail hospitalized, older adults.
This is an interesting finding considering that vinyl often causes glare, which can be an issue with those experiencing vision problems. This supports the suggestion to use continuous flooring material because these findings show that individuals walk differently on various types of flooring (see Figure 4). In addition, Leibrock and Terry (1999) suggested that some individuals look at the ground for fear of falling while walking. Continuous floor material may prevent confusion because the person does not need to worry about changes in flooring.

![Figure 4: Example of continuous floor material](image)

_Open spaces between fixtures on the selling floor._

Open spaces between fixtures or wide aisles lend easier mobility to those individuals using a wheelchair or a walker (see Figure 5). In a preference study looking at a variety of public space interior environments, Scott (1993) reported
that the combination of depth and enclosed spaces were not preferred. She indicated that this type of setting could cause confusion in the environment because a person may not be able to picture what larger spaces exist in an adjacent room. Her sample included college students, and therefore the findings may differ among other demographic populations.

Creating open spaces may minimize potential selling space (Underhill, 2004; U.S. Small Business Administration & U.S. Department of Justice, 1999) because not as many products would be available on the sales floor. Underhill (2004) explained that putting too many products in a selling space will often cause the customer to get annoyed and leave the store all together. He or she may become constantly frustrated with having to bump into the fixtures and products, and even other customers. This type of environment is not adaptive, and therefore, non-universally-designed.

In his retail observations, Underhill (2004) found that the tighter the shopping accommodations, the more likely the shopper will not stay there for very long. Lee and Johnson (2005) suggested that more room to move around in increases the possibility of making a purchase. Therefore, one might inquire how a store can provide accessibility yet maximize store sales (Underhill, 2004). He stated that too much merchandise makes it too difficult to see other merchandise. He calls this a “visual jumble” (p. 182) and described the perfect store as being a work of art. Therefore, the space needs to be aesthetically-pleasing. In other words, the customer needs to be able to easily visualize the story that the retailer
is creating. Therefore, the merchandise floor and its visual and wayfinding cue components are entities of nonverbal communication.

Kaufman-Scarborough (1998) explained that retailers who consider the accessibility of all potential customers are also benefiting themselves. The author suggested that these physically-challenged customers may become loyal to the retailer over time. The customer may likely return again because she knows that she can function optimally in this environment; all of her cognitive and physical needs are considered so she can still function independently.

According to the Americans with Disabilities Act (U.S. Small Business Administration & U.S. Department of Justice, 1999), there should be a minimum of 36" between fixtures and displays on the selling floor. In a federal letter to retailers in the state of Massachusetts, Moore (2004) suggested that a wide turning space enables a customer to move or turn throughout the area without colliding into any surrounding objects allowing easier and safer access of products.
Wide aisles.

Wide aisles not only allow for multiple people to walk down a path at the same time, but also encourages wheelchair access (see Figure 6). Both Universal Design and ADA also indicated that all aisles should be wide to allow accessibility (U.S. Small Business Administration & U.S. Department of Justice, 1999; Paradiso & Holden, n.d.). The ADA requirement states that all aisles should be at least 36” wide.

McClain (2000) investigated wheelchair access in three malls in the Southwest part of the United States. Through convenience sampling, she analyzed if areas of shopping malls, including parking lots, entrances, ramps, elevators, telephones, restrooms, and food courts complied with ADA guidelines. In relation to wide aisles, she also found that half of the aisles in department
stores were not wide enough, but most small stores were compliant with the 36” wide standard.

In evaluating wheelchair accessibility in public spaces, Nelson, Jones, and Salkind (1986) found that wheelchair users will usually find at least one barrier every time they visit public environments. Although they did not study retail environments, or wide aisles in particular, their findings suggested that we need to place more attention on accessibility and maneuverability in public spaces. They surveyed 2,000 public environments to evaluate physical inaccessibility for people with disabilities. These authors stated, “90% of the 2,000 settings surveyed presented substantial barriers to accessibility. Approximately 55% of the settings surveyed were totally inaccessible. They also stated that their original intent of this survey was to help an independent living facility put together a guide on accessibility.
Other Functional Retail Features

According to Underhill (1999) and Lee and Johnson (2005), there are five store environmental characteristics that provide optimal design: 1) transition zone, 2) chevroning, 3) butt-brush effect, 4) seating area, and 5) dressing rooms. These authors suggested that implementing these characteristics can potentially maximize retail sales. Underhill's (1999) design implications can be used simultaneously with the principles of Universal Design. Although more than one Universal Design principle can be attributed to each “zone”, the researcher has matched the one that corresponds best.
Transition zone.

Fayek and Heuberger (1998) analyzed a department store Robinsons-May in California to investigate design concepts based on space plans, or how well a customer can maneuver around in the retail environment. From their analysis, these authors resolved that initial store introduction, or “quality of the visual appeal” (p. 14) is important because wanting to enter is based on first impressions.

This introduction to the store is also explained by Underhill (1999) as the “transition zone” which is the place where customers enter the store from outside. This area also known as the entryway is a place where individuals become aware of the store’s layout (see Figure 7). It is here where the customer ultimately decides whether or not to stay. For older adults, the “transition zone” is a critical area because of their changes in vision abilities, and perception of space. Additionally, Lee and Johnson (2005) suggested that stores should not put much more than a large display here in order to slow down the customer.

The “transition zone” is also related to Universal Design Principle 6: Low Physical Effort (Connell et al., 1997; Paradiso & Holden, n.d.), which suggests that this entry area should provide minimal effort in deciding where to go or what to do next. Lee and Johnson (2005) and Underhill (1999) also stated that this transition zone is usually lost in the shuffle of entering the store and deciding where the customer wants to go. Therefore, they recommend using this area for a “power display” (p. 1) instead of a mix of merchandise. Lee and Johnson (2005) defined “power display” as “a large, horizontal display that acts as a
The transition zone is the first thing a customer should see when she enters a store.

Figure 7: Example of a transition zone (what you may see upon first entering a store)

Chevroning.

Lee and Johnson (2005) explained that "chevroning" has to do with the way fixtures are turned so that they are visible to customers. They also stated that "chevroning" involves moving shelves and fixtures so that they are turned towards 45 degrees, enabling the customer to visualize more of the products (p. 2). Underhill (1999) described "chevroning" as including wayfinding cues or the ability to find particular products in a retail environment. According to Thapar, Warner, Drainoni, Williams, Ditchfield, Wierbicky, & Nesathurai (2004), wayfinding is defined as the process of following a path from one place to
another. Wayfinding can be conducted through directional signage, other focal points, and flooring materials (see Figure 8). Signage and other visual cues provide additional information about a setting. According to Hunt (1991), numbers and signs are the most common wayfinding tool in an environment.

Hunt (1991) suggested that a customer may remember product information depending on the way it was presented. Thus, based on the definition of “chevroning,” these store design characteristics may be helpful in communicating to an individual’s cognitive abilities. Chevroning is also related to Universal Design Principle 4: Perceptible Information (Connell et al., 1997; Paradiso & Holden, n.d.), which suggests that the fixtures and shelving units should provide products that are easy to see and interpret.

Figure 8: Example of chevroning (racks to the side and back of the store)
Butt-brush effect.

Underhill (1999) first defined sufficient space in an environment as the “Butt-Brush Effect.” He described that the customer needs personal space while shopping or they may avoid the area altogether. Thus, more space to maneuver throughout the retail floor influences customers to continue shopping in a particular area (Lee & Johnson, 2005). According to Universal Design guidelines and the U.S. Small Business Administration & U.S. Department of Justice (1999), there should be a minimum 36” aisle space between displays and shelving units, and 180 degrees turning area for wheelchair access.

The “Butt-Brush Effect” is also related to Universal Design Principle 7: Size and Space for Approach and Use (Connell et al., 1997; Paradiso & Holden, n.d.), which suggests that the environment should have adequate space for people of all abilities to move around, but to also see the products and store design features (see Figure 9). In one study conducted by Machleit, Eroglu, and Mantel (2000), participants were not as excited about shopping when the environment was crowded. However, the authors stated that “the effect is stronger for spatial crowding than it is for human crowding” (p. 34). It should be noted that their sample consisted of college students.

In studying retail mall density, or crowdedness in malls, Michon, Chebat, and Turley (2005) resolved that older individuals (who shop during low traffic hours) are most likely to pay attention to their environment. These authors investigated shoppers during various parts of the day in low, medium, and high retail density periods of a day. Perhaps this finding concludes that
characteristics of the environment are even more important for older adults. Day, Carreon, and Stump (2000) suggested that sensory over stimulation, influenced by clutter, can influence confusion and the ability to concentrate. They were referring to how over stimulation affects individuals with dementia, but this issue may be problematic to everyone.

![Figure 9: Example of the butt-brush effect (showing that there is not enough space between fixtures at back of store)](image)

*Seating area.*

Lee and Johnson (2005) explained that seating is an important characteristic of store design because it enables an individual to continue shopping while providing their friend with a place to wait comfortably. Underhill (1996) stated that a women will likely stay in a store longer to shop if her
husband has a place to sit down and wait. Additionally, a chair provides a place to rest, which is a necessity for older adults (see Figure 10).

The “Seating Area” store characteristic is related to Universal Design Principle 6: Low Physical Effort (Connell et al., 1997; Paradiso & Holden, n.d.), which suggests that the environment should offer minimal physical exertion. A chair allows the customer to rest, so that she has energy to continue shopping.

Figure 10: Example of a seating area

_Dressing rooms._

Underhill (1999) explained that “Dressing Rooms” weigh heavily as a selling tool in a retail store. He stated that “a shopper who talks to a salesperson and tries something on is twice as likely to buy as a shopper who does neither”
Therefore, retailers should focus on making their dressing rooms desirable to all customers (see Figure 11). He explained that the customer is in a “buying mode” (p. 171) when she is in a dressing room. Therefore, it is beneficial to provide adequate lighting, seating, wall hooks, mirrors, grab bars and space in this area, as it is here where the customer will decide whether or not to purchase the item. (Lee & Johnson, 2005). In addition, the authors suggested that there must be adequate signage pointing to the dressing room.

The “Dressing rooms” store characteristic corresponds to Universal Design Principle 6: Low Physical Effort (Connell et al., 1997; Paradiso & Holden, n.d.), as the proper provide design features mentioned earlier. In essence, the retailer should provide a dressing room with proper tools that will help the customer decide if she wants to purchase the product.

Figure 11: Example of a dressing room
Gitlin, Mann, Tomit, and Marcus (2001) studied environmental problems in the home that occur where older adults may conduct their daily and instrumental activities of daily living. They found that most issues occur where individuals perform activities where they are taking care of themselves. One of these findings had to do with people having issues in the locations where they get dressed. Although this study focused only in the home, the findings can be translated to a retail dressing room since people undress and then get dressed and then undress and get dressed again. Therefore, retailers should pay particular attention to the design of their dressing rooms.

Older Female Shopper Demographics

Previous Research

Many researchers have determined that retailers are overlooking the senior demographic segment (Birtwistle & Tsim, 2005) entirely, which is astounding as “consumers over 50 account for almost half the total consumer spending in this country” (U.S. Department of Labor, 2005). According to Pak and Kambil (2005) there are “80 million baby boomers and 75 million so-called ‘traditionalists’ consumers (those born between the years 1900-1945)” (p. 3). Therefore, it is to the retailer’s financial interest that they reach out to this older demographic (Morgan & Levy, 2002).

From a marketing perspective, Sherman, Schiffman, and Mathur (2001) suggested that the best way to successfully advertise to older customers is to understand their needs. Morgan and Levy (2002) also explained that retailers
must understand their customers’ motivations in order to reach them successfully. The bottom line is that retailers should create spaces where older adults can continue to participate in shopping activities as they go through these changes.

As of today, limited academic research has been devoted to seniors and their shopping behaviors (Lumpkin & Greenberg, 1982). In fact, Moye and Kincade (2003) suggested that more research is needed to further assess store characteristic preferences among specific demographic segments. They determined that four categories define the shopper age 18 and older, “Decisive Apparel Shopper, Confident Apparel Shopper, Highly Involved Apparel Shopper, and Extremely Involved Apparel Shopper” (p. 58). These different categories were based on “store of first choice, attitude, and household income” (p. 58).

Financial Information

There is some controversy as to whether or not the average older adult has ample expenditure funds to spend on activities like shopping. Is this mindset due to ageism in our society (Carrigan & Szmigan, 2000)? Perhaps this is one reason why so little research has been designated to this age group and why there are contradicting findings. Jackson (1992) indicated that the older population is often generalized as being poor and not large purchasers of clothing. However, she found that older age does not significantly affect apparel purchasing. She also explained that older adults will disburse of their money on apparel similar to the way in which individuals of other demographic segments disburse of it.
According to the U.S. Department of Labor (2004), the average yearly expenditure total on apparel and services in consumer units ages 55 and older was $1,323. The report compared this to $2,072 spent by consumer units under age 55. The findings also indicated that the total income before taxes in household units ages 55 and older was $46,298, while there were 1.9 persons in each unit. The term, consumer unit was defined as constituents of a household (U.S. Department of Labor, 2005).

A review of the literature also indicated that women as a whole have significant purchasing power. According to Yerak (2003), the NPD Group stated that “women, ages 13 and older spent approximately $93.1 billion in 2004 and women, ages 55 and older spent a total of $14.8 billion.” This source was taken from the NPD group, but no other reference information was provided. Older shoppers may predominantly be women perhaps because this gender lives approximately seven years longer than their male counterpart (Morgan & Kunkel, 2001; Rowe & Kahn, 1998).

Oates, Shufeldt, and Vaught (1996) conducted a study on 425 participants, ages 65 and older, residing in their homes and engaging in shopping activities. The researchers stated that individuals completed a survey on the importance of store attributes selling over-the-counter drugs and their lifestyles. The researchers ran a cluster analysis to identify lifestyle groups based on a previous study by Sorce, Tyler, and Loomis (1989). In Oates, Shufeldt, and Vaught (1996), a factor analysis was also conducted to see what
underlying patterns existed among the store atmosphere characteristics. This factor analysis came up with four factors:

“1) Store/personnel quality, 2) Store characteristics of location, temperature, and an uncrowded store with a place to relax while shopping, 3) Discount/sales policies, and 4) Service attributes and comprises items relating to delivery, phone-in, carry-out, and parking” (p. 19). Oates, Shufeldt, and Vaught (1996) also stated that their study, like other studies, confirmed that older adults cannot be analyzed according to their age, but should be instead analyzed according to lifestyles.

Knox (2006) and Johnson (2000) confirmed that many older individuals are financially well-off, which affects aspects of their lifestyles which entail where they will spend their money. Not only does this group have the financial means (Moye & Giddings, 2002) but they also have more leisure time than other populations (Fifty-plus women shop for value, 1996).

As shopping is often considered to be an “experience” to seniors who have more time on their hands, it makes sense that retailers should create a comfortable environment where older customers would be motivated to spend their extra time. Lumpkin and Greenberg (2001) stated that older adults in general tend to shop where they feel comfortable with the surroundings.

**Baby Boomers**

According to Novelli (2002), the baby boomer demographic group includes 76 million Americans. He suggested that the population over age 65 will actually double in the next 31 years. Marketers, in the past, including retailers, have
neglected individuals ages 50 and older, because people were not living as long as they are today (Novelli, 2002). Perhaps this is also because there were fewer individuals over age 65.

According to a demographic profile by the Mature Market Institute Met Life (n.d.), “older boomers spend 13% more than average on adult women’s apparel and 11% more than average on adult male apparel.” The question is, will this economic trend continue as they continue to age? Many boomers will have discretionary income (Novelli, 2002), so retailers can encourage them to continue shopping by designing their stores so that they are adaptable to declining abilities.

Moschis, Lee, and Mathur (1997) discussed how the baby boomer generation (persons born between the years of 1946-1964) is beginning to hit retirement age when they will have more leisure time on their hands. Swinyard and Rinne (1994) also suggested that baby boomers enjoy shopping but are often too busy for it. Therefore, it may be possible that baby boomers will shop more often once they retire.

Price (2002) and Rowe and Kahn (1998) explained that positive relationships with other people contribute to successful aging. Hare, Kirk, and Lang (2001) reported that many older consumers participate in shopping (for food) excursions to fulfill a social need. They stated that shopping provides older adults with a reason to leave their homes and social contact with other people. Beck, Shultz, Walton and Walls (1990) explained that older adults are susceptible to loneliness because they are more likely to experience loss among
their personal relationships than younger people. Therefore, older adults may seek friendly store associates to fulfill the void of social interaction. Therefore, based on these findings, it can be suggested that older adults shop for two reasons: 1) for basic necessities (apparel and food), and 2) to maintain social connections.

Theoretical Concepts And Frameworks

Approach-Avoidance Behavior Theory

Based on environmental psychology, Mehrabian and Russell (1974) suggested that three emotional states prompt an individual to approach or avoid the environment: pleasure, arousal and dominance. In environmental psychology, approach behavior is defined as a willingness to remain and respond to a particular environment. (Turley & Milliman, 2000). Russell and Mehrabian (1978) stated that an individual’s behavior is based on emotions influenced by the surroundings.

Russell and Mehrabian (1978) explained that the term "approach" means experiencing pleasure for the environment, and wanting to stay. The authors explained that “approach, versus avoidance, is used here to mean increased preference, liking, evaluation, exploration, motivation at tasks, and desire to affiliate and cooperate,” (p. 6). Avoidance behavior can be explained as not wanting to stay in or approach a particular place (Spangenberg, Crowley & Henderson, 1996).
Spangenberg, Crowley, and Henderson (1996) explained that approach-avoidance theory is connected to the stimulus-organism-response (S-O-R) paradigm framework. The S-O-R paradigm suggests that the environment is a stimulus (S) that contains cues which affect individuals’ emotional reactions (O), which then affect approach and avoidance behaviors and responses (R) (Spangenberg, Crowley & Henderson, 1996; Mehrabian & Russell, 1974).

According to the approach-avoidance theory, pleasure signifies that “a person feels good, joyful, happy, or satisfied” (Donovan & Rossiter, 1982, p. 38) in an environment. Arousal signifies that “a person “feels excited, stimulated, alert, or active” (Donovan & Rossiter, 1982, p. 38) and dominance signifies that a person “feels in control of, or free to act in” (Donovan & Rossiter, 1982, p. 38) the environment. Russell and Mehrabian (1976) defined pleasure as ecstasy, arousal as alertness, and dominance as power. Dominance has also been described as control and submissiveness (Russell & Mehrabian, 1978).

It should be noted that many approach-avoidance environmental studies have omitted measuring “dominance” as it has been found to be insignificant in influencing emotions or feelings (Sweeney & Wyber, 2002; Donovan & Rossiter, 1982). Foxall and Greenley (1998) and Foxall (1997) also affirmed that “dominance” has been left out of consumer behavior studies as it has a negative association to both “pleasure” and “arousal.”

*Approach and avoidance in retail environments.*
Approach and avoidance behaviors have often been used in evaluating purchasing behaviors (Donovan & Rossiter, 1982), as well as in other preference-related studies related to landscape of the environment. In connection to Figure 12, Baker, Grewal and Levy (1992) revealed their findings and illustrated how the Mehrabian-Russell approach-avoidance theory can be applied to other consumer behavior studies focusing on characteristics of the retail environment.

<table>
<thead>
<tr>
<th>Environmental Stimuli</th>
<th>Emotional States</th>
<th>Approach/Avoidance Behaviors</th>
</tr>
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<tbody>
<tr>
<td>(Physical Features)</td>
<td>(Pleasure and Arousal)</td>
<td>(Willingness to Buy)</td>
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</table>

Figure 12: Approach-avoidance model relating to consumer behavior

**Pleasure and arousal.**

In a retail environment, pleasure and arousal are triggered by design cues (Markin, Lillis, Narayana, 1976), such as the Universal Design features discussed in this study (“value contrast, no pattern, focal point, continuous floor material, open spaces between fixtures on the selling floor, and wide aisles”). Whereas, retail stores that implement no value contrast, pattern, no focal point, multiple
floor materials, no open space, and narrow aisles, may influence avoidance behaviors.

Yoo, Park, and MacInnis (1998) found that store characteristics, such as “product assortment, product value, salesperson’s service, after-sale service, and facilities” (p. 260) also influence emotions in customers. These authors also found that stores that are accommodating influence pleasure.

Other researchers have investigated approach and avoidance behaviors using other scenarios of atmospheric store features. For example, Spangenberg, Crowley, and Henderson (1996) investigated the effects of olfactory sense on consumer behavior, and resolved that there is a difference between smell versus no smell, and found that individuals were more likely to approach a store when there was some type of olfactory element. Eroglu, Machleit, and Davis (2003) studied how atmospheric cues (i.e. description about the company, testimonies from other customers, and monthly specials) in an online shopping environment also influence approach and avoidance behaviors.

Based on the Mehrabian-Russell approach-avoidance model (Donovan & Rossiter, 1982; Russell & Mehrabian, 1976), a customer’s decision to enter a retail environment is based on whether or not she feels at ease with the surroundings. In other words, how the individual emotionally responds to these design features determine if she will approach the environment. For example, an individual in a wheelchair may be more likely to approach a store with wide aisles and adequate spacing of fixtures because she can move around and function fairly comfortably. This could be considered an emotional response because the
individual may be experiencing pleasure and arousal, because she is able to function optimally in this type of environment.

According to Donovan and Rossiter (1982), the following points present and explain four facets of approach-avoidance behaviors:

- “A desire physically to stay in (approach) or to get out of (avoid) the environment” (p. 37). In other words, does an individual remain in the store or does she leave? What are her first impressions of the store? Does she stay, or leave the store quickly? (Soars, 2003)

- “A desire or willingness to look around and to explore the environment (approach) versus a tendency to avoid moving through or interacting with the environment or a tendency to remain inanimate in the environment (avoidance)” (Donovan & Rossiter, 1982, p. 37). Does a customer search through a bin of unorganized sweaters, or does she overlook its overwhelming appearance? Is she interested in what the store has to offer?

- “A desire or willingness to communicate with others in the environment (approach) as opposed to a tendency to avoid interacting with others or to ignore communication attempts from others (avoidance)” (Donovan & Rossiter, 1982, p. 37). Does the customer seek or respond to help from sales associates? Does she feel comfortable enough to communicate with others in the store?
• “The degree of enhancement (approach) or hindrance (avoidance) of performance and satisfaction with task performances” (Donovan & Rossiter, 1982, p. 37)

According to Donovan and Rossiter (1982), “performance and satisfaction” has to do with how often a consumer visits a store, as well as how much time and money are spent. How frequently does the customer return to the store? Is she satisfied with her experience enough to visit again?

Russell and Mehrabian (1976) hypothesized that pleasure experienced from an environment influenced approach behaviors. Baker, Grewal and Levy (1992) concluded that pleasure and arousal influence the approach/avoidance behavior known as willingness to buy. Donovan and Rossiter (1982) also found that individuals will spend more time and money in a store where they experience more pleasure and arousal. Figure 13 illustrates how high arousal influences pleasant emotions which lead to approach behaviors (Baker, Grewal & Levy, 1992; Donovan & Rossiter, 1982; Russell & Mehrabian, 1976).

Turley and Milliman (2000) discussed how approach behaviors are observed as positive reactions because they are what keep the customers returning and exploring the store. Lam (2001) explained that emotional response defines how much money and time they will spend in the store.
Figure 13: Example of pleasure-arousal hypothesis


Baker, Grewal and Levy (1992) investigated two dimensions of store environment: “ambient”, which includes music and lighting, and “social” which includes the friendliness and number of store associates as well as a consumer’s feelings. Their findings illustrated that the ambient and social characteristics interact to affect an individual’s feelings of pleasure and arousal.
Fayek and Heuberger (1998) stated that “visual appeal is an important component of access, since customers can be encouraged or discouraged from entering a space based on their first impression from the exterior” (p. 16). Underhill (1996) also suggested that older consumers may find the interior design of store more important than its products. Therefore, pleasure and arousal are two components retailers should strive for when designing their stores.

**Ecological Model Of Aging**

The second theoretical concept utilized in this research includes the ecological model of aging, which argued that “Behavior is a function of the person and the environment” (Lewin, 1935). Lawton (1982) explained the “B = f (P, E)” component as representing competency or how well the individual can function in the environment based on his or her abilities. According to the author, individuals who experience some challenge, but who are not overly challenged, will perform or function well in the environment.

In the equation, “B = f (P, E), “P” or “person”, refers to the individual’s characteristics, including “needs, traits, and personal style” (Lawton, 1982, p. 35). In relating to this dissertation, “P” or “person” included women, ages 55+ living in independent living facilities or aging in place in central Ohio. As mentioned above, the “person” also included each individual’s abilities and disabilities.

The “E” or “environment” component indicated the characteristics of the setting and indicates the level of environmental press (Lawton, 1982). He
defined environmental press as characteristics or tools in an environment that
challenge individuals to behave to their maximum potential (p. 39, 42-44). Figure
14 illustrates that as “press” decreases, there is more support in the environment
for individuals. Lawton (1982) also suggested that a person does better in an
environment when they are challenged; however, there should be a happy
medium as too much press can translate into over-stimulation, which could
influence an individual to avoid the environment.

Universal Design features reduce the press of an environment, which
means that more individuals with a wider range of abilities can function in the
environment. For example, slip-resistant flooring has less press because it may
reinforce balance and composure in a person who experiences difficulty in
walking or even problems with vision. Another example suggests that
contrasting colors between a doorframe and a door also has less press because
it may stand out to an individual with declining vision. Both of these examples
illustrate how the environment is made easier for individuals through features of
Universal Design. According to Lawton (1982), whether or not persons perform
well in the environment is based on their competency and environmental press.
Figure 14: Environmental press and competency model

The ecological model of aging or person-environment fit theory can be used in conjunction with the approach-avoidance behavior theory, which was discussed earlier in this chapter. For example, an individual will approach an environment where she experiences the emotion of pleasure, and a person experiences pleasure when she feels competent or can function optimally in the environment because of weaker press.

According to the ecological model of aging or the person-environment fit theory, the ability to function optimally in an environment has to do with environmental press (Lawton, 1982; Kahana, 1982). Does environmental press in the environment address an individual’s physical needs? According to approach and avoidance theory, an individual will stay or approach an environment that does offer environmental press. However, if a retail store is inadequately designed to meet their customers’ needs, or if the environmental press is too strong, the customers are likely to exit or avoid the establishment.

Markin, Lillis and Narayana (1976) confirmed that a retail store’s physical environmental stimuli (merchandising of products and store design attributes) do affect how a consumer may respond to the environment. Therefore, based on Kahana’s (1982) suggestion, creating an adaptable retail environment benefits the older customer, but also the retailer because the customer may return to that particular store.
Conclusion

Through the integration of approach-avoidance theory and the ecological model of aging/person-environment fit theory, the following model was created to demonstrate how both frameworks relate to a Universally-designed retail environment (see Figure 15). This model illustrates how approach and avoidance behavior is a function of both the person (older adults in this case) and the environment (Universal Design features in a retail environment). For example, Donovan, Rossiter, Marcoolyn and Nesdale (1994) concluded that a feeling of overall emotional pleasure in a store influences how much time and ultimately how much money a customer will spend.

![Figure 15: Integrated theoretical model of approach and avoidance behavior](image-url)
The review of the literature has illustrated that older customers have the interest and financial means to continue shopping while they age. Therefore, store designers should aim to design an apparel retail environment that will positively affect the emotions of customers (Sharma & Stafford, 2000). This ideal scenario would involve both a happy customer and retailer. In other words, the retailer would be providing a Universally-Designed environment where the older customer would want to engage in shopping activities.
CHAPTER 3

METHODOLOGY

Introduction And Purpose

This chapter provides the 1) foundation of the current study, 2) participants and procedure, 3) methodological instrument, 4) development of the Universal Design Retail Preference Study (UDRPS), and 5) an explanation of how the data analysis was conducted and interpreted through statistic analyses using SPSS software. The intent of this study was to provide information on how to create a “user-friendly” and approachable apparel store environment through aesthetic and supportive characteristics geared towards the declining abilities of older women.

Foundation For Current Study Based On Previous Research

This research was modeled after previous aesthetic and preference-related studies conducted by Scott (1993), Kent (1989), and Zavotka (1995). Each of these studies examined design characteristics of interior environments using pictures or photographs to assess individual preferences among a sample population. According to Kaplan and Kaplan (1982), it is common to use slides or photographs as a measurement of analysis in environmental preference.
Kaplan (1987) also explained that early aesthetic and preference research always used “preference as the dependent variable” (p. 12).

In Scott (1993), university college students rated 80 black and white photographic slides for preference on a Likert-type scale. The photographs included design attributes, such as hallways, restaurant bars, cafeterias, meeting rooms and offices, but did not feature retail environments. These photographs depicted scenes featuring “geometric shape, spaciousness (i.e., size, degree of enclosure, and density of interior forms), directional emphasis, spatial organization, complexity of visual field (i.e., number and variety of elements), surface texture and pattern, surface value, and lighting composition and type” (Scott, 1993, p. 9). The participants’ responses to these slides were quantitatively evaluated through a principal component analysis (PCA), a data reduction technique.

In the second phase of the study, participants verbally evaluated and described their likes and dislikes of the photographs (Scott, 1993). This information was then later used to code and tabulate the photos, which were then organized according to their mean preference scores (Scott, 1993). She also conducted a content analysis on these findings.

Scott (1993) referred to the approach-avoidance framework (Mehrabian & Russell, 1974) and the Kaplan information processing model also known as the preference framework to construe and analyze the responses of the participants. The Kaplan informational-processing model suggests that “involvement” and
“making sense” are essential to human needs (Kaplan & Kaplan, 1982). Scott (1993) resolved that people prefer design settings where they can be involved and that individuals made similar assessments about aesthetically-pleasing environments. These assessments, based on photographs, included both verbal and preference judgments on a Likert-type rating scale. Scott (1993) also recommended that future research be conducted to see how her findings on design elements relate to other environments and demographic segments.

A similar study conducted by Kent (1989) investigated the environmental design characteristics of common areas of shopping malls based on mystery and preference, also part of the Kaplan informational-processing model (Kaplan & Kaplan, 1982). Kent (1989) gathered 80 photographs of retail malls featuring seating, views, spatial elements and hallways, which he then evaluated for elements of “mystery.” According to Kaplan and Kaplan (1982), mystery is defined as collecting additional information as an individual moves through an environment. Kent (1989) presented this group of slides to university students who used a Likert-type rating scale to evaluate their preference levels. He further analyzed the scores for the overall preference mean as well as interrelationships among the factors through factor analysis.

Next, Kent (1989) qualitatively explained the findings of the content of photographs and suggested that further analysis be conducted using other factors of the Kaplan model including, “coherence, legibility and complexity” (p. 34). He concluded that a positive relationship exists between mystery and
preference in the store environment. He resolved that an individual is more likely to prefer an environment that contains new information as he or she proceeds throughout the setting.

Finally, Zavotka (1995) utilized photographs or drawings of paired items to analyze elements of visual complexity found in interior design furnishings in relation to intellectual abilities and gender. Photographs included design characteristics of “symmetry, dimensionality, and line complexity” (Zavotka, 1995, p. 398).

In her study, university students completed a questionnaire where they selected a preferred item out of a pair of photographs or drawings. In addition, these participants also responded to questions pertaining to demographics and their scholarly abilities. Zavotka (1995) categorized the findings into four groups, “preferred complex, preferred simple, preferred a mixture of simple and complex, and no consistent preference” (p. 400), and resolved that there was a correlation between interior design skills of the participants and their preferences of design. She used an analysis of variance (ANOVA) to determine if there were significant differences between each group. Zavotka (1995) concluded that there were significantly high preference scores for complexity in both males and females who were skilled in art and spatial abilities. Those participants who were skilled in math had lower preference scores for complexity (Zavotka, 1995). One could conclude from this study that using photographs of objects allows one to discriminate preferences for complexity.
Based on these three studies, this dissertation used digital photographs to survey the preferences of older adults for Universal Design features in retail stores. The researcher assumed that individuals make decisions to “approach” an environment grounded in first impressions. This philosophy was based on the Mehrabian and Russell approach-avoidance framework (Mehrabian and Russell, 1974).

Participants And Procedure

Participants

Participants in this study consisted of older female adults who were solicited from senior organizations, including independent living facilities and senior social groups. Independent living facilities house individuals who wish to receive minor services in an apartment-like setting. Senior social groups offer entertainment and intellectual activities to older adults in the community who may be living in independent living facilities or aging in place. It was expected that women from these two sources were most likely to be participating in retail shopping activities by themselves or with a shopping companion.

Sampling

The population was a convenience sample consisting of individuals from fourteen organizations (see Appendix A). Creswell (1994) defined a convenience sample as individuals who volunteer to be part of the study. To recruit participants, the researcher began by creating a list of senior organizations and
then contacting them to find out the name of the activity directors. The researcher then contacted the activity directors over the telephone and through email. This information was collected through the Internet and word-of-mouth communication.

Fourteen organizations were used for recruiting (see Appendix A). These locations included 9 senior residential communities and 5 senior activity centers. Participants were recruited through flyers, newsletter articles, and personal invitations from the activity directors and the researcher (see Appendix A). For incentive to participate in the study, the researcher held a raffle at each of these locations for one gift certificate to a bookstore. Eligibility to participate required the participant to be female, at least 55 years old, and capable of going to a retail store by themselves or with the assistance of another person.

Procedures

Initially, pilot studies were used to determine the format of the questionnaire and whether or not this study could be conducted on older adults (see Appendix B for specific results). Next, data were collected from study participants in a group setting. There were approximately 3-15 participants in each group. The sessions were held at either the participants' independent living facilities or the regular meeting location of the group. Participants sat at tables and faced the slide projector screen. Participants were each given a survey packet and a pen. The packet consisted of a written explanation of the questionnaire, a written consent form, the Universal Design Retail Preference
Survey (UDRPS), and the shopping interest and demographic questionnaire (see Appendix C). In addition, the researcher provided a verbal explanation prior to the participants completing the instrument.

After the verbal introduction, the researcher instructed the participants how to complete the survey by showing photographs in question 1 on the screen and explaining that "A" or "B" must be selected on each page. There were a total of 24 pairs of slides. The researcher also explained the meaning of the confidence scale and the section where participants were to provide an explanation of their preferences of the photographs. Next, the researcher explained the shopping behavior section located at the end of the questionnaire and advised the participants that they could leave when they were finished, and that they would be notified that day if they won the raffle. The duration of the entire session was approximately 30-40 minutes. At the end of the survey session, participants occasionally provided their insight individually to the researcher. Many expressed their gratitude for the study and how important it was for them to express their concern about retail shopping environments.

Instrument

A questionnaire consisting of three sections was developed specifically for this study by the researcher. These sections included: (1) Universal Design Retail Preference Survey (UDRPS), (2) shopping behavior questions, and (3) demographic information. The questionnaire consisted of a total of 28 pages: 1
Measures

In this study, there were four measures used to investigate the research questions. They included: 1) preference for Universal Design features, 2) retail store avoidance features, 3) retail store approach features, and 4) characteristics of the sample.

Measure 1: preference for Universal Design features.

The Universal Design features were categorized as either pertaining to optimal visibility, strategic focal point, or spatial organization. See Table 1 for a description of these three categories of Universal Design features. The participants’ preferences for these Universal Design features were measured using the Universal Design Retail Preference Survey (UDRPS) developed for this study.
<table>
<thead>
<tr>
<th>Universal Design categories</th>
<th>Universal Design features used in photographs (UD)</th>
<th>Non Universal Design features used in photographs (UD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal visibility:</td>
<td>Value contrast (4 pairs)</td>
<td>No value contrast</td>
</tr>
<tr>
<td>- Contrasted, warm-colored and dimensional signage created with simple type fonts (Ruderman &amp; Ruderman, 1992)</td>
<td>No pattern (4 pairs)</td>
<td>Patterned surfaces</td>
</tr>
<tr>
<td>- “Redundant cueing” or presenting a message more than once (Hunt, 1991)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Avoid using two-dimensional patterns (Day, Carreon &amp; Stump, 2000)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strategic focal point:</td>
<td>Focal point (4 pairs)</td>
<td>No focal point</td>
</tr>
<tr>
<td>- Created by size or arrangement of items; symmetrical balance (Allen &amp; Stimpson, 1992)</td>
<td>Continuous floor material (4 pairs)</td>
<td>Multiple floor materials</td>
</tr>
<tr>
<td>- Objects should be placed at eye level to create emphasis or a central focal point (Hiatt, 1991)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spatial organization:</td>
<td>Open spaces between fixtures on the selling floor (4 pairs)</td>
<td>No open spaces between fixtures on the selling floor</td>
</tr>
<tr>
<td>- Eliminate overstimulation of senses (Day &amp; Calkins, 2002) by spacing out merchandise on fixtures</td>
<td>Wide aisles (4 pairs)</td>
<td>No wide aisles</td>
</tr>
<tr>
<td>- At least a 3’ x 3’ turning space should be available (U.S. Small Business Administration &amp; U.S. Department of Justice, 1999)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Clutter should not be placed in open spaces (U.S. Small Business Administration &amp; U.S. Department of Justice, 1999)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Aisles should ideally be at least 36” wide (U.S. Small Business Administration &amp; U.S. Department of Justice, 1999); 48” for two people to pass through comfortably</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Descriptives of Universal Design categories and features used in this study

The preference survey (UDRPS) consisted of 24 pairs of photographs distributed evenly across the six Universal Design/Non Universal Design categories explained in Table 1. Thus, there were 2 pairs of photographs presented as “A” or “B” per Universal Design feature.
Each pair of photographs was randomly organized and presented on its own page of the questionnaire. In each of these pairs of photographs, only one Universal Design feature varied as everything else remained the same. For example, one page presented one photograph showing a make-up counter with a solid background (UD) and one showed the same make-up counter with a patterned background (not UD).

Each pair of photographs was presented both in a Power Point presentation on the wall (Table 2) and on paper (see Appendix C). The almost life size projected view simulated what the retail environment might look like up-close in real life, while the paper version eliminated confusion as to whether or not the participant was accurately circling her preferred photograph.

The participants evaluated the pairs of photographs presented in the questionnaire and selected their preferred shopping environment. After selecting photograph “A” or “B”, the participants were asked 1) to rate their level of confidence using a Likert-type rating scale and 2) write why they selected the photograph. The purpose of the confidence scale was to determine how confident participants were in their selection of photograph “A” or “B.”
<table>
<thead>
<tr>
<th>Optimal Visibility</th>
<th>Value contrast/No value contrast</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>![Image A] ![Image B]</td>
</tr>
<tr>
<td>UD</td>
<td>![Image A] ![Image B]</td>
</tr>
<tr>
<td>Note: UD was not on the original slide presentation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>![Image A] ![Image B]</td>
</tr>
<tr>
<td>UD</td>
<td>![Image A] ![Image B]</td>
</tr>
</tbody>
</table>

Table 2: Example of slide show

Continued
<table>
<thead>
<tr>
<th>Optimal Visibility</th>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>No pattern/Pattern</td>
<td>UD</td>
<td>UD</td>
<td>UD</td>
<td>UD</td>
</tr>
</tbody>
</table>

Continued
<table>
<thead>
<tr>
<th>Strategic Focal Point</th>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focal point/No focal point</td>
<td>UD</td>
<td></td>
<td>UD</td>
<td></td>
</tr>
</tbody>
</table>

Continued
<table>
<thead>
<tr>
<th>Strategic Focal Point</th>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous floor material/ Multiple floor materials</td>
<td>UD</td>
<td>UD</td>
<td>UD</td>
<td>UD</td>
</tr>
</tbody>
</table>

Continued
### Spatial Organization

Open spaces between fixtures on the selling floor/No open spaces

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.jpg" alt="Image" /></td>
<td><img src="image2.jpg" alt="Image" /></td>
</tr>
<tr>
<td>UD</td>
<td>UD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image3.jpg" alt="Image" /></td>
<td><img src="image4.jpg" alt="Image" /></td>
</tr>
<tr>
<td>UD</td>
<td>UD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image5.jpg" alt="Image" /></td>
<td><img src="image6.jpg" alt="Image" /></td>
</tr>
<tr>
<td>UD</td>
<td>UD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image7.jpg" alt="Image" /></td>
<td><img src="image8.jpg" alt="Image" /></td>
</tr>
<tr>
<td>UD</td>
<td>UD</td>
</tr>
<tr>
<td>Spatial Organization</td>
<td>Wide aisles/No wide aisles</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
</tr>
</tbody>
</table>
Measure 2: retail store avoidance features.

At the end of the questionnaire, there was a section that pertained to shopping behaviors. Participants were required to respond to open-ended questions in order to seek further understanding of retail environment shopping features that might lead to avoidance. The following “avoidance” questions were asked:

1. What are your biggest problems during in-store apparel shopping?
2. When you enter a store, what overwhelms you?

Mehrabian and Russell (1974) suggested that avoidance behaviors are more likely to occur if a person is not comfortable in a situation. Therefore, the researcher assumed that older customers may become discontent and may leave a retail store if they do not feel at ease or are not able to function in the store environment independently.

As discussed in the Review of Literature, Figure 16 illustrates the integrated model of approach and avoidance behavior as created by this researcher which shows how these theories are united in this study. This model is an integration of approach-avoidance theory (Mehrabian & Russell, 1974), the ecological model of aging (Lewin, 1935), and Universal Design features applied to retail store environments.
Finally, at the end of the questionnaire, in the shopping behavior section, the following “approach” question was asked:

1. What physical characteristics of the store interiors would influence you to want to spend more time there?

This question provided insight into what makes an older adult comfortable in a retail store. As discussed earlier, Mehrabian and Russell (1974) suggested that approach behaviors are more likely to occur if a person is comfortable or content in a situation. Therefore, the researcher assumed that older customers will approach a retail store if they are able to function on their own.
As explained in the Review of Literature, Lewin (1935) conceptualized this theory in his ecological model of aging, “Behavior is a function of the person and the environment; B= f (P, E).” According to Lawton (1982), how well a person can adapt to a new environment is based on her abilities and the environmental press. The researcher in this study suggested that Universal Design features improved the environmental press in the environment allowing the individual to adapt to new situations. Thus, this philosophy led to approach behaviors rather than avoidance behaviors because the individual felt more pleasure towards the situation.

*Measure 4: characteristics of the sample.*

In order to understand how preferences for Universal Design features and shopping behaviors might differ by sample characteristics (the independent variables), the following shopping questions were asked:

1. How often do you shop for apparel?
2. Do you shop alone? If no, with whom do you shop?

The following demographic questions were asked:

1. In what year were you born?
2. What is your highest level of education?
3. What is your ethnicity?
Development Of The Universal Design Retail Preference Survey (UDRPS)

The researcher used black and white digital photography as well as Adobe PhotoShop to capture and manipulate design features at a discount department store (in Columbus, Ohio), a suburban up-scale boutique (in Dublin, Ohio), and a small town department store (Wooster, Ohio). Black and white photography was used to eliminate any color bias among participants. As stated earlier, use of black and white photos for research was supported by Scott (1993). Additionally, each photograph presented a shopping environment without any available sales help.

Initially, the researcher collected several hundred photographs and eventually narrowed them down. Each photograph was taken from at least five feet away from the design characteristic at hand. All of the photographs were grouped into three categories (see Table 1), optimal visibility, strategic focal point and spatial organization. Below is an outline of the steps used in selecting and filtering the photographs:

1. The researcher conducted pilot studies 1 through 4 to determine, a) if there is a need for Universal Design features to be implemented into retail environments, b) if older women continue to engage in shopping activities as they grow older, and c) what Universal Design features may already exist in retail environments (see Appendix B for specific results).

2. The researcher evaluated literature presenting photographs of the
interior design of retail stores and other environments to conceptualize ideas for the best angle and other elements.

3. The researcher took approximately 100 photographs with a digital camera at the discount department store. The digital camera enabled the researcher to evaluate the photograph at the location to see if it was of acceptable quality and if it successfully captured the Universal Design feature.

4. The researcher evaluated all of the photographs on Adobe Photoshop and organized each one into the various Universal Design features categorized onto floppy disks.

5. The researcher and her advisor selected approximately 10-15 photographs in each Universal Design feature category.

6. The researcher used Adobe Photoshop to eliminate all color in the photographs creating a black and white environment.

7. The researcher printed each photograph in black and white on standard 8” x 10” white printer paper.

8. The researcher labeled each photograph by its Universal Design feature category.

9. The researcher and the advisor evaluated these photographs and eliminated ones that did not adequately represent Universal Design features.
10. The researcher’s dissertation committee further evaluated the selected photographs.

11. The researcher investigated if this type of research study could be conducted successfully with an older population through pilot study 5 (see Appendix B for specific results).

12. The researcher used findings from pilot study 5 to determine which photographs to keep in a future pilot study and possibly the main study. The researcher and advisor concluded that the pairs of photographs should completely mirror each other (see Appendix C) showing the same scene instead of showing the same Universal Design features but different scenes.

13. The researcher took approximately 300 more photographs with a digital camera. These photographs were taken in two more locations at the suburban upscale boutique and the small town department store.

14. The researcher evaluated all of the photographs on Adobe Photoshop and organized each one into the various Universal Design features on to a flash drive.

15. The researcher selected approximately 10-15 photographs in each Universal Design feature category.

16. The researcher used Adobe Photoshop to eliminate all color in the photographs creating a black and white environment.
17. The researcher printed each photograph in black and white on standard 8 1/2” x 11” white printer paper.

18. The researcher labeled each photograph by its Universal Design feature category.

19. The researcher and the advisor evaluated these photographs and eliminated ones that did not adequately represent Universal Design features.

20. The researcher and an undergraduate student studying interior design used Adobe Photoshop to digitally change each photograph to make a comparable pair of photographs, so that one photograph of the same scene showed Universal Design features and one did not (see Figure 17).

![Universal Design versus non Universal Design](image)

Figure 17: Universal Design versus non Universal Design
21. The researcher, the advisor and other committee members evaluated the photographs to see how well they reflected Universal Design.

22. The researcher and the undergraduate student studying interior design used Adobe Photoshop to make additional changes to the photographs.

23. Pilot studies 6 and 7 were conducted to determine what photographs were easy to interpret, as well as what data analyses should be used in the main study (see Appendix B for specific results).

24. Based on the findings of pilot studies 6 and 7, additional changes were made to the photographs Adobe Photoshop and changes were made in the selection of several photographs on the questionnaire (see Appendix C).

25. The final selection of photographs featuring Universal Design features and Not Universal Design features were selected.

Validity Of The Universal Design Retail Preference Survey (UDRPS)

To validate whether the photos exhibited the desired Universal Design feature, the researcher and University professors with expertise in Universal Design, retail design, and gerontology viewed and evaluated the photographs to determine whether they represented Universal Design features.
Data Analysis

There were 24 pairs of photographs distributed evenly across the six Universal Design/Non Universal Design categories. Thus, there were two pairs of photographs presented as “A” or “B” per Universal Design feature. Each pair of photographs was randomly organized and presented on its own page of the questionnaire. In each of these pairs of photographs, only one Universal Design feature varied and everything else was held constant.

The participants evaluated the pairs of photographs presented in the questionnaire and selected their preferred shopping environment choosing photograph, “A” or “B”. These categorical preference scores were dummy coded where “1” equals the presence of a Universal Design preference and “0” equals the absence of a Universal Design preference. These total scores, or how many times participants selected photographs featuring Universal Design features, were totaled to provide an average preference score.

At the end of the questionnaire, responding to fill-in-the-blank and additional Likert-type rating scales, the participants were asked to respond to questions based on demographics as well as questions based on their individual shopping behaviors.

Quantitative statistical analyses were conducted in this study to develop its conclusions. Descriptive statistics were calculated to determine the number of times an individual selected Universal Design features when choosing her preferred photograph of the paired retail environment scenarios. In addition,
Descriptive statistics were also calculated in order to investigate apparel shopping frequency, whether or not participants shop alone, and other demographic information. In addition, a K-means cluster analysis was also implemented to identify groups that may have existed in the data across Universal Design features. This analysis was conducted to explore what Universal Design features (averages of photograph "A" or "B") could be grouped based on average preference means of the participants. Additionally, the clusters were analyzed to explore their demographic components.

The purpose of a cluster analysis is to classify a specific population into groups based on similar characteristics (Hair, Anderson, Tatham & Black, 1998) such as in Universal Design preferences. According to Hair, Anderson, Tatham & Black (1998), there are three steps to a cluster analysis: 1) conclude how many groups exist within the sample population, 2) cluster these groups, and 3) interpret the composition of these groups.
CHAPTER 4

RESULTS

This chapter consists of 1) the sample description, 2) a discussion of the preparation for the data analysis, 3) a reliability evaluation, 4) the findings from the data analysis, and 5) a summary. The statistical package used in this study was SPSS, version 14.0.

Sample Description

The participants were recruited using the procedures, described in Chapter 3, from nine senior residential communities and five senior centers in Columbus, Ohio, and surrounding suburbs. There were initially 152 older adult females who were given the questionnaire; however, 25 of these individuals were dropped due to missing values as these individuals did not answer at least 80% of the preference questions. Therefore, 127 participants were used for the study.

Demographic and Shopping Questions

At the end of the instrument, participants were asked to respond to questions based on demographics (age, ethnicity, and education) and shopping attitudes. The median age of the population was 81, and the mean age was 79.36 (SD = 8.17). Most of the sample was between the ages of 80-99 years old.
(56.0%) and college-educated (53.2%). Many shopped once a month or more often (42.9%), and over half shopped alone (57.9%). Ethnicity was dropped as 96.7% of the sample was Caucasian, 1.6% was African-American, 2.0% were "other", and 3.1% did not respond to this question (see Table 3 for more specific information).
<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency</th>
<th>Valid Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 1: ages 59-69</td>
<td>16</td>
<td>12.8</td>
</tr>
<tr>
<td>Group 2: ages 70-79</td>
<td>39</td>
<td>31.2</td>
</tr>
<tr>
<td>Group 3: ages 80-99</td>
<td>70</td>
<td>56.0</td>
</tr>
<tr>
<td>No response</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school</td>
<td>59</td>
<td>46.8</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>36</td>
<td>28.6</td>
</tr>
<tr>
<td>Graduate</td>
<td>31</td>
<td>24.6</td>
</tr>
<tr>
<td>No response</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Frequency of apparel shopping</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Once a week</td>
<td>15</td>
<td>11.9</td>
</tr>
<tr>
<td>Several times a month</td>
<td>2</td>
<td>1.6</td>
</tr>
<tr>
<td>Once a month</td>
<td>37</td>
<td>29.4</td>
</tr>
<tr>
<td>Every couple of months</td>
<td>4</td>
<td>3.2</td>
</tr>
<tr>
<td>Every six months</td>
<td>30</td>
<td>23.8</td>
</tr>
<tr>
<td>Once a year</td>
<td>14</td>
<td>11.1</td>
</tr>
<tr>
<td>When needed</td>
<td>11</td>
<td>8.7</td>
</tr>
<tr>
<td>On occasion</td>
<td>3</td>
<td>2.4</td>
</tr>
<tr>
<td>When have the chance</td>
<td>5</td>
<td>4.0</td>
</tr>
<tr>
<td>No comment when</td>
<td>5</td>
<td>4.0</td>
</tr>
<tr>
<td>No response</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Shop alone</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>70</td>
<td>57.9</td>
</tr>
<tr>
<td>No</td>
<td>51</td>
<td>42.1</td>
</tr>
<tr>
<td>No response</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Frequencies of demographic variables (N= 127)
Preparation Of The Data For Analysis

As explained in Chapter 3, there were 24 pairs of photographs distributed evenly across the six Universal Design/Not Universal Design features. Each pair was presented as “A” or “B,” and randomly organized throughout each page of the survey. In each pair, only one Universal Design feature varied as everything else remained the same. The six Universal Design features (wide aisles, no pattern, focal point, open spaces, value contrast, and continuous flooring) were also organized into three categories (optimal visibility, strategic focal point, and spatial organization). It should be noted that photographs featuring “open spaces between fixtures on the selling floor” and “wide aisles” refer to spatial areas measuring to at least 36 inches wide.

Average Preference Level Scores

The participants evaluated each pair of photographs and selected their preferred shopping environment by choosing photograph “A” or “B.” These categorical preference scores were dummy coded where “1” equaled the presence of a Universal Design preference and “0” equaled the absence of a Universal Design preference. A Universal Design average preference score within each feature was determined.

Average Confidence Level Scores

On each of the 24 pages, the participants rated how confident they were with their answer. They did this by using a Likert-type rating scale, which ranged from 1 (“not at all confident”) to 5 (“very confident”). These ratings were also
scored to provide an average confidence level score, which was used to determine reliability as discussed below.

Reliability

Confidence ratings have been used in psychology research to test accuracy in individual responses (Stankov & Crawford, 1997; Stankov & Crawford, 1996; Campbell, 1990). Stankov and Crawford (1997) stated that confidence judgments give “the perception of a person’s own work” (p. 94). Stankov and Crawford (1996) stated that asking people to rate their confidence “may be important in studies of individual differences in risk-taking behaviour, self-efficacy, optimism bias, and many situations that call for decision making under the conditions of uncertainty” (p. 971). These authors also stated that confidence rating measurements come from research based on “probabilistic decision making” (p. 971). They defined confidence ratings as “how well a person evaluates and monitors his or her performance” (p. 971). In other words, using confidence ratings indicates how accurate someone is with their response to a question.

Stankov and Crawford (1997) used confidence judgments in order to measure cognitive abilities including vocabulary, English, and math scores of female college students. In order to research self-esteem and self-concept, Campbell (1990) asked participants to evaluate themselves by identifying 15 pairs of bipolar adjectives that they felt they personally possessed. Next, she asked them to rate how confident they were with their answer, on a scale from
“not at all confident” to “very confident” (p. 540). Finally, she calculated the mean for both the adjectives and average confidence scores.

In this dissertation, a reliability test was conducted on the total average confidence level scores amongst the participants. The lowest mean confidence level rating was 2.88, which corresponded to “neutral” and the highest average was 5.00, corresponding to “very confident” on the Likert-type scale. This test indicated that participants were in fact confident with a Cronbach’s Alpha of .954, and a mean rating of 3.96 (SD= .48), which corresponded to the Likert-type scale rating of “confident.” This demonstrated that most participants were relatively confident with their selections of photographs “A” or “B.”

Findings From The Data Analysis

Research Question 1

In an unfamiliar apparel retail environment, are Universal Design features as identified through the Universal Design Retail Preference Survey (UDRPS) preferred? If so, which ones?

Data Analysis

For the first research question, descriptive statistics were conducted on the preference scores of the participants. First, Universal Design as a total preference score amongst the participants was investigated. Second, preference scores for Universal Design categories (optimal visibility, strategic focal point, and spatial organization) were investigated. Third, preference scores for each Universal Design feature (value contrast, no pattern, focal point,
continuous flooring, open spaces between fixtures on the selling floor, and wide aisles) were investigated.

Results by total.

On average, across all participants and all relevant responses, Universal Design was preferred over Non Universal Design 73.6% of the time (SD=.12). Figure 18 is a frequency histogram of the distribution of the participants’ preferences scores showing that a significant majority of participants preferred Universal Design. The x-axis represents the proportion of responses for each participant preferring Universal Design. The y-axis represents the number of participants achieving or approximating the respective average preference score. Note the concentration of responses with an average preference score greater than 0.5. For example, approximately 30 people selected Universal Design 81% of the time.
Results by category.

In all three categories (optimal visibility, strategic focal point and spatial organization), Universal Design was preferred more than Non Universal Design. The preferences were highest in "spatial organization" where participants preferred Universal Design 83% of the time. The preferences were lowest in "optimal visibility" where participants preferred Universal Design 63% of the time (see Table 4).
Results by feature.

As explained earlier, there were four pairs of photographs among each of the six Universal Design features (value contrast, no pattern, focal point, continuous flooring materials, open spaces between fixtures, and wide aisles). See Table 4 for specific results on the means and standard deviation for each feature. See Table 5 for percentages of each individual pair of photographs.

<table>
<thead>
<tr>
<th>Universal Design Categories</th>
<th>Mean Percentage</th>
<th>Standard deviation (SD)</th>
<th>Universal Design features</th>
<th>Mean percentage</th>
<th>Standard deviation (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal Visibility</td>
<td>.63</td>
<td>.19</td>
<td>Value contrast (4 pairs)</td>
<td>.73</td>
<td>.27</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No pattern (4 pairs)</td>
<td>.52</td>
<td>.26</td>
</tr>
<tr>
<td>Strategic focal point</td>
<td>.75</td>
<td>.19</td>
<td>Focal point (4 pairs)</td>
<td>.83</td>
<td>.23</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Continuous flooring materials (4 pairs)</td>
<td>.67</td>
<td>.32</td>
</tr>
<tr>
<td>Spatial organization</td>
<td>.83</td>
<td>.16</td>
<td>Open spaces between fixtures on the selling floor (4 pairs)</td>
<td>.75</td>
<td>.24</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Wide aisles (4 pairs)</td>
<td>.91</td>
<td>.16</td>
</tr>
<tr>
<td>Overall Universal Design Mean</td>
<td></td>
<td></td>
<td></td>
<td>.74</td>
<td>.12</td>
</tr>
</tbody>
</table>

Table 4: Preference for Universal Design by category and feature
### Table 5: Examples of slides showing Universal Design features with percentages

<table>
<thead>
<tr>
<th>Value contrast/ No value contrast</th>
<th><img src="image1.jpg" alt="Image A" /></th>
<th><img src="image2.jpg" alt="Image B" /></th>
<th><img src="image3.jpg" alt="Image A" /></th>
<th><img src="image4.jpg" alt="Image B" /></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>77.5%</td>
<td>67.2%</td>
<td>80.0%</td>
<td>71.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* highest percentage in this category</td>
<td></td>
</tr>
<tr>
<td>No pattern/ Pattern</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>---------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td>84.0%</td>
<td>* highest percentage in this category</td>
<td>61.3%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15.1%</td>
<td>*</td>
<td>43.8%</td>
<td></td>
</tr>
</tbody>
</table>

Continued
<table>
<thead>
<tr>
<th>Focal point/No focal point</th>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>74.6%</td>
<td>* highest percentage in this category</td>
<td>87.1%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>85.4%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>86.9%</td>
</tr>
</tbody>
</table>

Continued
<table>
<thead>
<tr>
<th>Continuous floor material/ Multiple floor materials</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image A" /> <img src="image2.png" alt="Image B" /></td>
<td>54.9%</td>
<td><em>77.7%</em> highest percentage in this category</td>
</tr>
<tr>
<td><img src="image3.png" alt="Image A" /> <img src="image4.png" alt="Image B" /></td>
<td>69.9%</td>
<td>65.8%</td>
</tr>
</tbody>
</table>

Continued
<table>
<thead>
<tr>
<th>Open spaces between fixtures on the selling floor/No open spaces between fixtures on the selling floor</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>94.4%  * highest percentage in this category</td>
</tr>
<tr>
<td></td>
<td></td>
<td>91.2%</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td></td>
<td>49.2%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>63.1%</td>
<td></td>
</tr>
</tbody>
</table>

Continued
<table>
<thead>
<tr>
<th>Wide aisles/No wide aisles</th>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="image1.png" alt="Image 1" /></td>
<td><img src="image2.png" alt="Image 2" /></td>
<td><img src="image3.png" alt="Image 3" /></td>
<td><img src="image4.png" alt="Image 4" /></td>
</tr>
<tr>
<td>94.2%</td>
<td><img src="image5.png" alt="Image 5" /></td>
<td><img src="image6.png" alt="Image 6" /></td>
<td>82.9%</td>
<td><img src="image7.png" alt="Image 7" /></td>
</tr>
<tr>
<td>95.0%</td>
<td><img src="image8.png" alt="Image 8" /></td>
<td><img src="image9.png" alt="Image 9" /></td>
<td>90.2%</td>
<td><img src="image10.png" alt="Image 10" /></td>
</tr>
<tr>
<td>* highest percentage in this category</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Research Questions 2 and 3

What features in an apparel retail shopping environment may elicit avoidance behaviors? What features in an apparel retail shopping environment may elicit approach behaviors?

Preparation Of Data For Qualitative Analysis

At the end of the questionnaire, participants were asked to qualitatively respond to open-ended questions in regards to their personal shopping behaviors. These questions included, "What are your biggest problems during in-store apparel shopping?", "When you enter a store, what overwhelms you?", and "What physical characteristics of the store interiors would influence you to want to spend more time there?"

Occasionally the participants listed more than one answer, thus the first response only was coded into the data set. Creswell (1994) and Marshall and Rossman (1989) explained that qualitative responses should be reduced to categories to make them easier to interpret. Therefore, in this dissertation, themes of these responses were grouped to determine which fall into positive or negative behaviors (see Tables 6 & 7). Creswell (1994) stated that this type of procedure breaks down the descriptive wording or responses into "themes or categories" (p. 154) to show associations. Note that these themes may elicit both approach and/or avoidance behaviors associated with survey questions 1-3. Second, these initial themes were interpreted and organized into two more sections, titled “Retail Environment” or “Retail Non-Environment.” Third,
frequency and percentage analyses were conducted to determine how often the participants recognized these design characteristics according to the associated question.

<table>
<thead>
<tr>
<th>SPATIAL CONFIGURATION</th>
<th>SEATING</th>
<th>WAYFINDING</th>
<th>DISPLAYS</th>
<th>LIGHTING</th>
<th>AMBIENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessibility</td>
<td>Availability of seating</td>
<td>Signage</td>
<td>Racks</td>
<td>Amount of lighting</td>
<td>Color</td>
</tr>
<tr>
<td>Merchandise organization</td>
<td>Locating items</td>
<td></td>
<td>Aesthetic displays</td>
<td></td>
<td>Smell</td>
</tr>
<tr>
<td>Product density</td>
<td>Locating sizing</td>
<td></td>
<td>Coordinated displays</td>
<td></td>
<td>Cleanliness</td>
</tr>
<tr>
<td>Placement of clothing</td>
<td>Locating items</td>
<td></td>
<td>Decorative displays</td>
<td>Relaxing atmosphere</td>
<td></td>
</tr>
<tr>
<td>Order</td>
<td>Locating items</td>
<td></td>
<td>Nature of displays</td>
<td>Music</td>
<td></td>
</tr>
<tr>
<td>Store layout</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open floor space</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mirrors</td>
</tr>
<tr>
<td>Spatial organization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Separate senior areas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aisles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6: Themes of retail environment features transcribed from descriptive responses of participants
Table 7: Themes of retail non-environment features transcribed from descriptive responses of participants

<table>
<thead>
<tr>
<th>SALESPERSON</th>
<th>STYLES</th>
<th>DIVERSITY IN CHOICES</th>
<th>PRICING</th>
<th>QUALITY</th>
<th>FIT</th>
<th>CROWDS</th>
<th>OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Help</td>
<td>Clothing styles</td>
<td>Variety</td>
<td>Sales</td>
<td>Quality of clothing</td>
<td>Sizing</td>
<td>Trying on clothing</td>
<td>Shopper density</td>
</tr>
<tr>
<td>Finding salesperson</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Data Analysis Research Question 2

Problems Of Most Concern During In-Store Apparel Shopping

Retail environmental issues.

Approximately 29.9% of the participants listed “retail environmental” features, such as spatial configuration, having no chair or wayfinding, as their biggest problems while shopping. Issues related to spatial configuration (18.7%), a major focus of Universal Design, was the greatest retail environmental issue of concern to the participants.

Retail non-environmental issues.

Approximately 67.3% of the participants listed “retail non-environmental” features, such as fit, styles, and salesperson as their biggest problems while shopping. The retail non-environmental responses were dominated by issues related to merchandise (49.5%). Of all the participants who responded to this question, approximately 29.0% of the responses, the greatest proportion for a single issue, suggested that fit is a problem.

No problem-no response.

Only 2.8% participants suggested that they did not have a problem with in-store apparel shopping, and a total of 20 did not respond to this question (see Table 8 for more specific information).
<table>
<thead>
<tr>
<th>PROBLEMS</th>
<th>Retail store feature</th>
<th>Frequency or how often participants indicated a response belonging in this category</th>
<th>Percentage of how often participants indicated a response belonging in this category percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>(29.9%) Retail</td>
<td>Spatial configuration</td>
<td>20</td>
<td>18.7%</td>
</tr>
<tr>
<td>Environmental</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seating</td>
<td></td>
<td>5</td>
<td>4.7%</td>
</tr>
<tr>
<td>Wayfinding</td>
<td></td>
<td>7</td>
<td>6.5%</td>
</tr>
<tr>
<td>Displays</td>
<td></td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Lighting</td>
<td></td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Ambience</td>
<td></td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>(67.3%) Retail</td>
<td>Salesperson</td>
<td>17</td>
<td>15.9%</td>
</tr>
<tr>
<td>Non-Environmental</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Styles</td>
<td></td>
<td>18</td>
<td>16.8%</td>
</tr>
<tr>
<td>Diversity of choices</td>
<td></td>
<td>1</td>
<td>0.9%</td>
</tr>
<tr>
<td>Merchandise</td>
<td>Pricing</td>
<td>2</td>
<td>1.9%</td>
</tr>
<tr>
<td>(49.5%)</td>
<td>Quality</td>
<td>1</td>
<td>0.9%</td>
</tr>
<tr>
<td>Fit</td>
<td></td>
<td>31</td>
<td>29.0%</td>
</tr>
<tr>
<td>Crowds</td>
<td></td>
<td>2</td>
<td>1.9%</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>None</td>
<td></td>
<td>3</td>
<td>2.8%</td>
</tr>
<tr>
<td>Total Answered</td>
<td></td>
<td>107</td>
<td>100.0%</td>
</tr>
<tr>
<td>No Response</td>
<td></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>127</td>
<td></td>
</tr>
</tbody>
</table>

Table 8: Retail design features that were problems to participants
Overwhelming Issues During In-Store Apparel Shopping

Retail environmental issues.

Approximately 74.0% of the participants listed retail environmental features as being overwhelming. Of all the participants who responded to this question, approximately 60.0% of the responses, the greatest proportion across the items mentioned, suggested that they find issues related to spatial configuration to be overwhelming.

Retail non-environmental issues.

Approximately 14.0% of the participants listed retail non-environmental features, such as fit, available styles and salesperson as overwhelming issues while shopping, and within that category, 9.0% of the responses related to merchandise. Of all the participants who responded to this question, approximately 6.0% of the responses suggested that they find aspects of pricing, a merchandise issue, to be overwhelming.

No problem-no response.

Approximately 12.0% suggested that they did not feel overwhelmed by shopping, and a total of 27 participants did not respond to this question (see Table 9 for more specific information).
<table>
<thead>
<tr>
<th>OVERWHELMING ASPECTS</th>
<th>Retail store feature</th>
<th>Frequency or how often participants indicated a response belonging in this category</th>
<th>Percentage of how often participants indicated a response belonging in this category</th>
</tr>
</thead>
<tbody>
<tr>
<td>(74.0%) Retail Environment</td>
<td>Spatial configuration</td>
<td>60</td>
<td>60.0%</td>
</tr>
<tr>
<td></td>
<td>Seating</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td></td>
<td>Wayfinding</td>
<td>7</td>
<td>7.0%</td>
</tr>
<tr>
<td></td>
<td>Displays</td>
<td>3</td>
<td>3.0%</td>
</tr>
<tr>
<td></td>
<td>Lighting</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td></td>
<td>Ambience</td>
<td>4</td>
<td>4.0%</td>
</tr>
<tr>
<td>(14.0%) Retail Non-Environment</td>
<td>Salesperson</td>
<td>4</td>
<td>4.0%</td>
</tr>
<tr>
<td></td>
<td>Styles</td>
<td>2</td>
<td>2.0%</td>
</tr>
<tr>
<td></td>
<td>Diversity of choices</td>
<td>1</td>
<td>1.0%</td>
</tr>
<tr>
<td>Merchandise (9.0%)</td>
<td>Pricing</td>
<td>6</td>
<td>6.0%</td>
</tr>
<tr>
<td></td>
<td>Quality</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td></td>
<td>Fit</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td></td>
<td>Crowds</td>
<td>1</td>
<td>1.0%</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>None</td>
<td>12</td>
<td>12.0%</td>
<td></td>
</tr>
<tr>
<td>Total Answered</td>
<td>100</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>No Response</td>
<td>27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>127</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 9: Retail design features that were overwhelming to participants
Summary of Results

The participants provided similar responses to both open-ended questions, which suggested that spatial configuration was an area of major concern. Written responses from the participants are included in the following text. These responses related to the approach and avoidance framework (Mehrabian & Russell, 1974) because they provide some indication why older female customers might approach or avoid an apparel retail store.

Summary of results to retail environmental issues.

Findings in both questions resolved that spatial configuration has a significant influence on an individual’s choices when shopping in retail environments. In fact, one participant stated that clutter “makes it look like a rummage sale” and another wrote that “filled racks” make her feel “claustrophobic.” In support of this statement, another participant said that “too much stimulus for eyes that don’t adjust as quickly as they once did," was a concern. This same participant wrote, “I find myself getting tired more quickly in a store crammed with too much merchandise.” One woman wrote that she “liked simplicity” while another response indicated that “too much clutter is confusing.”

In keeping the concept of avoidance behavior in mind, one participant wrote “I won’t stay or buy if it is an exhausting experience to try to find items…” Another participant also indicated that “too much ‘stuff’ discourages my buying.”
Summary of results to retail non-environmental issues.

In this "problem" section, the "fit" of merchandise was a major issue (29.0%). However, it was not investigated further in this study as it was not categorized as a retail environment issue. Responses from both questions also indicated that lack of a salesperson or an overbearing salesperson is also an issue.

Data Analysis Research Question 3

The participants were also asked to provide feedback to an open-ended question based on their individual attitudes about the physical attributes of retail stores. The open-ended question, “What physical characteristics of the store interiors would influence you to want to spend time there?” was used to further investigate what Universal Design features would influence approach behaviors conceptualized by the approach-avoidance framework (Mehrabian & Russell, 1974).

As explained earlier, all of the responses from these open-ended questions were analyzed and the descriptive wording was organized into categories (Creswell, 1994). As with the previous open-ended questions, if participants listed more than one answer, the first response only was coded. Second, the researcher interpreted and organized these initial themes into two more sections, titled “Retail Environment” or “Retail Non-Environment.” Third, a frequency and percentage analysis was conducted to determine how often the participants recognized these design characteristics according to the associated question.
Summary of results to retail environmental issues.

Approximately 89.5% of the participants, who provided a response, listed retail environmental features as positive store aspects. The results of this open-ended question suggested that the spatial configuration (30.5%) of a store does influence approach behaviors, as it received the largest response of the characteristics mentioned. The second largest response included lighting (21.9%), and the third largest included seating (11.4%).

One participant described a photograph featuring several racks pushed together as “cluttered” and “confusing.” Therefore, she selected the photograph that showed open spaces on the selling floor. Perhaps this “confusion” might have lead to avoidance behaviors. In another response, this same participant wrote, “Clutter under control. Clear signage, good lighting. Chairs available” when describing a store where she would want to spend time.

Summary of results to retail non-environmental issues.

Approximately 9.5% of the participants who provided a response listed retail non-environmental features as positive store aspects. Approximately 5.7% of the time, participants indicated salesperson as a positive aspect. See Table 10 for more specific information.
<table>
<thead>
<tr>
<th>POSITIVE ASPECTS</th>
<th>Retail store features</th>
<th>Frequency or how often participants indicated a response belonging in this category</th>
<th>Percentage of how often participants indicated a response belonging in this category</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Retail Environmental</strong></td>
<td>Spatial configuration</td>
<td>32</td>
<td>30.5%</td>
</tr>
<tr>
<td></td>
<td>Seating</td>
<td>12</td>
<td>11.4%</td>
</tr>
<tr>
<td></td>
<td>Wayfinding</td>
<td>7</td>
<td>6.7%</td>
</tr>
<tr>
<td></td>
<td>Displays</td>
<td>4</td>
<td>3.8%</td>
</tr>
<tr>
<td></td>
<td>Lighting</td>
<td>23</td>
<td>21.9%</td>
</tr>
<tr>
<td></td>
<td>Ambience</td>
<td>16</td>
<td>15.2%</td>
</tr>
<tr>
<td><strong>Retail Non-Environmental</strong></td>
<td>Salesperson</td>
<td>6</td>
<td>5.7%</td>
</tr>
<tr>
<td></td>
<td>Styles</td>
<td>1</td>
<td>1.0%</td>
</tr>
<tr>
<td></td>
<td>Diversity of choices</td>
<td>1</td>
<td>1.0%</td>
</tr>
<tr>
<td><strong>Merchandise</strong></td>
<td>Pricing</td>
<td>2</td>
<td>1.9%</td>
</tr>
<tr>
<td><strong>(2.9%)</strong></td>
<td>Quality</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td></td>
<td>Fit</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td></td>
<td>Crowds</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>1</td>
<td>1.0%</td>
</tr>
<tr>
<td><strong>None</strong></td>
<td></td>
<td>1</td>
<td>1.0%</td>
</tr>
<tr>
<td><strong>Total Answered</strong></td>
<td></td>
<td>105</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>No Response</strong></td>
<td></td>
<td>22</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>127</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 10: Positive aspects of a retail store that would influence an older customer to want to spend time there
Research Question 4

Which combinations of Universal Design features (wide aisles, no pattern, value contrast, focal point, open spaces between fixtures on the selling floor and continuous floor material) will likely contribute to preference or approach behaviors among older women in an unfamiliar apparel retail store? (Part 1)

Is there a difference, by age, education, shopping frequency or participants who do not have a shopping companion, between the significant clusters that have different preferences for Universal Design features? (Part 2)

Data Analysis (Part 1)

A K-means or partitioning cluster analysis was conducted on the six Universal Design features (wide aisles, no pattern, value contrast, focal point, open spaces between fixtures on the selling floor, and continuous floor material) to determine which can be classified according to their average Universal Design preference scores. First, SPSS provided three clusters based on the participants’ preference scores of the six Universal Design features. Second, once the data was distributed by SPSS, and the clusters were identified, the researcher investigated whether there were significant differences in the demographic variables (shop alone, shopping frequency, education, and age). Thirdly, the researcher compared the descriptive statistics of the demographic groups across all three clusters.

According to Aldenderfer and Blashfield (1984), cluster analysis is performed in order “to create a classification” of the variables (p. 7). Cluster
analyses are often conducted in the field of marketing in order to further study demographic segmentation (Ruiz, Chebat, & Hansen, 2004; Hair, Anderson, Tatham & Black, 1998; Lockshin, Spawton, & Macintosh, 1997). For example, Harp, Hlavaty and Horridge (2000) used cluster analysis to classify shoppers into three groups based on store attributes, such as price, quality, and store atmosphere. Jamal, Davies, Chudry and Al-Marri (2006) used cluster analysis to profile similar and different demographics of consumers. Thus, based on previous research, cluster analysis was appropriate for use in this study to investigate the Universal Design preferences of retail stores of the cluster groups.

A K-means cluster analysis allows the user to classify participants into a pre-specified number of groups. During this analysis, participants are moved from one cluster into another until the changes in cluster centers converge to zero, and an iteration limit is reached (SPSS, version 14.0; Garson, n.d.). This results in the “best cluster solution” of the groupings as defined by Hair, Anderson, Tatham, and Black (1998). In this dissertation, the researcher combined the average preference scores of participants for each Universal Design feature and then submitted them to the k-means cluster analysis, which converged after 20 iterations (see Table 11).
<table>
<thead>
<tr>
<th>Iteration</th>
<th>Change in Cluster Centers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>.637</td>
</tr>
<tr>
<td>2</td>
<td>.074</td>
</tr>
<tr>
<td>3</td>
<td>.066</td>
</tr>
<tr>
<td>4</td>
<td>.050</td>
</tr>
<tr>
<td>5</td>
<td>.073</td>
</tr>
<tr>
<td>6</td>
<td>.048</td>
</tr>
<tr>
<td>7</td>
<td>.019</td>
</tr>
<tr>
<td>8</td>
<td>.014</td>
</tr>
<tr>
<td>9</td>
<td>.022</td>
</tr>
<tr>
<td>10</td>
<td>.040</td>
</tr>
<tr>
<td>11</td>
<td>.031</td>
</tr>
<tr>
<td>12</td>
<td>.047</td>
</tr>
<tr>
<td>13</td>
<td>.020</td>
</tr>
<tr>
<td>14</td>
<td>.033</td>
</tr>
<tr>
<td>15</td>
<td>.023</td>
</tr>
<tr>
<td>16</td>
<td>.044</td>
</tr>
<tr>
<td>17</td>
<td>.026</td>
</tr>
<tr>
<td>18</td>
<td>.008</td>
</tr>
<tr>
<td>19</td>
<td>.007</td>
</tr>
<tr>
<td>20</td>
<td>.000</td>
</tr>
</tbody>
</table>

Table 11: Iteration history of cluster groups
Summary of results.

All of the 127 participants were included in this study. Table 12 below defines how many participants were assigned to each cluster by the SPSS software.

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>60.000</td>
</tr>
<tr>
<td>2</td>
<td>37.000</td>
</tr>
<tr>
<td>3</td>
<td>30.000</td>
</tr>
<tr>
<td>Valid</td>
<td>127.000</td>
</tr>
</tbody>
</table>

Table 12: Number of participants in each cluster

The final cluster descriptive information in Table 13 illustrates how the participants were grouped. Mean values above .5 indicated that more than 50% of the participants chose Universal Design features instead of Non Universal Design features. As the survey was comprised of only binary responses (“A” or “B”), the cluster center values reflect the frequency of participants who selected Universal Design.
<table>
<thead>
<tr>
<th>Universal Design categories</th>
<th>Universal Design features</th>
<th>Cluster Group 1 (N= 60) Frequency (Percentage)</th>
<th>Cluster Group 2 (N= 37) Frequency (Percentage)</th>
<th>Cluster Group 3 (N= 30) Frequency (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal visibility</td>
<td>Value contrast</td>
<td>54(.90)</td>
<td>27(.73)</td>
<td>12(.40)</td>
</tr>
<tr>
<td></td>
<td>No pattern</td>
<td>31(.52)</td>
<td>17(.46)</td>
<td>18(.60)</td>
</tr>
<tr>
<td>Strategic focal point</td>
<td>Focal point</td>
<td>54(.90)</td>
<td>32(.87)</td>
<td>20(.66)</td>
</tr>
<tr>
<td></td>
<td>Continuous floor material</td>
<td>47(.79)</td>
<td>10(.27)</td>
<td>27(.91)</td>
</tr>
<tr>
<td>Spatial organization</td>
<td>Open spaces between fixtures on the selling floor</td>
<td>47(.78)</td>
<td>22(.60)</td>
<td>26(.86)</td>
</tr>
<tr>
<td></td>
<td>Wide aisles</td>
<td>56(.93)</td>
<td>30(.82)</td>
<td>29(.96)</td>
</tr>
</tbody>
</table>

Table 13: Descriptive statistics of cluster groups

An analysis of variance (ANOVA) was also conducted to see if there was a significant difference in preferences of Universal Design features between groups (see Table 14). According to the results, all features but “no pattern” were in fact statistically significant (p<.01). Therefore, this finding suggested that the variable “no pattern” did not help the participant classification, therefore it was omitted from further discussion.
<table>
<thead>
<tr>
<th>Feature</th>
<th>df</th>
<th>F</th>
<th>2-tailed p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value contrast</td>
<td>124</td>
<td>72.296</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>No pattern</td>
<td>124</td>
<td>2.291</td>
<td>.105</td>
</tr>
<tr>
<td>Focal point</td>
<td>124</td>
<td>13.306</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Continuous floor material</td>
<td>124</td>
<td>124.882</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Open spaces between fixtures on the selling floor</td>
<td>124</td>
<td>12.516</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Wide aisles</td>
<td>124</td>
<td>9.929</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Table 14: Analysis of variance on Universal Design features

Table 15 illustrates which Universal Design features that were selected 80% of the time or higher in each group. In all three cluster groups, the variable, "wide aisles" was selected 80% of the time or more. In cluster groups 1 and 2, "focal point" was selected 80% of the time or more. The variables, "value contrast, continuous floor material, and open spaces between fixtures on the selling floor" were only selected once across all three cluster groups.
<table>
<thead>
<tr>
<th>Universal Design categories</th>
<th>Universal Design features</th>
<th>Cluster Group 1 (N= 60)</th>
<th>Cluster Group 2 (N= 37)</th>
<th>Cluster Group 3 (N= 30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal visibility</td>
<td>Value contrast</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>No pattern</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strategic focal point</td>
<td>Focal point</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Continuous floor material</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Spatial organization</td>
<td>Open spaces between</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>fixtures on the selling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>floor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wide aisles</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Table 15: Indications of which Universal Design features were selected the most in each cluster group of at least 80% of the time
Data Analysis (Part 2)

To determine if there was a difference in demographic variables (age, education, shopping frequency, and shop alone) in these cluster groups of preferences of Universal Design features, descriptive statistics were conducted (see Table 16 above).

Additionally, an ANOVA was conducted on all four demographic variables and the three cluster groups, and found that all mean groups were not statistically significant (see Table 17).

<table>
<thead>
<tr>
<th>Cluster Groups</th>
<th>Age m(SD)</th>
<th>Valid proportion that shopped alone</th>
<th>Valid proportion with a degree beyond high school</th>
<th>Valid proportion who shopped once a month or more often</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (N=60)</td>
<td>78.68(8.81)</td>
<td>.60</td>
<td>.57</td>
<td>.483</td>
</tr>
<tr>
<td>2 (N=37)</td>
<td>80.75(7.43)</td>
<td>.50</td>
<td>.39</td>
<td>.333</td>
</tr>
<tr>
<td>3 (N=30)</td>
<td>79.03(7.74)</td>
<td>.63</td>
<td>.63</td>
<td>.43.3</td>
</tr>
</tbody>
</table>

Table 16: Demographic information for each cluster group
<table>
<thead>
<tr>
<th>Demographic variable</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>100.202</td>
<td>2</td>
<td>50.101</td>
<td>.748</td>
<td>.476</td>
</tr>
<tr>
<td>Within Groups</td>
<td>8174.598</td>
<td>122</td>
<td>67.005</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>8274.800</td>
<td>124</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>3.289</td>
<td>2</td>
<td>1.644</td>
<td>2.513</td>
<td>.085</td>
</tr>
<tr>
<td>Within Groups</td>
<td>80.489</td>
<td>123</td>
<td>.654</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>83.778</td>
<td>125</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shopping frequency</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>3.667</td>
<td>2</td>
<td>1.834</td>
<td>1.432</td>
<td>.243</td>
</tr>
<tr>
<td>Within Groups</td>
<td>157.539</td>
<td>123</td>
<td>1.281</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>161.206</td>
<td>125</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shop alone</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>.337</td>
<td>2</td>
<td>.169</td>
<td>.683</td>
<td>.507</td>
</tr>
<tr>
<td>Within Groups</td>
<td>29.167</td>
<td>118</td>
<td>.247</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>29.504</td>
<td>120</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 17: ANOVA table for the demographic variables

Additionally, Table 18 reports additional descriptive statistics for the demographic variables.
<table>
<thead>
<tr>
<th>Demographic variable</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
<th>95% Confidence Interval for Mean</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lower Bound</td>
<td>Upper Bound</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>1</td>
<td>59</td>
<td>78.6780</td>
<td>8.1308</td>
<td>76.3813</td>
<td>80.9747</td>
<td>99.00</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>36</td>
<td>80.7500</td>
<td>7.4311</td>
<td>78.2357</td>
<td>83.2643</td>
<td>92.00</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>30</td>
<td>79.0333</td>
<td>7.7392</td>
<td>76.1435</td>
<td>81.9232</td>
<td>91.00</td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>79.3600</td>
<td>8.1689</td>
<td>1.1473</td>
<td>76.3813</td>
<td>80.9747</td>
<td>99.00</td>
</tr>
<tr>
<td>Education</td>
<td>1</td>
<td>60</td>
<td>1.8500</td>
<td>.8402</td>
<td>1.6330</td>
<td>2.0670</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>36</td>
<td>1.5278</td>
<td>.7362</td>
<td>1.2787</td>
<td>1.7769</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>30</td>
<td>1.9333</td>
<td>.8276</td>
<td>1.6243</td>
<td>2.2424</td>
<td>1.00</td>
</tr>
<tr>
<td>Total</td>
<td>126</td>
<td>1.7778</td>
<td>.8186</td>
<td>.7362</td>
<td>1.6330</td>
<td>1.9221</td>
<td>1.00</td>
</tr>
<tr>
<td>Shop frequency</td>
<td>1</td>
<td>60</td>
<td>2.0667</td>
<td>1.2054</td>
<td>1.7553</td>
<td>2.3781</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>36</td>
<td>2.3056</td>
<td>1.1667</td>
<td>1.9108</td>
<td>2.7003</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>30</td>
<td>1.8333</td>
<td>.9129</td>
<td>1.4925</td>
<td>2.1742</td>
<td>1.00</td>
</tr>
<tr>
<td>Total</td>
<td>126</td>
<td>2.0794</td>
<td>1.1356</td>
<td>.9129</td>
<td>1.6791</td>
<td>2.2796</td>
<td>1.00</td>
</tr>
<tr>
<td>Shopping alone</td>
<td>1</td>
<td>55</td>
<td>1.4000</td>
<td>.9444</td>
<td>1.2663</td>
<td>1.5337</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>36</td>
<td>1.5000</td>
<td>.5070</td>
<td>1.3284</td>
<td>1.6716</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>30</td>
<td>1.3667</td>
<td>.4901</td>
<td>1.1836</td>
<td>1.5497</td>
<td>1.00</td>
</tr>
<tr>
<td>Total</td>
<td>121</td>
<td>1.4215</td>
<td>.49585</td>
<td>.04508</td>
<td>1.3322</td>
<td>1.5107</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Table 18: Descriptive statistics for demographic variables
Summary of results.

Cluster group 1 represented the greatest number of participants in the sample (N= 60). The average age of members in group 1 was approximately 79. Roughly 57% held degrees in higher education and 60% stated that they shopped alone. Table 19 indicates how often the participants stated that they shopped for apparel. Group 1 also indicated that its participants were statistically more likely to select photographs featuring "value contrast, focal point, and wide aisles."

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>once a week</td>
<td>7</td>
</tr>
<tr>
<td>several times a month</td>
<td>2</td>
</tr>
<tr>
<td>once a month</td>
<td>20</td>
</tr>
<tr>
<td>every couple of months</td>
<td>1</td>
</tr>
<tr>
<td>every six months</td>
<td>13</td>
</tr>
<tr>
<td>once a year</td>
<td>3</td>
</tr>
<tr>
<td>when needed</td>
<td>7</td>
</tr>
<tr>
<td>on occasion</td>
<td>3</td>
</tr>
<tr>
<td>when have chance</td>
<td>3</td>
</tr>
<tr>
<td>no comment when</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
</tr>
</tbody>
</table>

Table 19: Apparel shopping frequency of cluster group 1
Cluster group 2 represented the second largest number of participants in the sample (N= 37). The average age of members in group two was approximately 81. Approximately 39% of these participants held degrees in higher education and 50% stated that they shopped alone. Table 20 indicates how often the participants stated that they shopped for apparel. Participants in group 2 were more likely to select “focal point and wide aisles” more than other Universal Design features.

<table>
<thead>
<tr>
<th>Cluster Group 2 Frequency Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>N= 37</td>
</tr>
<tr>
<td>once a week</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>13.9</td>
</tr>
<tr>
<td>several times a month</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>once a month</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>19.4</td>
</tr>
<tr>
<td>every couple of months</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>5.6</td>
</tr>
<tr>
<td>every six months</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>19.4</td>
</tr>
<tr>
<td>once a year</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>19.4</td>
</tr>
<tr>
<td>when needed</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>8.3</td>
</tr>
<tr>
<td>on occasion</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>when have chance</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>5.6</td>
</tr>
<tr>
<td>no comment when</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>8.3</td>
</tr>
<tr>
<td>No response</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

Total 37 100.0

Table 20: Apparel shopping frequency of cluster group 2
Cluster group 3 represented the smallest number of participants in the sample (N= 30). The average age of members in group three was approximately 79. Approximately 63% of these participants held a degree in higher education, and 63% stated that they shopped alone. Table 21 indicates how often the participants stated that they shopped for apparel. Participants in this group were more likely to select photographs featuring "continuous floor material, open spaces on the selling floor between fixtures, and wide aisles."

<table>
<thead>
<tr>
<th>Cluster Group 3 Frequency</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>once a week</td>
<td>3</td>
</tr>
<tr>
<td>several times a month</td>
<td>0</td>
</tr>
<tr>
<td>once a month</td>
<td>10</td>
</tr>
<tr>
<td>every couple of months</td>
<td>1</td>
</tr>
<tr>
<td>every six months</td>
<td>10</td>
</tr>
<tr>
<td>once a year</td>
<td>4</td>
</tr>
<tr>
<td>when needed</td>
<td>1</td>
</tr>
<tr>
<td>on occasion</td>
<td>0</td>
</tr>
<tr>
<td>when have chance</td>
<td>0</td>
</tr>
<tr>
<td>no comment when</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
</tr>
</tbody>
</table>

Table 21: Apparel shopping frequency of cluster group 3
Summary

The following information includes a summary from the findings:

- Participants selected Universal Design features most of the time (73.6%).
- Participants were confident in indicating preferences from photographs.
- Participants were most concerned with spatial configuration (including having no chair and wayfinding), presence of no salesperson or overbearing salesperson, and fit and styles of garments.
- Universal Design features preferred the most included wide aisles, focal point, and open spaces between fixtures on the selling floor.
- Universal Design features preferred the least included value contrast and continuous flooring materials.
- Approximately 42.9% of the participants shopped once a month or more often for apparel.
CHAPTER 5

DISCUSSION

Introduction

This chapter consists of 1) the purpose, 2) a summary of theoretical frameworks, 3) a discussion of the findings, 4) limitations, implications and recommendations for future research, and 5) contributions to academia and the retail industry.

Purpose

The goal of this research was to provide information on how to create a “user-friendly” and approachable apparel store environment through Universal Design features geared towards the declining functional abilities of older women.

Summary Of Theoretical Frameworks

This research investigated how approach-avoidance theory and the ecological model of aging/person-environment fit theory could be applied to retail environments. As discussed in Chapter 2, approach-avoidance theory has to do with an individual wanting to approach an environment where she experiences pleasure, which leads her to feel competent to function optimally in the environment (Mehrabian & Russell, 1974). The ecological model of aging/person
environment fit theory suggests that behavior is a function of the person and the environment (Lewin, 1935). This theory is also based on environmental press, which suggests that tools in an environment help a specific human need (Lawton, 1982). One could imply that by integrating these theoretical frameworks an older adult will approach a retail store if it provides the tools to help him or her perform well. In other words, an older adult will continue shopping in the retail store if it is equipped to meet her functional and cognitive needs. This is explained in the operational model (see figure 16) in Chapter 1.

Discussion Of The Findings

Research Question 1

In an unfamiliar apparel retail environment, are Universal Design features as identified through the Universal Design Retail Preference Survey (UDRPS) preferred? If so, which ones?

Overall, in all three categories (optimal visibility, strategic focal point and spatial organization), Universal Design features were preferred more than non-Universal Design features. The three Universal Design features that were preferred the most included wide aisles, focal point, and open spaces between fixtures on the selling floor. Two out of these three features were of the “spatial organization” category. The Universal Design features that were preferred the least included value contrast and continuous floor material.

Based on their personal observations of the photographs, the participants provided statements about their preferences of Universal Design features.
Tables 22-24 provide a summary of these statements with key words being underlined to identify common themes. These themes help provide insight as to why those features might be important to older adults.

**Summary Of Findings**

All three Universal Design categories included statements describing visual design characteristics. Additionally, the participants tended to notice wide aisles that were clutter-free and those that provided access to aesthetically-merchandised products. The participants also acknowledged their preference for wayfinding cues, suggesting that they liked to be directed to particular departments of the store, products, or sizes. These statements provided by the participants clearly indicated what characteristics of a retail environment were and were not preferred. Therefore, these findings support the integrated operational model of approach and avoidance behavior, which suggests that a person may approach or avoid a retail environment if it is catered to meet his or her functional abilities through Universal Design features and the specific measurements advocated through ADA guidelines.

As discussed in the Review of Literature, Hunt (1991) explained that an environment should be created so that its design features should accommodate an individual’s cognitive and physical needs, so that the person will not have to try to functionally adapt to the environment. If the person must try to adapt to the environment and does not want to, or feels helpless, he or she may instead decide to avoid the environment altogether. However, by providing features of
Universal Design, the person is able to function optimally, thus wanting to stay in the environment.
### SPATIAL ORGANIZATION

- Open spaces between fixtures on the selling floor
- Wide aisles

- Wider aisle. More room to look at merchandise.
- I like to see where I am going- don’t like to bump into things.
- Racks in the aisles impede seeing everything. I don’t like clutter.
- Like clear aisles.
- More space to show items; other picture is too cluttered and too close together.
- You can see things with a wider aisle.
- Aisle is wider for easy access.
- Aisles are wider to appeal to wheelchairs.
- I do like to look at displays if there’s enough room.
- More aisle room.
- Wider aisles and less clutter.

The key words that were used by participants to describe the photographs featuring “spatial organization,” included **general visual information** about the environment and **ambulatory** design. These key words appear to be very general in nature by providing information of how to get to a certain location.

---

**Table 22: Written statements about the photographs featuring “spatial organization”**
<table>
<thead>
<tr>
<th>STRATEGIC FOCAL POINT</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Focal point</td>
</tr>
<tr>
<td>- Continuous floor material</td>
</tr>
</tbody>
</table>

- In B the rug **takes away** from the display.
- Middle suit **defines** the area.
- Identifying the size help me know if I’m in the right area.
- **Details** what’s displayed for person.
- More **organized** better and **more on display**.
- Racks are better **defined** with the name of product.
- Sign might **catch your eye**.
- I like to know what the area is.
- Looks more **open**.
- I like to **see** as much as possible displayed.
- **Marked** area always best.
- Apparel is well **marked** for customer to go to her (his) area.
- I like to see the outfit **together**.
- A looks **neater and free from clutter**.

The key words that were used by participants to describe the photographs featuring “strategic focal point,” included **specific visual information** about the environment and **directional** design. These key words appear to be very specific in nature by providing information about wayfinding, or finding specific product information.

Table 23: Written statements about the photographs featuring “strategic focal point”
OPTIMAL VISIBILITY
- Value contrast
- No pattern

- Neater display.
- Patterned tablecloth adds interest to plain items.
- Door with better definition is easier.
- Nicer look to table with contrasting cloth.
- The white cloth defines an area.
- Door defined.
- Less distraction on counter design.
- Scarf on table accentuates display.
- Less cluttered.
- More attractive presentation.
- Entrance to room more defined.
- More defined for low level sighted customers.

The words participants used to describe the photographs featuring “optimal visibility” included directional and aesthetically-pleasing design in the environment. These key words also appeared to be very specific in nature by providing information about wayfinding and how attractive something is.

Table 24: Written statements about the photographs featuring “optimal visibility”
Research Questions 2 and 3

What features in an apparel retail shopping environment may elicit avoidance features? What features in an apparel retail shopping environment may elicit approach behaviors?

According to approach-avoidance theory, “avoidance behavior” can be defined as wanting to leave the environment, and “approach behavior” is defined as wanting to stay or feeling impelled to remain in the environment (Donovan & Rossiter, 1982; Mehrabian & Russell, 1974). It should concern retailers that customers may choose to leave or not even enter a store if they do not feel comfortable in the environment. This behavior may prevent loss of potential sales and future business.

In this study, the following six Universal Design features were investigated to explore how approach behavior might be influenced in a retail store: value contrast, no pattern, focal point, continuous floor material, open spaces between fixtures on the selling floor, and wide aisles. The findings of this study revealed that only five of these features, value contrast, focal point, continuous flooring, open spaces between fixtures on the selling floor, and wide aisles, had significant impact on the population of this study. The variable “no pattern” was not discussed further as it was found not significant among the three cluster groups (p= .105). The mean percentage of the variable “no pattern” was approximately .52. Thus, the following discussion will explain these five features in more detail and also report how each feature is associated with a principle of Universal Design established by researchers Connell et al. (1997), from the Center Of
Universal Design at North Carolina State University. Note that each Universal Design feature is discussed in order of preference as reported through findings of the cluster analysis. The researcher has also provided key words at the end of each brief discussion to describe the Universal Design feature at hand. These key words were composed from the statements provided by the participants in this study, from the Universal Design Research Preference Survey (UDRPS).

**Wide aisles.**

According to Connell et al. (1997), “Principle 7, Size and Space for Approach and Use” is related to “wide aisles”, as it acknowledges accessibility. The authors explain that in this principle, the “Appropriate size and space is provided for approach, reach, manipulation, and use, regardless of the user’s body size, posture, or mobility.”

It should also be noted that the photographs of the scenes showing aisle widths included pathways heading towards the entrance and exit, spaces between racks and pathways between different locations or zones on the sales floor. The photographs featured wide aisles all measured to at least 36 inches wide, meeting the ADA requirement (U.S. Small Business Administration & U.S. Department of Justice, 1999); however, participants preferred photographs of 60 inches wide aisles which is recommended by Universal Design guidelines. The photographs of the scenes featuring “continuous floor material” included various flooring textures such as, carpet, brick and vinyl tiling.

In describing the photographs featuring “wide aisles,” one person stated, “Wider aisle. More room to look at merchandise.” This person also wrote, “Like
wider aisle.” Another commented, “Wider aisles, cleaner appearance.” In the explanation of why she did not like narrower aisles, a participant wrote, “A is too cluttered” and “looks like crowded.” These statements indicate the need for ambulatory and visual assistance. In other words, participants may use wide aisles to see what they can find as they move throughout a store. Key words: more room, look, cleaner, non-cluttered.

![Figure 19: Example of wide aisles for accessibility](image)

**Focal point.**

The Universal Design Principle 4, “Perceptible Information” is related to focal point, as its purpose is to draw attention to an item. A focal point also provides a form of non-verbal communication. Customers rely on focal points to obtain direction to a particular product or clothing department.

In describing photographs featuring focal points, one participant stated, “The signage helps me *identify* (perhaps) the age group and *saves* me *time*.” Here, she is referring to identification or direction to a certain clothing department, such as “women’s’ casual.” She also stated, “The sign makes it look
more cluttered, but does add description to the merchandise.” Clearly, this person was suggesting that she would prefer directional advice even though the sign may clutter up the area. Another participant stated, “Identification is good.” These findings correspond to previous studies and other literature which suggests that signage is made up of visual cues and stimuli in the environment and should be used as direction or wayfinding cues (Hiatt, 1991; Fozard, Gordon-Salant, Schieber, & Weiffenbach, 1993). Hiatt (1991) also stated that “visual cues” (p. 126) help in communication.

Participants appeared to respond more to advertising, merchandising or signage when the object was highlighted or surrounded by other design elements. In particular, the participants suggested that focal points are most effectively used when applied interchangeably with value contrast because the message they are trying convey is more visible. As one participant stated, “the dark table cloth lets you see the table more.” Thus, the focal point should be effectively created so that older adults with declining vision problems do not miss its purpose.

In Gap Inc.’s new concept store, “Forth & Towne,” geared towards the Baby Boomer generation, the architects have created a focal point in the middle of the store which is also designated as the fitting room area (Blum & Lee, 2005). This design enables the customer to locate the fitting room easily, and without discomfort. Blum and Lee (2005) stated that every retail store needs an “iconic center” (p. 64) which will capture the attention of the customer. An effective “iconic center” is easily understood and approachable. Thus, the “iconic center”
draws attention and elicits non-verbal communication. Key words: identify, saves time, description.

Figure 20: Example of focal point being used to identify area of selling floor to provide directional guidance

Open spaces between fixtures on the selling floor.

The Universal Design Principle 7, “Appropriate size and space is provided for approach, reach, manipulation, and use, regardless of the user’s body size, posture, or mobility” (Connell et al., 1997) is related to “open spaces between fixtures on the selling floor.” The authors explained that every customer should be able to comfortably move through an environment.

In describing the photographs featuring “open spaces between fixtures on the selling floor”, participants stated, “Less clutter- room for more people- good for walkers, etc.!!!” and “More uniform area.” In describing the photographs with closed spaces, a participant explained that the area “looks cluttered- difficult to
travel through.” Another stated, “not enough room to walk.” Many other participants suggested that clutter elicits “confusion.”

A sense of confusion may make interpreting or comprehending aspects of the store, such as the store layout or even merchandised mannequins or wall fixtures, difficult to interpret. In other words, a customer may feel too overwhelmed from the clutter on the sales floor to try to visualize what the retailer wants to convey. According to these statements, these feelings could elicit avoidance behaviors. Key words: Less clutter, room, uniform, no confusion.

Figure 21: Example of open spaces on the selling floor between fixtures

Value contrast.

The Universal Design Principle 4, “Perceptible Information” is also related to value contrast, as its purpose is to also draw attention to an object or provide better visibility of an object. A retailer can draw attention to a dressing room or an exit by choice of color rather than only by signage. According to Leibrock and Terry (1999), individuals with declining vision are drawn to objects featuring both dark and light colors as they are able to see the object more clearly when it is
highlighted by contrasting colors. Hiatt (1991) also suggested that value contrast should be used in accentuating design characteristics.

In reference to the photographs featuring aspects of color contrast, one participant stated, “Items show better with white cloth underneath.” The participant also stated that “the door is more obvious” in the photograph featuring a dressing room painted in two colors rather than in one. Another participant indicated that value contrast, “helps eye find” in describing the photograph. One participant explained that, “It’s easier to see the entrance”, while another wrote that she preferred the “décor around the door as it accents the entrance and helps senior find the entrance”. Key words: show better, more obvious, helps find, easier to see, accents.

![Figure 22: Example of value contrast being used to accentuate a product](image)

*Continuous floor material.*

The Universal Design Principle 4, is defined as, “Perceptible Information: The design communicates necessary information effectively to the user’s sensory abilities” (Connell et al., 1997). This principle is related to “continuous floor
material” as it indicates that a retail store should be easy to follow and interpret. In other words, the flooring should not bear any confusion on the customer.

Individuals who are concerned with changes in flooring may ultimately avoid the aisle entirely as they may be too focused on what they interpret to be a step and trigger hazardous falls. Therefore changes in flooring create a physical barrier and defeats the purpose of wide aisles and according to ADA standards, public environments should be designed barrier-free (Reagan, 1998).

In interpreting the photographs featuring “continuous floor material”, participants indicated that changes in the flooring texture can indeed be confusing. For example, the appearance of aisles may give the illusion that they are not as wide when differences in flooring textures are applied. Several of the participants’ shared their attitudes about continuous floor material in short answer form. They wrote, “roomier, less stimuli, less clutter” on the floor, and “the carpeting should be the same.” Another participant reaffirmed that older adults generally do prefer smooth floor surfaces, therefore perhaps meaning continuous floor material.

Many of the participants implied that multiple types of flooring around aisle spaces or other spaces on the selling floor tend to appear small. One participant in particular explained that one type of flooring appears more spacious and another wrote that the “same color carpet gives a more open appearance.” This indicates that a smaller retail environment should use one type of flooring to give the illusion that there is more room. On the other hand, a larger store might use multiple types of flooring to make it seem smaller and more manageable.
In summary, the participants preferred photographs featuring continuous floor material. However some indicated that they like changes in flooring because they can use this as directional or wayfinding cues to help them get to other departments.

Changes in flooring create a safety hazard as older individuals experiencing vision problems may also perceive changes in flooring to be a step. These individuals may be so visually drawn to the different textures or colors that they may not see the clothes or fixtures around them. They may also find it difficult to maintain balance with changes in flooring. One participant wrote, “Carpet highlight is distracting- look at clothes, not it!” One participant stated that she could stumble as differences in flooring are an obstacle. Another stated that “it might be possible to stumble…” A person who may be afraid of falling be so focused on not falling that she may miss other cues in the environment.

Keywords: roomier, less stimuli, less clutter, open appearance.

Figure 23: Example of continuous flooring
Summary of Findings

In research questions 1-3, “spatial configuration” was a reoccurring theme. Although it was manifested through various descriptions, it became evident that it was a major concern to participants in this research study. As explained in Chapter 4, the term “spatial configuration” generally included design issues such as “accessibility, merchandise organization, smaller stores, spaciousness, and store layout.”

Other common issues included “lighting” and “fit.” Although not looked at in this study, future research should consider evaluating how lighting impacts approach behavior. The researcher has explained in the Review of Literature how vision declines as individuals move through the aging process. Approximately 21.9% of the participants indicated that lighting is a positive aspect of store environment.

As a separate issue, fit was another popular concern and frustration. The researcher learned that older women are seldom able to find sizes or styles that cater to their needs and desires; they find this very frustrating. If more apparel was designed for the older woman, an older customer might visit retail stores even more frequently, thus making more purchases. In other words, there is no purpose in designing an approachable environment if the customer arrives and cannot find clothes that fit her.
Research Question 4

Which combinations of Universal Design features (wide aisles, no pattern, value contrast, focal point, open spaces between fixtures on the selling floor and continuous floor material) will likely contribute to preference or approach behaviors among older women in an unfamiliar apparel retail store? (Part 1)

Is there a difference, by age, education, shopping frequency or participants who do not have a shopping companion, between the significant clusters that have different preferences for Universal Design features? (Part 2)

The findings of the cluster analysis confirmed the most important message of Universal Design: the intent to meet the functional needs of everyone (Leibrock & Terry, 1999). As reported, this analysis found that age was not a discriminating factor of each of the cluster groups. The variable “shopping alone” and “education” were also not discriminating factors.

These findings provide indication as to why members of these clusters might approach or avoid a retail store. Each cluster group is discussed as an independent demographic segment but not categorized into specific age groups. Retailers may want to pay particular attention to differences in these cluster groups, as they give indication as to why participants preferred specific groupings of the Universal Design features.
Cluster group 1: eager and inquisitive shopper

- N = 60
- Label: Very frequent shoppers who prefer a broader existence of Universal Design features
- Average age = 79
- Age range = 59-99
- Almost 57% were college-educated
- 60% shopped alone
- 48% shopped once a month or more often
- Preferred: value contrast, focal point, and wide aisles

Participants in cluster group 1 preferred retail environments that presented more general Universal Design features. These individuals did not seem to prefer a specific design theme, but instead preferred many functional and aesthetic aspects that are delivered through Universal Design. The participants selected Universal Design features from all three categories consisting of: optimal visibility, strategic focal point, and spatial organization. Perhaps this is based on the fact that they shop very frequently, and often alone, thus, needing to rely more on the environment to help them to continue to function independently.

This cluster group was the youngest of the three clusters which might also explain why many still shop alone, although there was no statistically significant
 difference in the “shop alone” and “age” between the three cluster groups. Additionally, a majority of these participants were college-educated which could indicate that they may have experienced more leadership roles in life, which could suggest that they are comfortable and determined to locate merchandise on their own.

Table 25: Examples of Universal Design features that were preferred in cluster group 1
Cluster group 2: reluctant shopper with visual informational concerns

- N= 37
- Label: Less frequent shoppers who prefer Universal Design features that provide direction in the spatial traffic patterns
- Average age: 81
- Age range: 60-92
- Approximately 39% were college educated
- 50% shopped alone
- 33% shopped once a month or more often
- Preferred: focal point and wide aisles

Participants in cluster group 2 preferred retail environments that presented direction as they move throughout a retail environment. Their preferences were more information-driven, and they appeared to be interested in how they could clearly see something in the direction they were walking. They stated that they shopped less frequently than the other cluster groups which might also indicate that they were more concerned with obtaining the right amount of information to find what they were looking for. Only half of the participants shopped without a companion which might also indicate some insecurity in shopping activities. It is not clear why these participants shopped with a companion, perhaps it was due to frailty, cognitive insecurities, or the fact that they needed someone to drive them because they do not drive.
Table 26: Examples of Universal Design features that were preferred in cluster group 2
Cluster group 3: eager shopper with maneuverability concerns

- N= 30
- Label: Frequent shoppers who prefer Universal Design features that accommodate ambulatory issues
- Average age: 79
- Age range: 61-91
- Almost 63% were college-educated
- 63% shopped alone
- 43% shopped once a month or more often
- Preferred: continuous floor material, open spaces on the selling floor between fixtures, and wide aisles

Participants in cluster group 3 preferred retail environments that catered more towards ambulatory or maneuverability issues. They seemed interested in how they were going to get from point A to point B without any obstructions. It is interesting to point out that this group was the most educated, and included individuals who shop more independently than the other cluster groups.
Table 27: Examples of pairs of photographs that were preferred by participants in cluster group 3

<table>
<thead>
<tr>
<th>Continuous floor material</th>
<th>Wide aisles</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Open spaces between fixtures on the selling floor</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
</tr>
</tbody>
</table>
Summary Of Findings

All three clusters are related to Universal Design Principle 6, “Low Physical Effort: The design can be used efficiently and comfortably, and with a minimum of fatigue” (Connell et al., 1997). In retail environments, Universal Design can be used to create a space where customers of all ages can perceive, comprehend and explore the merchandise independently, in a tireless and enjoyable fashion. The findings of these clusters also related to the design plans of retail store Forth & Towne, created by architect David Rockwell. Rockwell has emphasized that he is more concerned with how an environment feels rather than its appearance (Blum & Lee, 2005), although an environment should be inviting and encourage visitors. Thus, it is important to use Universal Design features in ways that they can be both functional and aesthetically-pleasing.
Limitations, Implications And Recommendations For Future Research

*Limitations and Implications*

There were several limitations to this study. First, this research was limited to older female adults in the Midwest; therefore the results could differ from those living in other parts of the country. For example, older customers in Manhattan might generally shop more often than those in Ohio as stores may be more accessible without a car.

Second, the researcher did not ask participants to complete an assessment of their functional and cognitive abilities (i.e. activities or daily living (ADL) or instrumental activities of daily living (IADL). Therefore, there was no statistical analysis on determining how their abilities may have impacted their Universal Design preferences. Also, cognitive abilities may have played a part in how long it took the participants to complete the questionnaire. In some cases, not every participant finished at the same time. Participants occasionally attempted to move through the questionnaire at their own speed, thus not wanting to look at the power point presentation.

Cavanaugh and Blanchard-Fields (2002) explained that older adults cognitively process information slower as they get older, therefore, every older adult will move at their own speed. They stated that “sustained attention is the ability to maintain attention or focus in performing a task over a long period of time” (p. 181). The authors also stated, “in the case of attention, slower processing speed may compromise older adults’ ability to attend to and select critical elements from the deluge of information presented to them” (p. 190).
Similarly, Filipp (1996) described this as “attentional block hypothesis”, which suggests that “lapses of concentration in the aged due to a lowered ability, to inhibit or suppress task-irrelevant information” (p. 225). The only solution to this issue would be to conduct the assessment independently; however this would be a time management issue for the researcher.

Third, the participants of this study were volunteers who may have had greater interest in shopping than the entire population. The researcher assumed that individuals who did not like to shop would not want to participate in the study. Also, the population was recruited from independent living facilities and senior social groups, which indicated that they were part of a higher economic group.

**Recommendations for Further Study**

The researcher concludes that a multitude of Universal Design features do exist and should be further investigated in retail stores. Recognizing that lighting, grab bars, seating, lever door handles on dressing room doors, mirrors, and other features were not part of this dissertation, they should be further investigated as they were brought up in the qualitative analysis in the statements provided by the participants. The same format of the Universal Design Research Preference Survey (UDRPS) may be used to evaluate these Universal Design features, and see which are preferred by other demographic segments. In addition, in a future study, the researcher may further refine the slides to change several photographs. In particular, the slide showing “pattern versus no pattern” (see Figure 24), participants may have misconstrued the pattern for lighting. This could be a reason why this Universal Design feature was found not statistically
significant. Although the researcher did attempt to eliminate all other characteristics or objects that may have been a distraction.

![Pattern versus no pattern](image)

Figure 24: Pattern versus no pattern

It is recommended that lighting, especially, should be evaluated as this was a main finding in research question 3. The researcher learned that older adults may be concerned with lighting because it could enable them to pick up on visual cues, such as focal point and no pattern, throughout the entire retail environment. Lighting might also help older individuals to navigate through fixtures and traffic patterns on the retail floor. Their otherwise declining vision abilities might prevent participants from experiencing the most that they can from their shopping encounters.

Lastly, the k-means cluster analysis indicated that older adults are not all the same. Therefore, it is not accurate to treat them as having the same needs. Perhaps, however, future studies can look at each of these groupings as target
audiences. It may also be insightful to look at this older population according to income level. Additionally, one might investigate populations who shop with someone else. For example, who are these “shopping companions” and what in particular are they buying? Does a shopping companion influence what or where an older adult may shop? Do shopping companions influence the amount of time spent shopping? Also, what were the effects of physical and cognitive limitations in someone needing a shopping companion?

In addition, it would be interesting to further investigate the preferences of Universal Design features in older female shoppers through shopper surveillance. Perhaps this could be done from a test-store environment, where many Universal Design features could be changed and implemented in various clothing departments.

Contributions To Academia And The Retail Industry

This research study contributes both a new theoretical model and an instrument of measurement (Universal Design Retail Preference Survey, UDRPS) to be used to further study Universal Design features that are accommodating to consumer populations. The researcher’s theoretical model is an integration of already existing frameworks from the discipline of design, gerontology, and environmental psychology (see Figure 15).

The findings of this research can be used by retailers to better understand the declining abilities of older customers, and how they can cater their stores towards these changing needs. Retailers should be aware that older adults are a
large consumer segment, which can potentially expand apparel sales. Perhaps apparel retail stores could place clothing for older women in a separate “senior department” section. In addition, retailers could implement Universal Design features to this section, which could include aisles measuring to 60 inches wide, and focal points, to test which ones work best with their older customers. This “senior department” could also offer more styles, sizes, and colors of garments, and salespeople knowledgeable about declining physical and cognitive abilities, as well as salespeople who are familiar with clothing construction and fit.

Major findings indicated that spatial configuration is a main concern of older adults. Table 28 is a prioritized list of Universal Design recommendations that retailers can use to better design their stores to create both an adaptable and aesthetically-pleasing environment to customers of all ages and abilities. The ranking of these Universal Design features is interpretive based on the quantitative and qualitative results, as well as the researcher’s observations from the main study and pilot studies.
<table>
<thead>
<tr>
<th>Universal Design features</th>
<th>Recommendations by the researcher to provide better retail design</th>
</tr>
</thead>
</table>
| **Wide aisles**          | • Provide *general visual information* about merchandise or object.  
                           | • Use 36 inches *wide* aisles.  
                           | • Keep aisles *free of obstruction* customers with ambulatory issues. |
| **Open spaces between fixtures on the selling floor** | • Provide *general visual information* about merchandise or object.  
                           | • Keep sales floor *open and free of obstruction* (3 feet by 3 feet turning space).  
                           | • *Easy access* for customers with *ambulatory issues*.  
                           | • *Organize* clothing departments into separate sections on the sales floor.  
                           | • Provide *visible and reachable* merchandise fixtures. |
| **Focal point**           | • Provide *specific visual information* about merchandise or object.  
                           | • Provide *direction* and lead the customer to a clothing department or location in the store.  
                           | • Draw attention to a garment, fixture, or signage by creating *emphasis* and *definition* through value *contrast*, arrangement or size of the merchandise or object.  
                           | • *Identify* areas of sales floor through accentuating and *detailing* merchandise or object. |
| **Value contrast**        | • Create *aesthetically-pleasing* merchandise displays.  
                           | • Use color or value *contrast* to *define* and provide *direction* to merchandise and objects.  
                           | • Provide *detail* to text so that it is easy to *see*, *interpret* and *comprehend*. |
| **No pattern**            | • Create *aesthetically-pleasing* merchandise displays.  
                           | • Use *solid* backgrounds on walls, flooring, signage, and display tables to provide *less stimuli* and distraction. |
| **Continuous floor material** | • Keep the flooring texture and color *consistent* and *clutter-free*.  
                              | • Provide *specific visual information* about merchandise or object.  
                              | • Provide *direction* and *lead* the customer to a clothing department or location in the store. |

Table 28: Prioritized list of recommendations for Universal Design features in a retail store
Conclusion

In conclusion, the researcher has aimed to enlighten the retail industry by providing evidence that shopping continues to be an important activity for adults as they age, whether it be for daily necessities, such as clothing and accessories, or for social interaction. Incorporating Universal Design features into a retail store would help create a more relaxing environment because individuals would be able to function more optimally, thus they might be less worried or nervous about their shopping experience. These Universal Design features, listed in Table 28, help customers reach their desired location on the retail sales floor, as well as help them in locating the products for which they are searching. In the adjournment of this dissertation, the researcher hopes that the reader walks away with the knowledge of how Universal Design features can be implemented in a retail store so that older customers can shop at ease.
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The Ohio State University Extension (n.d.). *Top “10” Universal design features for your home* [Brochure]. Columbus, Ohio.


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APPENDIX A

Tools Used For Recruiting Purposes

- Locations where participants were recruited and where study took place
- Recruitment Information (article for newsletter distribution and flyer)
- Script used in the introduction of survey
LOCATIONS WHERE PARTICIPANTS WERE RECRUITED AND WHERE STUDY TOOK PLACE

SENIOR RESIDENTIAL COMMUNITIES:
1. Mayfair Village Retirement Community
2. Sunrise of Worthington
3. Willowbrook Christian Community
4. Wesley Glen Retirement Community
5. Emerald Crossings
6. Wellington Village
7. Kensington Place
8. The Forum At Knightsbridge
9. Dublin Retirement Village

SENIOR ACTIVITY CENTERS:
10. Dublin Senior Center
11. Gillie Recreation Center
12. Hilliard Senior Center
13. Westerville Senior Center
14. Reynoldsburg Senior Center
(Dublin Retirement Village) – To be handed out OR published in newsletter.

**OSU Graduate Student Needs Your Help!**

**Come Enter Drawing for $20.00 Gift Certificate to Local Bookstore**

Do you like to go shopping? Come help Ohio State University Ph.D. student Megan Huss Pace learn more about your apparel shopping interests! The survey, **for women only**, will take place on **Wednesday, July 27th at 1:30pm**, and will last for approximately 30 minutes. The participants will be asked to fill out a short questionnaire on their preferences of the interiors of apparel stores. By participating, your name will be entered in a raffle for a $20.00 gift certificate to a local bookstore! The drawing will take place after everyone in your group completes the survey! The information that you share with Megan will ultimately help retailers design stores to better suit your preferences! There is a sign up sheet.
FLYER

Opportunity to Enter Drawing for $20.00 Gift Certificate to Bookstore

WHO: Calling all female members, ages 55+

WHAT: Come help Ohio State University Ph.D. Graduate student Megan Huss Pace learn more about your apparel shopping interests by participating in a survey! Your name will be entered into a raffle for a $20.00 gift certificate to a local bookstore!

WHERE: Tea Room

WHEN: Wednesday, July 27th at 1:30pm and will last for approximately 30 minutes

WHY: Results from this study will ultimately help retailers design stores to better suit your preferences!
If interested, please sign up!!

SIGN UP SHEET

OSU Survey on Shopping Preferences –
Conducted by Megan Pace

The survey, for women only, will take place on Wednesday, July 28th at 1:30pm, and will last for approximately 30 minutes.

<table>
<thead>
<tr>
<th>NAME</th>
<th>Phone Number</th>
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</tbody>
</table>
Thank-you for participating in my study. My name is Megan Huss Pace and I am a Ph.D. Student in the Department of Consumer Sciences, currently in the Dissertation process of my degree. My educational and career background is in apparel retail and consumer behavior and marketing. I am interested in the shopping behaviors of older women, thus I am here today to learn a little more about your shopping interests by asking you to fill out this questionnaire. All of the responses will be confidential. Every participant who completes this questionnaire will be eligible to participate in a raffle drawing for $20.00 to a local bookstore. The drawing will take place after every questionnaire is turned in. If you wish, you may leave upon completing the questionnaire and I will notify the winner immediately upon receiving the last questionnaire. If you would like to see the photographs enlarged, you may look at them on the overhead projector screen. Once again, thank-you for your time and your help with teaching me more about shopping behaviors of women in your age group.
APPENDIX B

Results Of The Preliminary Studies
Preliminary Studies For The Development Of The Instrument

Preliminary studies occurring between summer 2002 through spring 2005 were conducted to determine salient design features that were of concern to older adults. The way in which each of these studies contributed to the main research study is concluded at the end of every pilot study discussion.

**Pilot Study 1: Informational Interviews**

Informational interviews based on purchasing attitudes and prior shopping experiences included the researcher and two female residents of Friendship Village Retirement Community, Columbus, Ohio. This study did not include a field visit, but instead existed of a recollection of past shopping experiences. See the following three pages for a transcription of this interview.

To summarize, both interviewees shared a common concern for the lack of availability of immediate salespersons in helping to locate merchandise and communicate with the customer. In Tables 29 and 30, the far left column of the chart indicates the “Design Characteristic” (i.e. cluttered space, salespeople, and lighting). The second column represents the “Observation” that was mentioned by the interviewee(s), and the third column illustrates the “Behavioral Effect” that may have been influenced by the design characteristic.
Results.

(R= researcher; Su1 = woman 1; Su2= woman 2)
R: Do you go shopping by yourself?
Su1: I use the van. I don’t drive anymore.
Su2: I am still driving.
R: Where do you do most of your apparel shopping?
Su1: Well, the only place I have been here is Lazarus at Tuttle, but I didn’t buy anything. It was on a Saturday and my daughter took me. I didn’t feel like shopping anyway. They put their clothes close together there. You kind of have to duck in and out among the racks.
Su1: I remember when Lazarus had real rounder clothes- you could get in and out. Don’t you remember? The stores didn’t use to be so jammed full of clothes.
Su2: This summer I’ve shopped two or three times and I was at Marshall Fields over at Tuttle Crossing. When I first came here, I went in to Lazarus and my daughter-in-law went with me.
R: Describe your shopping experience.
Su2: The shopping experience was very nice. I didn’t feel that I was crowded, and the aisles in which I walked had plenty of space to get around. I did get some nice things in Lazarus. I got a very nice skirt.
Su2: I want to talk about this one store for a minute. Every time I go in to just look around, the racks plus the cases I used to see always hold new shipments.
R: Is it easy to find what you are looking for?
Su2: I don’t buy anymore because I can’t find anything.
R: Were the sales people helpful?
Su2: Yes, that is what I want to talk about. Salespeople, they have disappeared from the scene and you’re lucky if you can find somebody at what I call the cash register.
Su1: I pretty much agreed with you on all that. Twice I had sales people help me and I wrote a letter. It means that much to me to have help when I am looking for something. They are the only two I remember for quite a few years.
R: Do you try things on in the store?
Su1: Most of the time I don’t. Most of the time I can estimate. If it is a brand that I am not familiar with, I probably will try it on.
R: You mentioned Lazarus, where else do you shop?
S2: This past year I would go into Lazarus and after I got through the passageways and what have you, I looked around but I haven’t bought a thing. The shops I really like and where they have people that will help are what I really like. That’s what I’m used to since I’ve been in cities my whole working life. I always used a personal shopper and I am spoiled rotten. Marshall Fields I like and Lord and Taylor and Talbots.

S1: I like Talbots.

S2: They are not pressuring you to buy a thing; they chat with you and ask if you need help. I really appreciate those shops.

S1: I used to like to go to the ones in Canton.

R: What about Talbots do you like?

S1: It is very, very nice and I can wear it anytime.

R: What about the fitting rooms?

S1: When I bought a skirt, I asked the clerk to help me into the garment. There is space in the fitting room, which is nice. There is a nice mirror, you can see full-length and I think all those things I think are meaningful to women in our age grouping. I think we expect those things. Don’t you? You know, we’ve grown up with that kind of thing and there is a new world out there in more ways then one, let me tell you.

R: Talbots also has a chair next to the cash wrap if you get tired.

S1: I never see anything like that anymore and that is an important factor when you are out shopping.

R: Can you find your sizes when you do go shopping? Are they well marked?

S2: I can find mine.

S1: Do you ever buy from catalogs?

S2: I used to get some things but it is a very unsatisfactory procedure for me to go through these days and the postage to take things back. I have gone to Penney’s because they can send it to the store at Tuttle Crossing. But, if it comes to the store I can open the package and go to a fitting room. If I like them, I pay for them right there. If they have to go back, they return them to their center and there is no charge. Now I don’t mind that. Some places will charge $6.95 just for the delivery of a small package- a sweater or a blouse.

S1: I haven’t had much luck; I have two things that I’ve bought that I like.

R: Can you describe the lighting in a store.

S2: I can say that mid-week I went out with my husband. He wanted new underwear so I was trying to help him find the sizes. In this particular shop, it
wasn’t well lighted and I said to him in the car, “I think they must have had their lights on dim”. We wanted to ask about another size that we couldn’t find one on the shelf. We then walked around the entire men’s department and found one gent and a lady at the cash register. He also couldn’t find the size.

R: Should apparel be better lit?
S1: I can usually find what I want.

S2: I think a lot of the shops have really cut back on their staff. I think it has been a drastic cut since 9/11. I think it is worse now, don’t you?

S1: I dash in and out. When they have a sale, I am there when the store opens.

S2: The last time I was in Lazarus, this was in the summer, and I couldn’t find any clerks. If there are clerks there, they should know where the merchandise is in stock and located. The customer can’t. You should be able to go up to the clerk and ask where something is and they should be able to tell you.

R: What about flooring? Do you feel comfortable walking in the stores?
S1: I just go in and get what I want and get out.

S2: I never really particularly thought about my walking. I did notice them and where they are well kept, they are beautiful.

S1: Yes, if they weren’t cleaned, that is what I would notice or if there was debris.

S2: I’ve never had any problem with just a little slip in my walking but you would think that it might be a hazard, and I think that the business people would have that in the forefront and take care of that safety.

S1: They could get sued.

S2: I think that would be high on the list.

R: Do you find that the height of the rack and counters are adequate?
S1: I’m kind of average height. I think the height has to be comfortable for the clerks since the customers are more in and out.

S2: I know exactly, I think I know exactly what you are asking. The counters were up high and you had to sort of lift up. But I haven’t been aware of any place like that for a long time.

S1: Most of the counters are about the same height in all the stores, I think. I was thinking that it was pretty well pre-determined.

S2: I guess we all have to work together and put these things together and we try to make it better in the long run. Eventually your message will get to the people who will do something about it. I think doing this background work should help if that is what you want to accomplish.

R: Thank-you very much for your time.
<table>
<thead>
<tr>
<th>Negative Design Characteristic</th>
<th>Observation</th>
<th>Behavioral Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluttered space</td>
<td>• Clothes were too close together, jammed and difficult to locate</td>
<td>• Didn’t feel like shopping</td>
</tr>
<tr>
<td></td>
<td>• Went on a weekend (probably too crowded)</td>
<td>• Ducking in and out of clothes</td>
</tr>
<tr>
<td></td>
<td>• Unable to get in and out of store easily</td>
<td>• Unable get in and out of store easily</td>
</tr>
<tr>
<td></td>
<td>• No purchasing because unable to locate merchandise</td>
<td>• No purchasing because unable to locate merchandise</td>
</tr>
<tr>
<td>Salespeople</td>
<td>• Unavailable</td>
<td>• Frustrated</td>
</tr>
<tr>
<td></td>
<td>• Unfamiliar with location of merchandise on floor or if in stock</td>
<td>• No purchasing because unable to locate merchandise</td>
</tr>
<tr>
<td></td>
<td>• Retailers cut back on staff</td>
<td></td>
</tr>
<tr>
<td>Trying merchandise on in store</td>
<td>• N/A</td>
<td>• Not usually unless it is an unfamiliar brand</td>
</tr>
<tr>
<td>Resting area</td>
<td>• More should exist</td>
<td></td>
</tr>
<tr>
<td>Lighting</td>
<td>• Too dim</td>
<td>• Cannot find sizes or locate garments</td>
</tr>
<tr>
<td>Flooring</td>
<td>• Debris; dirty</td>
<td>• Customer could sue retailer</td>
</tr>
<tr>
<td>Counters</td>
<td>• Too high</td>
<td>• Tired from straining</td>
</tr>
<tr>
<td>Catalogs</td>
<td>• Inconvenient, extra shipping expense</td>
<td>• Return things to store; dissatisfied</td>
</tr>
</tbody>
</table>

Table 29: Negative findings on apparel retail environment
<table>
<thead>
<tr>
<th>Positive Design Characteristic</th>
<th>Observation</th>
<th>Behavioral Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barrier-free space</td>
<td>• Not over-crowded • Plenty of space to walk between racks and on aisles and passageways</td>
<td>• Purchased a skirt</td>
</tr>
<tr>
<td>Salespeople, personal shoppers</td>
<td>• Helpful • No pressure • Social</td>
<td>• Wrote a letter thanking them</td>
</tr>
<tr>
<td>Fitting rooms</td>
<td>• Spacious • Full-length mirror</td>
<td>• Content; suits expectations</td>
</tr>
<tr>
<td>Flooring</td>
<td>• Well-kept • Beautiful</td>
<td>• Content</td>
</tr>
<tr>
<td>Sizes</td>
<td>• Easy to find</td>
<td>• Make purchases</td>
</tr>
<tr>
<td>Counters</td>
<td>• Most are same height</td>
<td>• N/A (according to subjects, counters should be more comfortable for clerks since the customers are more in and out of the store)</td>
</tr>
<tr>
<td>Catalogs</td>
<td>• J.C. Penney’s ships catalog merchandise to store • Can try on in fitting room with help of salesperson</td>
<td>• Retailer will pay for return expense if customer is not satisfied; motivator • Purchases items through this vehicle</td>
</tr>
</tbody>
</table>

Table 30: Positive findings on apparel retail environment
Conclusion.

The findings of this pilot study reported both positive and negative issues older women may have with retail design features. Additionally, the type of behavior which may have been caused by a particular design feature was also recognized.

Pilot Study 2: Findings From Talbots’ Evaluation And Store Assessment

Talbots, a specialty retailer, sells classic apparel and accessories (Talbots, n.d.). According to a Talbots’ home office public relations employee, the retailer targets women of all ages, and especially tries to reach multi-generations of families (i.e. grandmothers, mothers, daughters, babies). From this telephone conversation, it was concluded that Talbots catered to older women. Therefore, to see how successful they were in meeting the declining needs of older customers, Talbots appeared to be an ideal location in which to do a store evaluation and a Universal Design assessment.

This pilot study took place at Talbots apparel store, at Tuttle Mall in Dublin, Ohio during the fall of 2002. The following design questions were explored:

1. What elements or physical features about the environment encourage a positive shopping experience?
2. What factors about store merchandising and design can be changed to make it easier to shop?
Results.

The observation concluded that Talbots does consider most of the physical abilities of older women in its physical environment, however there are some issues that were not considered. See Table 31 for a summary of the problem areas and suggestions that could be implemented in order to cater more successfully to older customers. The left side of this chart indicates the findings, and the right side indicates suggestions for improvement.
<table>
<thead>
<tr>
<th>Problem areas</th>
<th>Suggestions for improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Entrance flooring is glaring tile; not slip-resistant</td>
<td>• Add low pile carpeting or solid tile</td>
</tr>
<tr>
<td>• Tile consists of small specs that could pose a problem for people with vision problems</td>
<td></td>
</tr>
<tr>
<td>• Specs in carpeting which could cause a problem for people with vision issues</td>
<td></td>
</tr>
<tr>
<td>• Chairs to right of store too close to rack</td>
<td>• Add additional barrier-free spaces throughout store</td>
</tr>
<tr>
<td>• Protruding at store front</td>
<td></td>
</tr>
<tr>
<td>• Stool could get in way of walkway</td>
<td></td>
</tr>
<tr>
<td>• Not enough lighting in middle of store (recessed lighting is used)</td>
<td>• Add more light throughout store (perhaps track lighting)</td>
</tr>
<tr>
<td>• Accent lighting on wall displays although not enough</td>
<td>• Replace bulb in fitting room</td>
</tr>
<tr>
<td>• Lighting dull</td>
<td></td>
</tr>
<tr>
<td>• Not balanced; left side of store appeared to have more lighting</td>
<td></td>
</tr>
<tr>
<td>• Not enough lighting above front door; shadows on floor; No accent lighting above signage</td>
<td></td>
</tr>
<tr>
<td>• Incandescent and Fluorescent lighting (in fitting rooms); dull</td>
<td></td>
</tr>
<tr>
<td>• One bulb needs changed in fitting room area</td>
<td></td>
</tr>
<tr>
<td>• Signs used to promote items but lettering is too small; cannot see it from more than four feet away</td>
<td>• Use raised, larger lettering</td>
</tr>
<tr>
<td>• Use less information on signs</td>
<td></td>
</tr>
<tr>
<td>• Walkways are not wide enough in some areas; especially on the sides of store</td>
<td>• Widen walkways to at least 36” across</td>
</tr>
<tr>
<td>• All walls are same color</td>
<td>• Use ivory and taupe to add contrast</td>
</tr>
<tr>
<td>• Seating near front of store</td>
<td>• Add seating in more areas of the store</td>
</tr>
<tr>
<td>• Disability fitting room is at back against the far wall</td>
<td>• Move handicapped fitting room to front of store</td>
</tr>
<tr>
<td>• A mirror sticks out and is protruding part of the entrance</td>
<td></td>
</tr>
<tr>
<td>• Needs additional hook for purse</td>
<td>• Add another hook in fitting room</td>
</tr>
</tbody>
</table>

Table 31: Results from Talbots’ assessment
Conclusion.

The findings from this pilot study illustrated that retailers may be neglecting to implement Universal Design features that might make shopping more desirable to older adults. Thus, it was determined that there is indeed a need to conduct further research on the implementation of Universal Design in apparel retail stores.

Pilot Study 3: Questionnaire

Questionnaires were given to 11 women ages 70 to 81 living Columbus, Ohio. A copy of this questionnaire is provided in the following pages. The following questions were investigated:

1. What store characteristics encourage a positive shopping experience?
2. What store characteristics should be changed to encourage a positive shopping experience?
Results.

The main (positive) findings of this study are provided below:

- A majority of participants were in good health (18.2% - very good health; 54.5% - good health; 27.3% - fair health) and continued to drive a car (90.9%).
- All participants do purchase apparel in brick-and-mortar stores.
- Shopping companions included a husband and sons.
- A majority shop every few months or more.
- All participants can easily find their sizes perhaps due to adequate lighting and readable signs.
- Almost all (90.9%) stated that it is easy to maneuver around stores.
- Almost all (90.9%) find that the average fitting room has enough room and that the door handles are easy to operate.
- 9 out of 11 (81.8%) participants find shopping to be a pleasurable experience.
The main (negative) findings of this study are provided below:

- 45.5% respondents reported that they need to take a rest during shopping.
- 9.1% stated that floors are difficult to walk on or slippery.
- Approximately half (45.5%) stated that sales people are not around to help locate items. One person did not respond to this question.
- Several participants stated that most stores are “understaffed”, “there are only sales desks” and “sometimes is there help.”
- The results showed that approximately 55% always try on garments. One woman stated, “I usually find things that fit. I can tell by looking.”
- Only three (27.3%) out of ten respondents believe there should be additional fixtures in dressing rooms to hang on to while changing.
- Eight (72.3%) out of eleven of the subjects do not have a favorite clothing store.
Measurement. Older Women and Apparel Purchasing

Directions:

Please read the following statements and answer a few questions about yourself.

Background Information

1. What year were you born? __________________

2. What is your marital status?
marrred _____ widowed _____ divorced ____ single __________

3. Where do you live?
my own home or apartment _____ with family members _____
retirement community _____

4. Do you drive? yes ____ no __________

5. How would you rate your overall health today? (please circle)

very good good fair poor

General Purchasing Behaviors

6. Where do you shop for apparel? (please mark all that apply)
mall _____ Internet _____ catalog _____ store _____ (where? ______) other ___

7. How frequently do you shop in a store for clothes? (please circle)

several times a month once a month

every few months only rarely/once a year

8. Do you shop with someone?
yes _____ (if so, who? ________) no ____

9. Can you easily find your sizes?
10. Is it easy to move around the store? (Consider the store where you most frequently shop)
yes ____ no ____ (if no, why not? _______________________________ )

11. Is the lighting sufficient?
yes ____ no ____ (if no, why not? _______________________________ )

12. Are there sales people around to help you locate or lift items?
yes ____ no ____ (if no, why not? _______________________________ )

13. Are the signs easy to read?
yes ____ no ____ (if no, why not? _______________________________ )

14. Is the flooring difficult or slippery to walk on?
yes ____ no ____ (if no, why not? _______________________________ )

15. Do you use a personal shopper?
yes ____ (why? _______________________________ )
no ____ (why not? _______________________________ )

16. Do you find that you need to rest during shopping trips?
yes ____ (where? _______________________________ ) no ____

17. Do you generally enjoy your shopping trips?
yes ____ no ____ (if no, why not? _______________________________ )

18. Do you end up not buying any clothes because you cannot find what you want?
yes ____ no ____ comment(s)____________________________________

19. Do you have a favorite clothing store?
yes ____ (which one? _______________________________ ) no ____
Dressing Rooms

20. Do you always try items on in the store?
yes ____ no ____ (if no, why not? _______________________________ )

21. Is there enough room in the dressing room?
yes ____ no ____ (if no, why not? _______________________________ )

22. In the dressing room, are the doorknobs or handles easy to turn?
yes ____ no ____ (if no, why not? _______________________________ )

23. Is there sufficient lighting in the dressing room?
yes ____ no ____ (if no, why not? _______________________________ )

24. Do you need something to hang onto in the dressing room while changing?
yes ____ no ____ (if no, why not? _______________________________ )

25. Any other comments about shopping:

Thank-you for completing this questionnaire
Conclusion.

The findings of this pilot study identified main issues that older adults have with apparel retail stores. Almost half of the participants (45%) were concerned with the lack of sales help in a retail store. This finding supported the philosophy that Universal Design features should be implemented because they exist to help individuals function independently. In other words, Universal Design features may enable the customer not to rely as much on sales associates for help.
Pilot Study 4: In-store Evaluation

In spring of 2003, the researcher accompanied several residents from the Dublin Retirement Village assisted living facility in shopping activities. The purpose was to personally evaluate their shopping behaviors in a physical store. The small group visited discount apparel stores T. J. Maxx, Marshall’s and department store Kaufmanns over several visits. The women’s ages ranged from 70 to 83 and their health appeared to be average. Common physical issues included declining vision and hearing.

Results.

It was observed whether or not the women were able to locate clothing sizes easily and maneuver throughout the spaces. Overall, signage at the discount stores appeared adequate as it enabled the participants to identify the different apparel departments. Signage was lacking in the department store, however. The lack of sales associates was also a concern as they were unavailable to assist with questions and help in reaching and locating inaccessible items. One participant avoided a shoe section due to clutter. Another participant stated that she was able to maneuver easily through the aisles at the department store.

Conclusion.

It was discovered that design issues do exist in the retail environment and should be addressed to make shopping more bearable for older adults. It was also concluded that older adults are still interested in shopping as they age, and
also concerned with apparel retail environments. Additionally, this pilot study also helped in determining that the main research study should not include real-life store evaluations as not enough people were interested in participating, and individuals became tired at different times. Attention-spans appeared to be shorter in some people versus others.

Pilot Study 5: Introduction To Slide Preference Study

During the spring of 2003, a slide preference study was conducted on the women participating in the group shopping excursions. Photographs of the women’s apparel section in a mass merchandise discount retail store were presented in a Power Point slide show where participants verbally described what they did and did not like.

Results.

The real-life encounters with older consumers were insightful in helping to narrow down the not-so-obvious challenges of universal design in a retail store environment. These findings were qualitative. Again, the implementation of Universal Design features would alleviate concerns of older customers. However, the main point of this pilot study was to learn if older adults can use both slides and questionnaires simultaneously.
Conclusion.
It was confirmed that older adults could use both a written test accompanied by a power point presentation. Other findings also addressed the need for additional sales help in providing direction to other departments, reaching products, and reading off price points.

Pilot Study 6: Introduction To Slide Preference Study And Evaluation

A measurement, similar to the one used in the main study, was used on five people consisting of both adult men and women of various ages between the age of 35 to 80. The purpose of this pilot study was to evaluate the format and set-up of the pairs of photographs to see if they were applicable and understandable. A slide show was not used in this pilot study, nor were the data analyzed.

Results.
The general feedback provided across the pilot participants indicated the photographs were large enough to see on the questionnaire and the text was legible. Additional feedback suggested that the questionnaire was lengthy.

Conclusion.
The findings of this pilot study illustrated that the organization of the questionnaire made sense, the photographs were clear and easy to interpret, and that it should be shortened in length.
**Pilot Study 7: Comprehensive Pilot Study**

This pilot study was a preliminary test of the main study using the same methodology with slightly different research questions. The survey in the pilot study, however, consisted of 28 pairs of photographs. The following questions were investigated:

1. In an unfamiliar apparel retail environment which aesthetic and functional Universal Design feature is preferred most by older females?

2. How often were photographs of Universal Design features selected among these older adults?

3. Is there a difference in preference for aesthetic and functional Universal Design features by race, education, age, shopping interests or shopping experiences in an unfamiliar apparel retail environment?

4. Which of these Universal Design variables should be integrated and implemented in a design environment in order to make a store approachable to an older customer?

Table 32 explains the variables used in this pilot study. The earlier discussion about the development of the Universal Design Retail Preference Survey (UDRPS) also applied to this study. It should be noted, however, that in this pilot study, “multiple floor materials” was originally considered to be the Universal Design feature because it defined a traffic lane. In the main study, this variable was changed to “continuous floor material” as the Universal Design feature because it was considered less dangerous for walking. In the pilot study,
participants indicated that they might trip over the edge of the “multiple floor materials.” In several instances, the “multiple floor materials” photograph was also misinterpreted as a step.

The variables, “value contrast/no value contrast” and “no pattern/patterned surfaces” consisted of four sets of pairs of photographs for the participants to select, while the variables, “focal point by object/no focal point, multiple floor materials/continuous floor material, open spaces between fixtures on the selling floor/No open spaces between fixtures on the selling floor, wide aisles/no wide aisles” all consisted of five pairs of photographs. The rationale behind the different number of pairs was to determine which photographs were the most visible and comprehensive to the participant.
<table>
<thead>
<tr>
<th>Universal Design categories</th>
<th>General explanation</th>
<th>UD features</th>
<th>No UD features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal visibility</td>
<td>Contrasted, warm-colored and dimensional signage created with simple type fonts (Ruderman &amp; Ruderman, 1992); Avoid using two-dimensional patterns (Day, Carreon &amp; Stump, 2000)</td>
<td>Value contrast (4 pairs)</td>
<td>No value contrast (4 pairs)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No patterned surfaces (4 pairs)</td>
<td>Patterned surfaces</td>
</tr>
<tr>
<td>Strategic focal point</td>
<td>Visible object or design characteristic create emphasis (Hiatt, 1991) to merchandise or locations within store</td>
<td>Focal point by object (5 pairs)</td>
<td>No focal point by object (5 pairs)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Multiple floor material (5 pairs)</td>
<td>Continuous floor materials</td>
</tr>
<tr>
<td>Spatial organization</td>
<td>Adequate space for wheelchairs or two people passing through (U.S. Small Business Administration &amp; U.S. Department of Justice, 1999)</td>
<td>Open spaces between fixtures on the selling floor (5 pairs)</td>
<td>No open spaces between fixtures on the selling floor (5 pairs)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wide aisles (5 pairs)</td>
<td>No wide aisles</td>
</tr>
</tbody>
</table>

Table 32: Description of photographs used in pilot study 7

*Description of the survey.*

In this pilot study, as in the main study, each photograph was headed by “A” or “B”, and the pairs of photographs were randomly organized. Subjects were asked to rate their level of confidence in selecting these photographs (“A” or “B”) and explain their selection. These categorical preference scores were dummy coded where “1” equals the presence of a Universal Design preference and “0” equals the absence of a Universal Design preference. The researcher combined and totaled up all of these scores (the sums of how many times
participants selected photographs featuring Universal Design characteristics), which then provided the sum of preference scores. Additionally, each participant was also assigned a sum of confidence level score, which was a summarized total of her selections of Likert scale ratings. The choices in the Likert scale were headed as “Not At All Confident, Not Confident, Neutral, Confident and Very Confident”; the rating “Not At All Confident” was assigned a “1” and “Very Confident” was assigned a “5”.

Demographics.

There were initially 33 participants in this pilot study, however, 11 were dropped due to missing values. One of these participants was also dropped because she was under the age of 65. A majority of this sample comprised of college-educated, Caucasian females.

The mean age was 83.82, as the age range of the participants was 75 to 91. Almost 41% of the participants had obtained a graduate degree, while only 27.3% were not college-educated.

Results.

RQ1: In an unfamiliar apparel retail environment which aesthetic and functional Universal Design feature was most preferred by older females?

The data indicated that focal point was preferred by the participants because they selected photographs in this category the most often. On average
selected the photographs featuring focal point 3.5 out of a maximum of 5 times. The data reported that subjects were fairly confident with their responses.

RQ2: How often were photographs of Universal Design features selected among these older adults? Based on the results, 55% of the participants selected photographs featuring Universal Design 19 or more times.

RQ3: Is there is a difference in preference for aesthetic and functional Universal Design features by race, education, age, shopping interests or shopping experiences in an unfamiliar apparel retail environment?

A one-way analysis of variance (ANOVA) resolved that there was no significant difference in preference scores or confidence levels across demographics (age, education levels and ethnicity) among the participants. Therefore, there was no need to analyze each demographic group separately.

The ages of the population ranged from 75 to 91, with a mean of 84.

The results indicated that there were no significant differences in preferences based on shopping frequency among the participants. The categories in shopping frequency included, “once a month, every six months, once a year and none of the above.”

RQ4: Which of these Universal Design variables should be integrated and implemented in a design environment in order to make a store approachable to an older customer?
The data that were entered into the SPSS software consisted of the summed preference scores from the participants’ preferences of the 28 pairs of black and white photographs. This analysis was based on a slide preference study conducted by Scott (1993). Results of a principal component analysis illustrated underlying factors do exist among the Universal Design features. Based on a varimax rotation, and by eliminating eigenvalues less than one, the Universal Design features were grouped into two factors (see Table 33).

<table>
<thead>
<tr>
<th>Component 1</th>
<th>Component 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inference in spatial organization</td>
<td>Inference in visibility</td>
</tr>
<tr>
<td>Focal point</td>
<td>Value contrast</td>
</tr>
<tr>
<td>Open spaces between fixtures on the selling floor</td>
<td>No pattern</td>
</tr>
<tr>
<td>Wide aisles</td>
<td>Multiple floor materials</td>
</tr>
</tbody>
</table>

Table 33: Factor groupings of Universal Design features

According to the Varimax Rotation, the analysis conceived Factor 1, (eigenvalue of 2.022) and Factor 2 (eigenvalue of 1.380). See Table 34. According to a Varimax Rotation, the rotated eigenvalues for Factor 1 was 1.73 and Factor 2 was 1.67. Both of the Factors together accounted for 56.71% of the variance. The factors that were analyzed were determined by both the eigenvalues and scree plot.
The analysis extracted two factors: Factor 1, explained 28.8% of the variance, and included variables, “focal point, spatial area and wide aisles.” Factor 2 explained 27.9% of the variance, included variables, “color contrast, no pattern and changes in flooring.” The analysis also indicated that variables in Factor 1 were positively correlated. However, in Factor 2, “no pattern” was negatively correlated (-.50) with the other Universal Design features (see Table 35).
Table 35: Rotated component matrix of Universal Design features

<table>
<thead>
<tr>
<th>Universal Design features</th>
<th>Component 1</th>
<th>Component 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value contrast</td>
<td>.18</td>
<td>.79</td>
</tr>
<tr>
<td>No pattern</td>
<td>.47</td>
<td>-.50</td>
</tr>
<tr>
<td>Focal point</td>
<td>.73</td>
<td>.13</td>
</tr>
<tr>
<td>Multiple floor materials</td>
<td>.11</td>
<td>.79</td>
</tr>
<tr>
<td>Open spaces between fixtures on the selling floor</td>
<td>.79</td>
<td>4.547E-03</td>
</tr>
<tr>
<td>Wide aisles</td>
<td>.56</td>
<td>.40</td>
</tr>
</tbody>
</table>


Table 35: Rotated component matrix of Universal Design features

**Factor Descriptions.**

**Factor 1, Inference in Spatial Organization,** can be exhibited as Universal Design features wide aisles and large open spaces within the floor layout of the store, providing adequate visibility to focal points necessary for wayfinding or presenting apparel and/or accessories. A number of the participants explained that they would rather shop in such spatially configured environments so that they can have more access to the products. One participant suggested that wider aisles are more inviting.

Many of the participants also stated that the signs were an identifier for products or sections of the store. Thus, perhaps there must be adequate space so that the focal points are visible and customers have enough space. This design implementation would enable them to get from point A to point B without
feeling cramped. This might indicate of how a retailer might influence approach behavior in their store.

*Factor 2, Inference in Visibility,* can be exemplified as Universal Design characteristics including color contrast being present through changes in flooring, but not thru pattern. No pattern was the only negative loading variable present. Therefore, perhaps participants still preferred patterned over solid surfaces in this study despite the fact that it is not Universal Design.

One participant stated that “table skirt compliments the blouses or jackets” so she is clearly focusing on the aesthetic nature of the feature. She was referring to the patterned table skirt. Yet another participant noted that the “dark cloth [on the table] identifies- so can see it and go around it.” Perhaps this finding indicates that there *is* importance in combining both aesthetic and functional design characteristics to retail environments frequented by older consumers. Therefore, Factor 2 reminds us that a true Universally-Designed environment must incorporate functional yet aesthetic characteristics.

*Results.*

In addition to selecting their preferred photograph, the participants were asked to qualitatively explain what problems they experience during shopping activities. The data illustrated that 59.10% of the population was overwhelmed by clutter and 18.10% were overwhelmed by large spaces.

Approximately 77% of the participants stated that the layout of a store impacts their shopping activities. Although only 16 out of 22 people explained
how the layout of a store impacts their shopping, 31.8% of the respondents stated in one way or another that wayfinding is an issue. Approximately 14% stated that they are affected by the size of a store and 9.1% are affected by accessibility. Another 9.1% are affected by clutter.

The data reported that 54.5% of the participants stated that “fit” is their most frequent shopping issue. However “fit,” and other variables such as “no salespersons and a place to sit” were not addressed further because they were not part of the Universal Design categories that were selected for this study.

The data reported that 77.3% of the participants shop for apparel more than once a year and 86.4% shop alone. These findings suggest that retailers should indeed be catering to the declining abilities of the older population, because they continue to shop by themselves as they grow older.

Conclusion.

As with the findings of earlier pilot studies, it was concluded that store design features should be investigated further to help retailers determine how they can better assist older customers. This pilot study also helped in deciding which photographs to utilize in the main study, as well as resolved that the format of the survey could easily be understood by older adults. Additionally, it was determined that the flooring variable should be switched and that “continuous floor material” should be analyzed as a Universal Design feature. Therefore, two variables (continuous floor material/multiple floor materials) were switched in the main study.
It was also concluded that a principal component (factor) analysis does indicate underlying patterns that exist among these Universal Design features. However, this led to the conclusion that a cluster analysis might be a better solution to identify how Universal Design features may be categorized into groups and further explain demographic information about participants who were associated with those groups. A discovery was also made to calculate the averages scores of the participants instead of the sums since the photographs were coded as “0” and “1.”
APPENDIX C

Measure Used In The Main Study

- Consent For Participation
- Universal Design Retail Preference Study (UDRPS)
- Questionnaire
CONSENT FOR PARTICIPATION IN RESEARCH

I consent to participating in research entitled: Effects of Universal Design features on older female apparel consumers.

Susie Zavotka, Ph.D., Principal Investigator, or her authorized representative Megan Huss Pace, M.S., has explained the purpose of the study, the procedures to be followed, and the expected duration of my participation.

I acknowledge that I have had the opportunity to obtain additional information regarding the study and that any questions I have raised have been answered to my full satisfaction. Furthermore, I understand that I am free to withdraw consent at any time and to discontinue participation in the study without prejudice to me.

Finally, I acknowledge that I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

Date: __________________ Signed: _______________________

(Participant)

Signed:
Megan Huss Pace _______________________
(Principal Investigator or her authorized representative)

Witness: ________________
1.) Imagine you’ve just walked into this store… In which environment would you rather shop? *(Circle A or B)*

![Image A]

![Image B]

2.) I am confident with my answer. *(Circle your answer)*

- Not at all confident
- Not confident
- Neutral
- Confident
- Very confident

3.) Explain why you selected “A” or “B” *(Write out your answer)*
1.) Imagine you’ve just walked into this store… In which environment would you rather shop? (Circle A or B)

A

B

2.) I am confident with my answer. (Circle your answer)

Not at all confident  Not confident  Neutral  Confident  Very confident

3.) Explain why you selected “A” or “B” (Write out your answer)

________________________________________________________________________________
1.) Imagine you’ve just walked into this store… In which environment would you rather shop? (Circle A or B)

2.) I am confident with my answer. (Circle your answer)

   - Not at all confident
   - Not confident
   - Neutral
   - Confident
   - Very confident

3.) Explain why you selected “A” or “B” (Write out your answer)
1.) Imagine you’ve just walked into this store... In which environment would you rather shop? (Circle A or B)

A B

2.) I am confident with my answer. (Circle your answer)

Not at all confident    Not confident    Neutral    Confident    Very confident

3.) Explain why you selected “A” or “B” (Write out your answer)
1.) Imagine you’ve just walked into this store… In which environment would you rather shop?  (Circle A or B)

A

B

2.) I am confident with my answer.  (Circle your answer)

Not at all confident  Not confident  Neutral  Confident  Very confident

3.) Explain why you selected “A” or “B”  (Write out your answer)
1.) Imagine you’ve just walked into this store… In which environment would you rather shop? (Circle A or B)

A

B

2.) I am confident with my answer. (Circle your answer)

Not at all confident    Not confident    Neutral    Confident    Very confident

3.) Explain why you selected “A” or “B” (Write out your answer)
1.) Imagine you’ve just walked into this store… In which environment would you rather shop? (Circle A or B)

A

B

2.) I am confident with my answer. (Circle your answer)

Not at all confident  Not confident  Neutral  Confident  Very confident

3.) Explain why you selected “A” or “B” (Write out your answer)

_______________________________________________________________________
1.) Imagine you’ve just walked into this store… In which environment would you rather shop?  (Circle A or B)

A  

B

2.) I am confident with my answer.  (Circle your answer)

Not at all confident  Not confident  Neutral  Confident  Very confident

3.) Explain why you selected “A” or “B”  (Write out your answer)

_______________________________________________________________________
1.) Imagine you’ve just walked into this store… In which environment would you rather shop? (Circle A or B)

A

B

2.) I am confident with my answer. (Circle your answer)

Not at all confident      Not confident            Neutral Confident         Very confident

3.) Explain why you selected “A” or “B” (Write out your answer)

_______________________________________________________________________
1.) Imagine you’ve just walked into this store… In which environment would you rather shop? (Circle A or B)

A

B

2.) I am confident with my answer. (Circle your answer)

Not at all confident  Not confident  Neutral  Confident  Very confident

3.) Explain why you selected “A” or “B” (Write out your answer)

_______________________________________________________________________
1.) Imagine you’ve just walked into this store… In which place would you rather shop? (Circle A or B)

A

B

2.) I am confident with my answer. (Circle your answer)

Not at all confident      Not confident            Neutral Confident         Very confident

3.) Explain why you selected “A” or “B” (Write out your answer)
1.) Imagine you’ve just walked into this store… In which environment would you rather shop? (Circle A or B)

A

B

2.) I am confident with my answer. (Circle your answer)

Not at all confident      Not confident            Neutral Confident         Very confident

3.) Explain why you selected “A” or “B” (Write out your answer)
1.) Imagine you’ve just walked into this store… In which environment would you rather shop? (Circle A or B)

A

B

2.) I am confident with my answer. (Circle your answer)

Not at all confident   Not confident   Neutral   Confident   Very confident

3.) Explain why you selected “A” or “B” (Write out your answer)

_________________________________________________________________________
1.) Imagine you’ve just walked into this store… In which environment would you rather shop?  (Circle A or B)

A

B

2.) I am confident with my answer.  (Circle your answer)

Not at all confident      Not confident            Neutral Confident         Very confident

3.) Explain why you selected “A” or “B”  (Write out your answer)
1.) Imagine you’ve just walked into this store… In which environment would you rather shop? (Circle A or B)

A

B

2.) I am confident with my answer. (Circle your answer)

Not at all confident  Not confident  Neutral  Confident  Very confident

3.) Explain why you selected “A” or “B” (Write out your answer)

_________________________________________________________________________
1.) Imagine you’ve just walked into this store… In which environment would you rather shop?  (Circle A or B)

A

2.) I am confident with my answer. (Circle your answer)

Not at all confident       Not confident       Neutral       Confident       Very confident

3.) Explain why you selected “A” or “B” (Write out your answer)
1.) Imagine you’ve just walked into this store… In which environment would you rather shop? (Circle A or B)

A

B

2.) I am confident with my answer. (Circle your answer)

Not at all confident  Not confident  Neutral  Confident  Very confident

3.) Explain why you selected “A” or “B” (Write out your answer)

_______________________________________________________________________
1.) Imagine you’ve just walked into this store… In which environment would you rather shop? (Circle A or B)

A

B

2.) I am confident with my answer. (Circle your answer)

Not at all confident  Not confident  Neutral  Confident  Very confident

3.) Explain why you selected “A” or “B” (Write out your answer)

_______________________________________________________________________
1.) Imagine you’ve just walked into this store… In which environment would you rather shop? (Circle A or B)

![Image A]

![Image B]

2.) I am confident with my answer. (Circle your answer)

Not at all confident      Not confident      Neutral      Confident      Very confident

231

3.) Explain why you selected “A” or “B” (Write out your answer)

_______________________________________________________________________
1.) Imagine you’ve just walked into this store… In which environment would you rather shop? (Circle A or B)

A

B

2.) I am confident with my answer. (Circle your answer)

Not at all confident  Not confident  Neutral  Confident  Very confident

3.) Explain why you selected “A” or “B” (Write out your answer)

_______________________________________________________________________
1.) Imagine you’ve just walked into this store… In which environment would you rather shop? (Circle A or B)

A

B

2.) I am confident with my answer. (Circle your answer)

- Not at all confident
- Not confident
- Neutral
- Confident
- Very confident

3.) Explain why you selected “A” or “B” (Write out your answer)

_______________________________________________________________________
1.) Imagine you’ve just walked into this store… In which environment would you rather shop? (Circle A or B)

2.) I am confident with my answer. (Circle your answer)

   Not at all confident      Not confident            Neutral        Confident      Very confident

3.) Explain why you selected “A” or “B” (Write out your answer)

_______________________________________________________________________
1.) Imagine you’ve just walked into this store… In which environment would you rather shop?  (Circle A or B)

A

B

2.) I am confident with my answer. (Circle your answer)

Not at all confident  Not confident  Neutral  Confident  Very confident

3.) Explain why you selected “A” or “B”  (Write out your answer)
1.) Imagine you’ve just walked into this store… In which environment would you rather shop? (Circle A or B)

A

B

2.) I am confident with my answer. (Circle your answer)

Not at all confident  Not confident  Neutral  Confident  Very confident

3.) Explain why you selected “A” or “B” (Write out your answer)

_______________________________________________________________________
A. Personal Information

1. In what year were you born? _____________________

2. What is your highest level of education? (circle below)
   - High school
   - Undergraduate degree
   - Graduate degree

3. If you have obtained an Undergraduate or Graduate degree, what was your degree and your concentration of study? ______________________

4. What is your race? (circle below)
   - African-American
   - Asian
   - Caucasian
   - Hispanic
   - Indian
   - Other___________

B. Shopping Interests

5. How often do you shop for apparel? (circle below)
   - Once a week
   - Once a month
   - Every six months
   - Once a year
   - Other___________
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Do you shop alone? (circle)</td>
<td>Yes</td>
</tr>
<tr>
<td>7. What kind of apparel products do you shop for?</td>
<td></td>
</tr>
<tr>
<td>8. What are your biggest problems during in-store apparel shopping? (Describe below)</td>
<td></td>
</tr>
<tr>
<td>9. When you enter a store, what overwhelms you?</td>
<td></td>
</tr>
<tr>
<td>10. What physical characteristics of the store interiors would influence you to want to spend more time there? (Describe below)</td>
<td></td>
</tr>
<tr>
<td>11. Does the layout of a store impact your shopping activities? (circle below)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Thank you for your time!
APPENDIX D

Human Subjects Exemption Forms
(pilot and main study)
**TITLE PAGE - APPLICATION FOR EXEMPTION**
FROM REVIEW BY THE INSTITUTIONAL REVIEW BOARD
The Ohio State University, Columbus OH 43210

<table>
<thead>
<tr>
<th>Principal Investigator</th>
<th>Phone:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name: Susan Zavotka, Ph.D</td>
<td></td>
</tr>
<tr>
<td>Department or College: Department of Consumer Sciences</td>
<td></td>
</tr>
<tr>
<td>Campus Address (room, building, street address): 265G CAMPBELL 1787 NEIL AVE COLUMBUS, OH 43210</td>
<td></td>
</tr>
<tr>
<td>Signature: [Signature] Date: 3/20/05</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Co-Investigator</th>
<th>Phone:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name: Megan Huss</td>
<td></td>
</tr>
<tr>
<td>Campus Address (room, building, street address) or Mailing Address:</td>
<td></td>
</tr>
<tr>
<td>Signature: [Signature] Date: 4/1/05</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Co-Investigator</th>
<th>Phone:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
<td></td>
</tr>
<tr>
<td>Campus Address (room, building, street address) or Mailing Address:</td>
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<td>Signature:</td>
<td>Date:</td>
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<tr>
<th>Protocol Title</th>
<th>Source of Funding</th>
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<tbody>
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<td>Effects of universal design characteristics on older female apparel consumers</td>
<td>N/A</td>
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<tbody>
<tr>
<td>Approved.</td>
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<tr>
<td>Disapproved.</td>
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</table>

Date of determination: 4/20/05 Signature: [Signature]
TITLE PAGE - APPLICATION FOR EXEMPTION
FROM REVIEW BY THE INSTITUTIONAL REVIEW BOARD
The Ohio State University, Columbus OH 43210

**Principal Investigator**
Name: Susie Zavotka, Ph.D
Phone:
Department or College: Department of Consumer Sciences
E-mail:
Campus Address (room, building, street address):
2650 CAMPBELL
1787 NEIL AVE
COLUMBUS, OH 43210
Signature: 
Date: 
Fax:

**Co-Investigator**
Name: Megan Hune, M.S., Ph.D. Candidate
Phone:
Campus Address (room, building, street address) or Mailing Address:

Signature: 
Date: 
Fax:

**Co-Investigator**
Name: 
Phone:
Campus Address (room, building, street address) or Mailing Address:

Signature: 
Date: 
Fax:

**Protocol Title**
Effects of universal design characteristics on older female apparel consumers

**Source of Funding**
N/A

**For Office Use Only**

☑ Approved. Research has been determined to be exempt under these categories:  
Research may begin as of the date of determination listed below.

☐ Disapproved. The proposed research does not fall within the categories of exemption. Submit an application to the appropriate Institutional Review Board for review.

Date of determination: 6/03/06
Signature: 
Office of Research Risks Protection

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