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Consumer Perceptions of Apparel Fit Satisfaction and Sizing Based Upon 3D Body Scanning and Block Garment Assessment

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By

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ABSTRACT

The objectives of this study were to first, determine whether Walmart, Inc. customers are purchasing the correct size garments for their body measurements, and their perceptions of the fit of Walmart, Inc. clothing prior to trying on the current block garments. The next objective was to determine which factors influence fit satisfaction after the participants have tried on the current block garments. Hypothesis 1 tested participants' perceived size and their actual size, Hypothesis 2 tested participants' pre and post try-on fit satisfaction perceptions, and Hypothesis 3, 4, and 5 tested which factors have a significant effect on garment fit satisfaction. Through the utilization of a 3D body scanner and two questionnaires, the hypotheses were tested.

There were a total of 55 usable responses (100% female), and all participants were Walmart, Inc. consumers. Participants were found to purchase the incorrect size garments more often than the correct size garments based on the results. Fit satisfaction increased post garment try-on from pre garment try-on. Age, garment type, and size were all statistically significantly influencing factors on fit satisfaction for shirts. Only garment type was found to be a statistically significant influencing factor on fit satisfaction for pants.

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DEDICATION

This thesis is dedicated to my parents, my sister, and my grandmother. I don't know how I would have made it through the last two years without your constant encouragement and prayers. Thank you for always believing in me, even when I didn't, and cheering me on until the end. Words cannot express how much I love you all and appreciate everything you all have done for me.

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CHAPTER 1

INTRODUCTION

Sizing and fit in ready-to-wear apparel causes issues for retailers and consumers alike. Retailers must strive to better understand their consumers' perceptions of themselves in order to help them purchase properly fitting clothing. If a manufacturer is able to improve their sizing system to provide a better fit for more body sizes, they may be able to help reduce returns and markdowns, as well as boost customer satisfaction and potentially increase sales. Due to the advancement in technology, retailers now have the ability to improve fit issues and to develop a more consistent and accurate sizing system (Alexander, Connell, & Presley, 2005; Kasambala, Kempen, & Pandarum, 2014; Pisut & Connell, 2007; Song & Ashdown, 2013).

Retailers of apparel must understand their consumers' fit preferences, fit issues, and the diversity of body sizes. Fit is defined as the way in which a garment conforms to the body and how it appears on the body (Kasambala *et al.*, 2014). Apparel retailers must also understand that different body sizes and body satisfaction levels result in different fit issues and preferences. The understanding of the physical and psychological issues associated with fit is necessary. As new technology is developed, it is now possible to integrate body scanning into apparel retail businesses for improved garment patterns and apparel fit (Alexander *et al.,* 2005; Pisut & Connell, 2007; Song & Ashdown, 2013).

Statement of the Problem

There is no national standardized sizing for women's wear, often causing consumers to guess which size they wear and thus, creating confusion (Alexander *et al.,* 2005; Kasambala *et al.*, 2014; Mason, DeKlerk, Sommervile, & Ashdown, 2008; Pisut & Connell, 2007; Song & Ashdown, 2013). In addition, there is a lack of information available to consumers, including

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specific measurements for each size (Pisut & Connell, 2007). Typical consumers often do not know their true measurements (Alexander *et al.,* 2005; Pisut & Connell, 2007; Song & Ashdown, 2013).

Within a particular size category, garment measurements can vary by several inches. Consumers who do not know their true size could potentially be purchasing the incorrect size garment, which likely would not fit correctly, leading them to believe the quality of the clothing is poor. This can be detrimental to a company in terms of sales, returns, and consumer perceptions (Alexander *et al.,* 2005; Kinley, 2010).

As an example, Walmart, Inc. is working on improving the fit of their clothing in order to better meet the needs of their customers. A key objective of this study was to evaluate the fit of Walmart, Inc.'s standard block garments by assessing customer satisfaction, and to determine how accurately consumers comprehend their body size by utilizing body scanning technology. Consumer perceptions and preferences with regard to Walmart, Inc. clothing are central to the study.

Purpose of the Study

Fit is a major issue in the apparel industry and poor fit can lead to unsatisfied customers. In order to better serve their customers, Walmart, Inc. has been interested in researching consumers' perceptions of the fit of clothing for Walmart, Inc., as well as determining how 3D technology can improve Walmart, Inc.'s business. The purpose of this study was to determine consumers' fit satisfaction levels of the current standard block garments based on general consumer perceptions, visual aids, and background characteristics. The study also investigated consumers' perceptions of their body size and perceptions of self.

A 3D body scanner was used to take full-body measurements of Walmart, Inc. customers who were willing to participate in the study. The scans provided accurate measurements of all participants. In addition to being scanned, participants were asked to complete a brief survey providing general information about themselves, as well as some of their shopping preferences. After being scanned, participants were asked if they would be willing to try on a set of Walmart, Inc.'s standard block garments and complete a survey analyzing consumer perceptions of the fit of the garments. Photos of the participants wearing the clothing were taken from the neck down to verify their responses. This allowed the researcher to determine how satisfied customers are with the fit of Walmart, Inc.'s standard block garments, and to examine how fit might be improved based on customer responses.

Research Questions:

The research questions used to guide this study are as follows:

1. Are consumers purchasing the correct size garments based on their body measurements?
2. Do consumer perceptions of fit satisfaction of Walmart, Inc. clothing improve after the consumer tries on the standard block garments?
3. What are contributing factors affecting consumers' fit satisfaction levels of Walmart, Inc.'s standard block garments?

Hypotheses:

The hypotheses tested in this study are as follows:

H_1: Consumers purchase the incorrect size garments based on their 3D body scan measurements.

H_2: Consumers will have higher fit satisfaction post garment try-on, than pre garment try-on.

H_{3A}: Younger consumers have higher fit satisfaction of shirts than older consumers.

H_{3B}: Younger consumers have higher fit satisfaction of pants than older consumers.

H$_{4A}$: Consumer size is an influencing factor on fit satisfaction of shirts.

H$_{4B}$: Consumer size is an influencing factor on fit satisfaction of pants.

H$_{5A}$: Knit shirts result in higher fit satisfaction ratings than woven shirts.

H$_{5B}$: Knit pants result in higher fit satisfaction ratings than woven pants.

CHAPTER 2

REVIEW OF LITERATURE

Social Importance of Clothing

Consumers use clothing as a means of self-expression and as a way to identify themselves with a particular social group (Alexander *et al.,* 2005; Johnson, Schofield, & Yurchisin, 2002; Kinley, 2010). Clothing is used as a form of nonverbal communication to convey a message to others, either consciously or subconsciously (Alexander *et al.,* 2005; Damhorst, 1990; Johnson *et al.,* 2002; Kasambala *et al.*, 2014; Ryan, 1991). Appearance is used as a cue when forming impressions and making assumptions about others (Johnson *et al.,* 2002; Kasambala *et al.*, 2014; Kinley, 2010; Ryan, 1991). Fit is a commonly used indicator when forming an opinion about someone (Johnson *et al.,* 2002; Kasambala *et al.*, 2014). Most people believe that their impressions of others based on appearance are accurate, and that the opinions others form about themselves based on their appearance are likely accurate as well (Johnson *et al.,* 2002).

Psychological Importance of Clothing: Body Image

The social comparison theory developed by Festinger in 1954 suggests that people desire to have their opinions and abilities validated by others, which they achieve by either deliberate or unconscious comparison to others (Festinger, 1954; Kinley, 2010). When appearance is validated through comparisons, self-esteem increases (Kinley, 2010; Stone, 1962).

Body cathexis is the level of satisfaction or dissatisfaction with different parts of the body, and is related to body image. Simply put, body cathexis is a person's feelings about their body. These feelings have a substantial influence on clothing preferences, including fit

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preferences. A relationship between body cathexis and fit satisfaction levels has been confirmed through previous research (Alexander *et al.,* 2005; Shin & Baytar, 2013).

Body image and self-esteem are two separate constructs. Self-esteem is most commonly defined as a person's general feeling of self-worth (Demo, 1985; Kinley, 2010). Body image is typically described as one's "mental representation" of self and the "psychological investment in appearance" (Cash, 2005; Kinley, 2010). Research has shown that there is a positive relationship between self-esteem and body image (Kinley, 2010; Lennon, Rudd, Sloan, & Kim, 1999).

Both body size and garment size effect self-esteem. Self-esteem is related to self-value, while body image is specifically how a person feels about their body. Women who are heavier tend to be less satisfied with their body. Heavier women's self-esteem decreases when they are able to fit into the size they expect to be. This differs from a smaller woman's reaction, which results in an increase in self-esteem when they fit into the expected size. Body size is likely a determining factor in satisfaction with body image, which effects self-esteem (Kinley, 2010).

It was determined that body satisfaction is positively correlated with fit satisfaction. It can be concluded that the more satisfied a person is with their body, the more satisfied they will be with the fit of their clothing (Alexander *et al.,* 2005; Shin & Baytar, 2013; Song & Ashdown, 2013). Research has found that thinner women are more satisfied with their bodies than heavier women (Frederick, Peplau, & Lever, 2006; Kinley, 2010). Consumers' fit satisfaction is highly associated with and dependent on their perceived body size and body cathexis, which varies based on their actual body size (Alexander *et al.,* 2005; Kasambala *et al.*, 2014; Shin & Baytar, 2013; Song & Ashdown, 2013).

Problems with fit are often exacerbated by consumers' body image and perceptions of self (Alexander *et al.,* 2005; DesMarteau, 2000; Kinley, 2010; Shin & Baytar, 2013). Clothing is

often used to alleviate self-consciousness and camouflage perceived "figure faults" (Alexander *et al.,* 2005; Kasambala *et al.*, 2014; Kinley, 2010; Kwon & Parham, 1994).

Research has found that women who are more concerned with their appearance have a lower self-esteem than those who do not care as much about their appearance. Clothing is a critical component of appearance that individuals are able to control, unlike many other aspects of appearance (Kinley, 2010; Shin & Baytar, 2013). Clothing is very important for women socially and psychologically because appearance affects how people perceive themselves and their self-confidence. Unsurprisingly, women want to improve their appearance and others' perceptions of them (Alexander *et al.,* 2005; Bailey, 2010; Shin & Baytar, 2013; Yoo, 1996).

Fit preferences differ across age groups (Alexander *et al.,* 2005; Kasambala *et al.*, 2014). There have been conflicting reports on whether younger or older women are more satisfied with their body image and fit satisfaction (Kinley, 2010). Changes in body size due to aging influences fit satisfaction (Kasambala *et al.*, 2014). Two studies have determined that younger women are more satisfied with their body image than older women (Cash & Henry, 1995; Frederick *et al.*, 2006; Kinley, 2010). Another study reported that older women are not satisfied with the fit of apparel designed for their age group (Alexander *et al.,* 2005).

However, research has demonstrated that age does not affect body satisfaction, and that body satisfaction remains fairly consistent throughout a woman's lifetime (Kinley, 2010; Tiggemann, 2004). Kinley (2010) reported that younger women were more influenced by size than older women and that older women seem to be more content with their bodies than younger women, which aligns with Tiggemann's (2004) findings. It is believed that women typically become more satisfied with their appearance as they get older. Older women are less concerned with size than younger women (Kinley, 2010). This does not mean that they are more satisfied

with fit (Alexander *et al.,* 2005). Clothing is used as self-expression for women, and whenever they are unable to find clothing that is age appropriate and fits properly, it can negatively affect their self-perception (Alexander *et al.,* 2005; Bailey, 2010; Johnson *et al.,* 2002; Kinley, 2010).

Vanity Sizing

There is a psychological need in Western culture to feel slim, which has caused a majority of retailers to use vanity sizing. "Vanity sizing" is a tactic used by retailers to convince their customers that they are smaller than they actually are, in order to boost their self-esteem by wearing smaller sizes. Retailers mark garments with smaller sizes, but larger measurements to fill the mental and emotional needs of consumers to feel smaller. Retailers use vanity sizing to boost the ego of their customers because they tend to feel better when they are able to buy a smaller size (Alexander *et al.,* 2005; DesMarteau, 2000; Kinley, 2010; Shin & Baytar, 2013). When a woman is able to wear a smaller size, she feels better about herself. In spite of this, women's self-esteem is not negatively affected by needing a larger size. External circumstances have little influence on self-esteem, which indicates that a larger size does not have a significant effect on self-esteem. Vanity sizing can have a positive impact on consumers' self-esteem, but it is not necessary because buying a larger size does not significantly negatively affect their self-esteem (Kinley, 2010).

Apparel Fit Quality: Importance to Consumers and Retailers

Consumers' attitudes toward apparel and their expectations of clothing impact their garment choices, either consciously or subconsciously. The attitude consumers have towards clothing impacts their fit preference. Confidence and comfort of consumers is heavily dependent on the fit of their clothing. Properly fitted clothing is essential for the mental and emotional stability and health of consumers. When a garment is well fitted, it looks best on the wearer,

therefore making the wearer more confident and satisfied. Unfortunately, dissatisfaction with fit is a frequently reported problem with apparel consumption. It has been found that a majority of the female population struggles to find correctly fitting clothing without alterations (Alexander *et al.,* 2005; Kinley, 2009; Newcomb & Istook, 2004).

Most consumers are not properly educated on how to take their body measurements, and it can be concluded that their perceptions of self may be skewed. It was found that a majority of consumers did not know their lower body measurements, and therefore did not accurately know their size. This is why body scanning has the potential to be beneficial to the retail and apparel industry (Alexander *et al.,* 2005; Pisut & Connell, 2007). Consumers' understanding of sizing and fit has a strong impact on their perceptions of garments pre-purchase and post-purchase (Mason *et al.*, 2008). Customers often do not know their correct size, and their perceptions of their body image are unlikely to match their true body size (Alexander *et al.,* 2005; Song & Ashdown, 2013).

Misconceptions of body size create a multitude of problems for consumers and retailers, but retailers cannot amend this. What they can do is improve how well their clothing fits their target market (Song & Ashdown, 2013). Consumers' perceptions of themselves create additional problems with fit, often believing that they are to blame when a garment does not fit them properly. In reality, fit issues often arise because the garment is made for a specific body size, which may not be flattering on all body sizes (Alexander *et al.,* 2005; DesMarteau, 2000; Kasambala *et al.*, 2014; Kinley, 2010).

Fit dissatisfaction is a commonly stated problem associated with apparel purchases (Alexander *et al.,* 2005; Kinley, 2009; Newcomb & Istook, 2004). If a consumer is not satisfied with a garment that they purchase, they will either blame themselves or the retailer. If the

consumer believes that the retailer is to blame for their disappointment then the consumer might not continue shopping at that retailer or may tell friends about their negative experience, which could hurt the business of the retailer (Alexander *et al.,* 2005; Kasambala *et al.*, 2014; Mason *et al.*, 2008). Retailers lose revenue every year because of markdowns, which are somewhat caused by dissatisfaction with fit. Contrariwise, if a retailer is able to provide garments with the correct fit for their target market, they will increase customer loyalty and satisfaction, which has the potential to improve the company's success in multiple ways, including reducing markdowns. Body scanning technology not only makes this plausible, but also easier for retailers (Alexander *et al.,* 2005).

Fit dissatisfaction has been determined as the third leading cause of loss of sales due to consumers' unwillingness to purchase ill-fitted garments. Female consumers spend a majority of their shopping time trying on clothing, because they must try on multiple garments to find one that fits properly (Alexander *et al.,* 2005; Kasambala *et al.*, 2014; Newcomb & Istook, 2004; Yoo, 1996).

Finding the perfect fit is especially hard in women's clothing because different brands are designed with different target markets in mind. Certain garments are more difficult to achieve the perfect fit. Women need to try on pants more often than tops, because tops often are more versatile when it comes to the body sizes they fit. Research has found that pants are the most difficult garment for women to find in the correct size, and fit is the main concern when shopping for pants (Alexander *et al.,* 2005; Kasambala *et al.*, 2014; Kinley, 2009, 2010**).**

One of the issues that many women face is that sizing labels for women's clothing often are not very informative or descriptive. With men's clothing, actual measurements are typically used to describe the size of the garment, making it much easier to find the correct size. If a

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customer can more easily find her correct size, she will have a more positive experience

shopping, which may help retailers succeed (Mason *et al.*, 2008).

The issue of fit is dependent on the personal preferences of the consumer, which means

that 'good fit' has a multitude of meanings. A few of the factors that influence fit preference are

how comfortable the garment is, how it looks on the consumer, the consumers' personal

preferences, fashion trends, cultural influences, age, gender, body size, and lifestyle. The most

consistent complaints of poor fit across the population are related to tightness and length. Many

fit issues are associated with one another; meaning if there is an issue in one area, there is likely

to be a correlating issue in another related area. The most common fit preference for garments is

semi-fitted, which is described as being close to the body with ease added for comfort and

movement. Loosely fitted clothing is the second most common fit preference, except in jackets.

Consumers with higher body satisfaction have a tendency to prefer more fitted clothing. This

means that those who prefer more fitted clothing are more likely to be more highly satisfied with

their bodies (Alexander *et al.,* 2005; Kasambala *et al.*, 2014; Pisut & Connell, 2007).

Brand Perceptions

Brand equity is a complex construct, primarily comprised of brand awareness and brand

association. Perceived quality and brand association, along with other components, can

drastically effect brand equity. Perceived quality is not the actual quality of a product, but is the

consumers' perceptions of the quality of a product, in comparison to other brands' alternatives

(Kim, Knight, & Pelton, 2009; Tong & Hawley, 2009). Quality of apparel is defined as the

consumer's assessment of the "standard of performance" of a garment. Consumers use both

intrinsic and extrinsic cues to evaluate the quality of a product. Intrinsic cues of apparel quality

can include fabric type, construction, style, color, fiber content, and fit. Consumers expect to

find quality garments when they go shopping, and whatever they buy must meet their needs in some way. Consumer expectations are based on how well they believe a product will perform, and product performance. Product quality positively and directly correlates to purchase intentions and overall customer satisfaction (Nelson, Rayman, & Burns, 2011).

Consumers use many cues to determine brand equity, but the most influential on purchase intentions is perceived quality. Higher quality increases purchase intentions and gives a brand a competitive edge over their competitors. There is a positive relationship between perceived quality, consumer satisfaction, and company profitability. Brand association is the consumers' emotional connection to a brand, which creates brand image. Brand associations give value to a brand and increase purchase intentions as well (Kim *et al.*, 2009; Tong & Hawley, 2009).

Garment Fit Complications

Mass produced, ready-to-wear clothing makes it necessary to have some sort of consistent sizing system to allow consumers to decipher which garments should fit them (Alexander *et al.,* 2005; Gill & Brownbridge). Consumers use clothing size to determine what to purchase based on their body size, but the problem lies in the idea of standardized sizing being a universal truth. Individual manufacturers, retailers, and designers develop custom size standards and occasionally change them as needed **(**Alexander *et al.,* 2005; DesMarteau, 2000; Kinley, 2010). There is no standardized sizing that is consistent across retailers and despite consumers being somewhat aware of this problem, they are still influenced by the number or letter on the tag (Gill & Brownbridge; Pisut & Connell, 2007).

The primary factors affecting fit are: the body measurements of the population, the construction of the garment, the quality of fit management, and the labeling of sizing information (Alexander *et al.,* 2005; Mason *et al.*, 2008). Outdated body measurements and inconsistent

sizing measurements across or within different retailers result in various fit problems (Alexander *et al.,* 2005; DesMarteau, 2000; Kinley, 2010; Mason *et al.*, 2008; Pisut & Connell, 2007).

The way in which clothing is sized is critical to how consumers view clothing and it impacts how the wearer views herself. The sizing system that is commonly used is not only inconsistent, but also outdated and there is a lack of clarity of how the system is intended to work (Alexander *et al.,* 2005; Gill & Brownbridge). The Federal Trade Commission and the Department of Commerce established the standard sizing system used today in the 1940s. This system is no longer relevant or useful because of how women's bodies have transformed, which is why so many retailers have developed their own sizing standards. Consumers are very dissatisfied with the fit of clothing due to the archaic data used to set the sizing standards. The changes in the weight and shape of the population, as well as changes that occur as consumers' age, must be taken into consideration by retailers to meet the needs of their consumers (Alexander *et al.,* 2005; Newcomb & Istook, 2004).

Fit and comfort are two of the most important attributes that consumers use to determine whether or not they will purchase something. This means that if a garment does not fit well, consumers will not buy it. This creates problems for retailers because clothing that does not sell results in profit loss (Alexander *et al.,* 2005; Kasambala *et al.*, 2014; Newcomb & Istook, 2004).

The only way retailers can determine if fit is an issue is by analyzing the returns of merchandise. A majority of returns are because of poor fit or the garment being the incorrect size. It is difficult to determine the severity of the impact of poor fit on profit loss because it is difficult to measure factors like dissatisfaction with brand, lost sales, and time wasted trying on garments. Due to the problems with sizing, consumers spend a lot of time and money trying to

find perfect fitting garments, which sometimes means they also must have them altered

(Alexander *et al.,* 2005; Newcomb & Istook, 2004; Yoo, 1996).

CHAPTER 3

DATA AND METHODS

Methods

Retailers have been attempting to find solutions to issues in apparel fit through research and the use of 3D body scanners. Issues with apparel fit are not only due to the technical aspect of garment fit, but also result from consumers' perceptions and preferences, and an inconsistency in sizing. Body size differences also contribute to issues with fit and fit preferences.

The purpose of this study was to determine consumers' fit satisfaction levels of Walmart, Inc.'s current standard block garments based on consumer perceptions and background characteristics. The study also investigated consumers' perceptions of their body size and perceptions of themselves. To obtain the information needed, a 3D body scanner and two questionnaires were utilized. The research questions proposed include:

1. Are consumers purchasing the correct size garments based on their body measurements?

2. Do consumer perceptions of fit satisfaction of Walmart, Inc. clothing improve after the consumer tries on the standard block garments?

3. What are contributing factors affecting consumers' fit satisfaction levels of Walmart, Inc.'s standard block garments?

Sample

The population for this study was female, Walmart, Inc. customers 18 years and older. This study was limited to females because only women's garments were available for garment try-on. The participants had to be at least 18 years of age based on the target market for the garments utilized. Participation for this study was voluntary and a total of 55 females participated. Participants were awarded a five-dollar Starbucks gift card upon completion of the

study. The average age of the participants was about 36 years old (S.D. = 11.07), with a range of

21 to 66 years old. The majority of participants were white (73.1%) with the remaining 26.9%

varying across several ethnicities as documented in Table 1. All information was coded for

confidentiality. This study has been granted IRB approval (Appendix A) from the University of

Arkansas for the collection and analysis of data.

Table 1

Demographics of Sample by Age and Ethnicity

N = 55	%	Mean	S.D.
Age	---	36.44	11.07
Ethnicity			
American Indian or Alaskan Native	3.6%		
Asian or Asian American	3.6%		
Black or African American	3.6%		
Hispanic or Latino	12.5%		
White	73.1%		
Other/ Combination	3.6%		

Instruments

The instruments required to collect the data for this study include the TC^2-KX-16 3D

Body Scanner (3D Body Scanner, 2014), and two questionnaires developed from previous

research findings and Walmart, Inc.'s current fit evaluation standards. The fit satisfaction

questionnaire was constructed based on terminology and components of fit communicated as

essential by Walmart, Inc.'s technical design team. Fit satisfaction components were also

extracted from a study conducted by Pisut and Connell (2006), entitled *Fit Preferences of*

Female Consumers in the USA, which evaluated crucial elements of fit as identified by female

consumers. The first questionnaire was developed based on these foundations to meet the needs

of Walmart, Inc. and to align with the technical design team's evaluation of 'good fit'. 'Good fit' is subjective deeming it necessary to analyze fit based on Walmart, Inc.'s definition and standards of 'good fit'.

The first questionnaire was designed to gather demographic information, as well as to assess participants' knowledge and preferences. The second questionnaire was used to determine customers' fit satisfaction of the block garments. The Apparel Merchandising and Product Development professors and a team of Walmart, Inc. employees reviewed both questionnaires. A pilot study was conducted with a convenience sample of approximately 60 undergraduate students. Based on the pilot study and the feedback of the reviewers, modifications were made to the questionnaires.

Body scanner

The TC^2-KX-16 3D body scanner was used to collect body measurements. This scanner uses light to collect measurements of the entire body, approximately 300 total. For the purpose of the study only 30 measurements that are determined to be the most crucial and relevant were extracted. The scanner is portable, which allowed the body scanner to be transported to Walmart, Inc.'s offices to collect the data. The scanner is approximately the same size as a fitting room and is free standing (3D Body Scanner, 2014). Curtains were set up to further ensure privacy. The scanner was calibrated once it is reassembled to ensure reliable measurements are gathered. Guidelines were set in place to show the participants where and how to stand inside the scanner.

One of the requirements of being scanned is that the participant had to remove their outer clothing, wearing only undergarments. 'Scan wear' was provided for those who desired and would feel more comfortable. The provided scan wear included tank tops, shorts, and leggings.

The objective of wearing minimal clothing while being scanned was to provide the most accurate measurements. The body scanner only provides an outline of the shape inside the scanner, so if the person inside is wearing clothing that is not form-fitted, only the outline of the clothing will be captured, not the outline of the body. If the actual body is not scanned, the measurements extracted from the scan will be inaccurate. The scanner uses the measurements to create a unique body model for each participant (3D Body Scanner, 2014).

Demographic and Shopping Preference Questionnaire

The first questionnaire (Appendix B) asked the participants to provide demographic information about themselves including age and ethnicity. Gender was not necessary as only females were eligible for participation. Participants were asked to list their age in years. Ethnicity was listed as (A: American Indian or Alaska native, B: Asian, C: Black or African American (not Hispanic), D: Hispanic or Latino, E: Native Hawaiian or other Pacific Islander, F: White (not Hispanic), G: Other/Combination). Participants were asked what size shirt (A: X-Small, B: Small, C: Medium, D: Large, E: X-Large, F: XX-Large) and pant (A: X-Small/ 0-2, B: Small/ 4-6, C: Medium/8-10, D: Large/12-14, E: X-Large/16-18, F: XX-Large/20) they typically purchase for comparison to the Walmart, Inc.'s sizing measurements. They were also asked to rate their satisfaction with the fit of Walmart, Inc. clothing as (A: Poor, B: Fair, C: Good, D: Perfect, E: N/A). This questionnaire was divided into two parts, with a total of eleven questions.

Quality of Fit Assessment Based on Consumer Preferences Questionnaire

The second questionnaire (Appendix C) was intended to gauge participants' fit satisfaction of the standard block garments. The survey was completed electronically via Qualtrics Online Survey Software. The survey was divided into two sections, one to assess the shirt and one to assess the pant. The section to rate the shirt consisted of 15 questions, and the

pant section consisted of 17 questions. Participants rated fit satisfaction on different parts of the body (shoulders, length, hip, waist, etc.), as well as overall fit satisfaction on a six-point Likert-type scale. Respondents chose answers on a scale of 0-5 (0= Very Poor; 1= Poor; 2= Fair; 3= Good; 4= Perfect; and 5= Not Applicable). Participants indicated which top or pant they were wearing by choosing from a drop down menu and they were instructed to type their participation number so that results may be compared to their scans, demographic surveys, and photos.

Data Collection

Numerous meetings were held with representatives from Walmart, Inc.'s technical design department. Based on Walmart, Inc.'s expected outcomes, potential studies were formulated and a plan was devised to efficiently collect a variety of data. Over the course of several meetings and discussions with Walmart, Inc.'s legal and store operations departments, the plans for the study were finalized. The Institutional Review Board for the University of Arkansas and Walmart, Inc.'s legal team approved the study for data collection.

Prior to the data collection, promotions were sent via email and posters advertising the study were placed at the location. The location of the data collection was Walmart, Inc.'s apparel offices in Bentonville, Arkansas. Data collection took place over the course of two days with a total of eleven hours. A team of Walmart, Inc. employees (five total) volunteered to assist with the data collection process to ensure efficiency and accuracy. Two rooms at the office were reserved for the duration of the study.

In order to collect as much data as possible, the study was split into two parts. Part one consisted of the consent form and the Demographic and Shopping Preference Questionnaire. Once the participant completed the consent form and questionnaire, they were body scanned. Part two required the participants to try on a set of Walmart, Inc.'s block garments, have their

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photo taken, and complete the Quality of Fit Assessment Based on Consumer Preferences

Questionnaire to evaluate their fit satisfaction levels regarding the block garments.

Body Scanning Process

Participants were required to sign the consent form before body scanning. The

participants were given an overview of the body scanning process and the requirements. The

researcher demonstrated how they were to stand inside the body scanner, and showed them

where the scan wear was located. The participants then completed the first questionnaire, which

was open-ended. Upon completion of the consent form and questionnaire, the participant

entered the body scanning area. The computer was located in a separate area from the body

scanner to allow for total privacy. The researcher was able to communicate with the participant

through a moveable wall.

There were certain requirements for being body scanned, such as attire. Scan wear was

available to participants inside the body scanning room. Signs posted in the body scanner

instructed the participants on how to stand inside the body scanner. Another stipulation of the

scanner was that participants needed to ensure that nothing was obstructing their measurements,

including hair. Hair ties were provided for participants.

Once the participant was in the proper attire and positioned correctly inside the scanner,

they indicated to the researcher that they were ready. The researcher then began the scan and

once the image was captured, the researcher informed the participant that they could re-dress.

Block Garment Assessment Process

The participants who were willing to participate in the second part of the study were

given a set of clothing to try on based on their measurements. A separate dressing area was

arranged for the participants to try on the block garments. The participants had their photos

taken wearing the block garments to validate the results of their surveys. Photos were taken from the neck down to ensure anonymity.

A full-length mirror was provided to allow participants to assess how the garments appeared when worn. They then completed the second questionnaire through Qualtrics Online Survey Software via laptop or iPad. The questionnaire required the assessment of their satisfaction level with the fit of the garments after they tried them on. Upon completion of the study, participants were awarded a $5 Starbucks gift card for their contribution to the study.

CHAPTER 4

RESULTS

The objectives of this study were to determine whether Walmart, Inc. customers are purchasing the correct size garments for their body measurements, and their perceptions of the fit of Walmart, Inc. clothing prior to trying on the current block garments, as well as to determine which factors influence fit satisfaction, after the participants have tried on the current block garments. Hypothesis 1 tested participants' perceived size and their actual size, Hypothesis 2 tested participants' pre and post try-on fit satisfaction perceptions, and Hypothesis 3, 4, and 5 tested which factors have a significant effect on garment fit satisfaction.

All data from the instruments was recorded and entered into Statistical Package for the Social Science (SPSS) data analysis software for hypothesis testing. Descriptive statistics, correlations, chi-square, and univariate analysis of variances (ANOVA) were utilized to analyze the data and test each of the hypotheses. Cronbach's alpha coefficients were used to analyze the internal consistency reliability of the items used to measure the variables used to test the hypotheses. The Cronbach's alpha value for the 11 variables used resulted in a calculated score of 0.721, which meets the recommended value of 0.70 and is acceptable.

The hypotheses tested are as follows:

H_1: Consumers purchase the incorrect size garments based on their 3D body scan measurements.

H_2: Consumers will have higher fit satisfaction post garment try-on, than pre garment try-on.

H_{3A}: Younger consumers have higher fit satisfaction of shirts than older consumers.

H_{3B}: Younger consumers have higher fit satisfaction of pants than older consumers.

H_{4A}: Consumer size is an influencing factor on fit satisfaction of shirts.

H_{4B}: Consumer size is an influencing factor on fit satisfaction of pants.

H_{5A}: Knit shirts result in higher fit satisfaction ratings than woven shirts.

H_{5B}: Knit pants result in higher fit satisfaction ratings than woven pants.

Sample Characteristics

Walmart, Inc.'s legal team granted permission to collect data within their offices to ensure that participants were Walmart, Inc. consumers. Participation was completely voluntary, and a small incentive was offered for contributing to the study. Every participant signed a consent form prior to participating in the study. There were a total of 55 usable responses (100% female), and all participants were Walmart, Inc. consumers.

As seen in Table 1, the average age of the participants was about 36 years old (S.D. = 11.07) with participants' ages ranging from 21 to 66 years old. All of the participants were female, with a majority (73.1%) being Caucasian, and the remaining (26.9%) split among several ethnicities (Table 1). A majority of participants indicated that they typically purchase size medium shirts (30.9%) and size medium pants (30.9%) as illustrated in Table 2. A majority of participants' actual size is medium for shirts (23.6%) and medium for pants (27.3%) as shown in Table 2, based on the 3D body scan measurements.

Participants were randomly assigned a set of either knit garments or woven garments to try-on. A majority of the participants (54.5%) tried on the knit shirt, while the remaining (45.5%) tried on the woven shirt as documented in Table 3. A majority of participants (55.6%) tried on the woven pants, while the remaining (44.4%) tried on the knit pants (Table 3).

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Table 2

Perceived Size versus Actual Size for Shirts and Pants

	%	Mean	S.D.
Self-Reported Perceived Size			
Shirt:	---	3.19	1.35
X-Small (1)	7.3%		
Small (2)	27.3%		
Medium (3)	30.9%		
Large (4)	9.1%		
X-Large (5)	20.0%		
XX-Large (6)	3.6%		
Pant:	---	3.02	1.38
X-Small (1)	12.7%		
Small (2)	25.5%		
Medium (3)	30.9%		
Large (4)	9.1%		
X-Large (5)	16.4%		
XX-Large (6)	3.6%		
Actual Size			
Shirt:	---	3.70	1.49
X-Small (1)	7.3%		
Small (2)	14.5%		
Medium (3)	23.6%		
Large (4)	20.0%		
X-Large (5)	21.8%		
XX-Large (6)	9.1%		
XXX-Large (7)	1.8%		
Pant:	---	3.43	1.60
X-Small (1)	7.3%		
Small (2)	25.5%		
Medium (3)	27.3%		
Large (4)	12.7%		
X-Large (5)	9.1%		
XX-Large (6)	14.5%		
XXX-Large (7)	1.8%		

Table 3

Frequency of Participants that Tried On Knit versus Woven Shirts and Pants

	%	Frequency	N
Shirt Type			
Knit	54.5%	30	55
Woven	45.5%	25	55
Pant Type			
Knit	44.4%	24	54
Woven	55.6%	30	54

Research Question 1: Perceived Size versus Actual Size

Hypothesis 1: Consumers purchase the incorrect size garments based on their 3D body scan measurements. To measure consumers' size perceptions, participants were asked to select the size shirt and pant they typically purchase with options for shirts listed as x-small to xx-large (A = X-Small, B = Small, C = Medium, D = Large, E = X-Large, F = XX-Large) and selections for pants listed as x-small to xx-large (A = X-Small/ 0-2, B = Small/ 4-6, C = Medium/ 8-10, D = Large/ 12-14, E = X-Large/ 16-18, F = XX-Large/ 20). Participants' actual sizes were computed based on their body measurements extracted from their 3D body scans and compared with the Walmart, Inc. sizing chart measurements. A variable, 'correct versus incorrect', was created by comparing consumers' self-reported perceived sizes and their actual sizes. Respondents who's self-reported perceived size was not the same as their actual size were coded as '1 = Incorrect'. Participants who's self-reported perceived size was the same as their actual size were coded as '0 = Correct'. This variable was used to determine the percentage of participants that were correct and the percentage of participants that were incorrect. Descriptive statistics were used to analyze the sizing results in conjunction with chi-square to test hypothesis 1.

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A strong majority of the participants (64.8%) purchase the incorrect size shirts and exactly half of the participants (50%) purchase the incorrect size pants based on their 3D body scan measurements as documented in Table 4. Actual size and perceived size were analyzed utilizing chi-square to determine whether there were significant differences between perceived size and actual size. Statistically significant differences were found between perceived and actual size for both shirts (chi^2=0.000, $p<0.001$, V=0.709) and pants (chi^2=0.000, $p<0.001$, V=0.574). This means that the participants were more frequently incorrect than correct.

Hypothesis 1 is supported based on the results of the data analysis. A majority of the participants purchase the incorrect size for shirts, and at least half of the participants purchase the incorrect size for pants. The difference between actual size and perceived size is statistically significant for both shirts and pants.

Table 4

Accuracy of Self-Reported Sizing for Shirts and Pants

	%	Frequency	N
Self-Reported Sizing			
Shirts:			
Correct	35.2%	19	54
Incorrect	64.8%	35	54
Pants:			
Correct	50%	27	54
Incorrect	50%	27	54

Research Question 2: Fit Satisfaction Perceptions

    Hypothesis 2: Consumers will have higher fit satisfaction post garment try-on, than pre garment try-on. To assess consumers' perceptions of apparel fit, participants were first asked to rate how Walmart, Inc. clothing typically fits them on a scale of poor to perfect (A: Poor, B: Fair, C: Good, D: Perfect, E: N/A) prior to being body scanned or trying on the block garments. After completion of their body scan, willing participants were given a set of the standard block garments to try on. After they tried the garments on, they were instructed to complete a questionnaire assessing the fit of the garments. Respondents were asked to rate the overall fit of each of the garments they tried on, using a six-point Likert-type scale of 0-5 (0= Very Poor; 1= Poor; 2= Fair; 3= Good; 4= Perfect; and 5= Not Applicable). The variables were recoded as (0 = N/A, 1 = Very Poor, 2 = Poor, 3 = Fair, 4 = Good, 5 = Perfect) for analysis purposes. To test hypothesis 2, descriptive statistics were utilized to determine the relationship between pre and post garment try-on fit assessment ratings.

    As shown in Table 5, there was an increase in fit satisfaction from pre try-on to post try-on for both the shirts and the pants. A majority (49.1%) of participants listed their pre try-on satisfaction as fair. Post try-on fit satisfaction for shirts was primarily listed as good (49.1%), and post try-on fit satisfaction for pants was also primarily listed as good (25.5%). The average pre try-on perception of fit satisfaction was M = 3.13 (S.D. = 0.71). The average fit satisfaction rating for the shirts post try-on was M = 3.65 (S.D. = 1.04) and for the pants it was M = 3.24 (S.D. = 1.40). Based on the means and percentages illustrated in Table 5, there is an increase in fit satisfaction post try-on from pre try-on for both shirts and pants. Thus, the results support the hypothesis.

Table 5

Fit Satisfaction Perceptions for Pre and Post Try-On

	%	Mean	S.D.
Pre Try-On Fit Satisfaction Perception	---	3.13	0.71
Poor	18.2%		
Fair	49.1%		
Good	30.9%		
Fit Satisfaction of Shirts (Post)	---	3.65	1.04
Very Poor	3.6%		
Poor	12.7%		
Fair	16.4%		
Good	49.1%		
Perfect	18.2%		
Fit Satisfaction of Pants (Post)	---	3.24	1.40
Very Poor	18.2%		
Poor	9.1%		
Fair	23.6%		
Good	25.5%		
Perfect	21.8%		

Research Question 3: Influencing Factors on Fit Satisfaction

Hypothesis 3: Participants were asked to provide their age for research purposes. Respondents were asked to rate the overall fit of each of the garments tried on, using a six-point Likert-type scale of 0-5 (0= Very Poor; 1= Poor; 2= Fair; 3= Good; 4= Perfect; and 5= Not Applicable). The variables were recoded as (0 = N/A, 1 = Very Poor, 2 = Poor, 3 = Fair, 4 = Good, 5 = Perfect) for analysis purposes. Correlations were employed to test hypothesis 3.

Hypothesis 3A: Younger consumers have higher fit satisfaction of shirts than older consumers. Data presented in Table 6 show that there is a mild, negative relationship (-0.24) between age and fit satisfaction of the shirts. As age increased, fit satisfaction of the shirts decreased. As age decreased, fit satisfaction of the shirts increased. Thus, younger participants

had a higher fit satisfaction of the shirts than older participants. The relationship between age and fit satisfaction of the shirts is statistically significant (0.04) at the p<0.05 level. Age is an influencing factor on fit satisfaction of the shirts. Based on the results, hypothesis 3A is supported.

Hypothesis 3B: Younger consumers have higher fit satisfaction of pants than older consumers. There is a mild, negative relationship (-0.04) between age and fit satisfaction of the pants (Table 6). As age increased, fit satisfaction of the pants decreased. As age decreased, fit satisfaction of the pants increased. Younger participants had a higher fit satisfaction of the pants than older participants. The relationship between age and fit satisfaction of the pants is not statistically significant (0.40) at the p<0.05 level, but a weak relationship does exist. The assumption that as age increases, fit satisfaction for pants decreases was confirmed, but the relationship was not found to be statistically significant. Thus, age is not a significantly influencing factor on fit satisfaction of the pants. Hypothesis 3B was not supported based on the insignificance of the relationship.

Table 6

Correlations between Age and Fit Satisfaction

		Fit Satisfaction: Shirts	Fit Satisfaction: Pants
Age	Pearson Correlation	-0.243	-0.036
	Significance (p < 0.05; 2-tailed)	0.038	0.399

Hypothesis 4: To measure consumers' size perceptions, participants were asked to select the size shirt and pant they typically purchase with choices for shirts listed as x-small to xx-large (A = X-Small, B = Small, C = Medium, D = Large, E = X-Large, F = XX-Large) and choices for pants listed as x-small to xx-large (A = X-Small/ 0-2, B = Small/ 4-6, C = Medium/ 8-10, D = Large/ 12-14, E = X-Large/ 16-18, F = XX-Large/ 20). Respondents' actual sizes were computed based on their body measurements extracted from their 3D body scans and compared with the Walmart, Inc. sizing chart measurements. Participants were asked to rate the overall fit of each of the garments tried on, using a six-point Likert-type scale of 0-5 (0= Very Poor; 1= Poor; 2= Fair; 3= Good; 4= Perfect; and 5= Not Applicable). The variables were recoded as (0 = N/A, 1 = Very Poor, 2 = Poor, 3 = Fair, 4 = Good, 5 = Perfect) for analysis purposes. To test hypothesis 4, univariate analysis of variances (ANOVA) was utilized.

Hypothesis 4A: Consumer size is an influencing factor on fit satisfaction of shirts. Based on the results of the ANOVA there is a statistically significant difference (0.03) in fit satisfaction of the shirts between participant sizes (Table 7). This means that size is an influencing factor on fit satisfaction of the shirts. Hypothesis 4A is supported by these findings.

Hypothesis 4B: Consumer size is an influencing factor on fit satisfaction of pants. Based on the results of the ANOVA documented in Table 7, there is not a statistically significant difference (0.14) in fit satisfaction of the pants between participant sizes. Hypothesis 4B is not supported by these findings.

Table 7

Analysis of Variance in Fit Satisfaction based on Actual Size

Variable		XS	S	M	L	XL	XX L	XXX L	F-value	Significance (p<0.05)
Fit Satisfaction of Shirts (Post)	Mean	4.25	3.75	3.69	2.91	3.67	4.60	3.00		
	N	4	8	13	11	12	5	1	2.142	0.033
Fit Satisfaction of Pants (Post)	Mean	3.50	3.57	2.47	3.29	3.60	3.43	5.00		
	N	4	14	15	7	5	7	1	1.280	0.143

Hypothesis 5: Participants were instructed to select the shirt and pant type they tried on for the garment fit assessment. Participants were asked to rate the overall fit of each of the garments tried on, using a six-point Likert-type scale of 0-5 (0= Very Poor; 1= Poor; 2= Fair; 3= Good; 4= Perfect; and 5= Not Applicable). The variables were recoded as (0 = N/A, 1 = Very Poor, 2 = Poor, 3 = Fair, 4 = Good, 5 = Perfect) for analysis purposes. To test hypothesis 5, descriptive statistics and ANOVA were utilized.

Hypothesis 5A: Knit shirts result in higher fit satisfaction ratings than woven shirts. The knit shirt (M = 3.87; S.D. = 1.01) resulted in a higher average fit satisfaction than the woven shirt (M = 3.40; S.D. = 1.04) as illustrated in Table 8. As expected, knit shirts proved to have better fit than woven shirts. Based on the ANOVA, there is a statistically significant difference (0.05) in fit satisfaction of the shirts between shirt types as seen in Table 9. Hypothesis 5A is supported based on these results.

Hypothesis 5B: Knit pants result in higher fit satisfaction ratings than woven pants. The knit pants (M = 3.96; S.D. = 1.04) resulted in a higher average fit satisfaction than the woven pants (M = 2.67; S.D. = 1.40) as shown in Table 8. This result supported the assumption that

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knit pants would fit better than woven pants. Based on the ANOVA, there is a statistically significant difference (0.000) in fit satisfaction of the pants between pant types as documented in Table 9. Hypothesis 5b is supported based on these results.

Table 8

Fit Satisfaction by Garment Type

	N	Mean	S.D.
Fit Satisfaction of Shirts (Post)			
Knit	30	3.87	1.01
Woven	25	3.40	1.04
Fit Satisfaction of Pants (Post)			
Knit	24	3.96	1.04
Woven	30	2.67	1.40

Table 9

Analysis of Variance in Fit Satisfaction by Garment Type

Variable		Knit Garment	Woven Garment	F-value	Significance (p<0.05)
Fit Satisfaction of Shirts (Post)	Mean	3.87	3.40	2.838	0.049
	N	30	25		
Fit Satisfaction of Pants (Post)	Mean	3.96	2.67	14.172	0.000
	N	24	30		

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CHAPTER 5

CONCLUSIONS

Summary

The Demographic and Shopping Preference Questionnaire, The Quality of Fit Assessment Based on Consumer Preferences Questionnaire, and the 3D body scans were used for data collection to compare perceived size and actual size of participants, and to determine if age, size, and garment type influence fit satisfaction. Differences between pre and post try-on fit satisfaction were determined by comparing the results of the demographics and shopping preference questionnaire and the quality of fit assessment based on consumer perceptions questionnaire. Hypotheses tested for this study were:

H_1: Consumers purchase the incorrect size garments based on their 3D body scan measurements.

H_2: Consumers will have higher fit satisfaction post garment try-on, than pre garment try-on.

H_{3A}: Younger consumers have higher fit satisfaction of shirts than older consumers.

H_{3B}: Younger consumers have higher fit satisfaction of pants than older consumers.

H_{4A}: Consumer size is an influencing factor on fit satisfaction of shirts.

H_{4B}: Consumer size is an influencing factor on fit satisfaction of pants.

H_{5A}: Knit shirts result in higher fit satisfaction ratings than woven shirts.

H_{5B}: Knit pants result in higher fit satisfaction ratings than woven pants.

Findings of the research, resulting from the data analysis, all of the hypotheses were supported except Hypotheses 3B and 4B. The results of the data analysis for hypothesis 3B showed an insignificant relationship between pant fit satisfaction and age. The relationship did exist and supported the assumption that as age increases fit satisfaction decreases, but the findings were not statistically significant. The results of the analysis for hypothesis 4B showed

insignificant differences in pant fit satisfaction between consumer sizes. Thus, size did not

significantly affect fit satisfaction for the pants and the hypothesis was not supported.

Participants were found to purchase the incorrect size garments more often than the correct size

garments, based on the results. Fit satisfaction increased post garment try-on from pre garment

try-on. Age, garment type, and size were influencing factors on fit satisfaction for shirts. Only

garment type was found to be an influencing factor on fit satisfaction for pants.

Conclusion

In response to the first research question, "Are consumers purchasing the correct size

garments based on their body measurements?" it can be concluded from the findings that no,

consumers are not purchasing the correct size garments for their body measurements. A majority

of respondents self-reported purchasing the incorrect size, which could result in dissatisfaction

with garment fit. This supports the previous research that has shown that consumers often do not

accurately know their garment size (Alexander *et al.,* 2005; Mason *et al.*, 2008; Pisut & Connell,

2007; Song & Ashdown, 2013). Consumers need to be better educated on sizing and fit in order

to have a higher fit satisfaction, and better perception of quality.

Research question two asked, "Do consumers perceptions of fit satisfaction of Walmart,

Inc. clothing improve after the consumer tries on the standard block garments?" Based on the

data the answer is yes, their fit satisfaction did increase after trying on the garments. This could

indicate that consumers' perceptions of Walmart, Inc. clothing are negatively skewed, but that if

consumers actually try on the clothing, their perceptions could be positively influenced. If

perceived quality is increased, brand perception will be improved. When consumers'

perceptions of a brand are higher, it positively impacts their purchase intentions by improving

brand equity (Kim *et al.,* 2009; Nelson *et al.*, 2011; Tong & Hawley, 2009). If Walmart, Inc. is

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able to improve their consumers' perception of their apparel quality, and therefore improve brand equity, they may be able to increase company profitability and consumer satisfaction.

The third research question asked, "What are contributing factors affecting consumers' fit satisfaction levels of Walmart, Inc.'s standard block garments?" Based on the findings, age, size, and garment type all affected fit satisfaction of the shirts. Garment type was the only factor found to significantly affect fit satisfaction of the pants. Previous research found conflicting results on how age impacts fit satisfaction (Alexander *et al.,* 2005; Cash & Henry, 1995; Frederick *et al.*, 2006; Kasambala *et al.*, 2014; Kinley, 2010; Tiggemann, 2004). From the results, age was found to correlate negatively with fit satisfaction, however the correlation was not statistically significant for pants. The results show that as age increases, fit satisfaction decreases. This supports several previous findings, which suggested that younger consumers may have a higher level of fit satisfaction (Cash & Henry, 1995; Frederick *et al.*, 2006; Kinley, 2010). Earlier research found that size influences fit satisfaction (Alexander *et al.,* 2005; DesMarteau, 2000; Frederick, Peplau, & Lever, 2006; Kasambala *et al.*, 2014; Kinley, 2010; Kwon & Parham, 1994; Shin & Baytar, 2013; Song & Ashdown, 2013). The results partially support this, because there were statistically significant difference in fit satisfaction of the shirts between sizes, but not for the pants. There has not been previous research on how garment type influences fit satisfaction, but the data showed significant differences in fit satisfaction between the types of garments. As expected, knit garments resulted in higher fit satisfaction ratings than the woven garments. This is likely due to the properties of the fabric and the style of the garments. One thing that was particularly surprising was that the knit pants were rated highest overall. Previous research has shown that pants are the most difficult garment to find proper fit in, which made it very interesting that they resulted in the highest fit satisfaction (Alexander *et*

al., 2005; Kasambala *et al.*, 2014; Kinley, 2009, 2010; Mason *et al.*, 2008; Newcomb & Istook, 2004; Pisut & Connell, 2007; Yoo, 1996).

Overall, the variable 'fit satisfaction of shirts' was impacted by the three independent variables tested, which were age, size, and garment type. 'Fit satisfaction of pants' was only significantly influenced by garment type, which illustrated statistically significant differences in fit satisfaction between the knit pants and the woven pants. Respondents were more frequently incorrect about their clothing size than they were correct. Fit satisfaction perceptions increased from pre try-on to post try-on, meaning once the participants tried on the clothing, they rated the overall fit as higher than their initial perception of Walmart, Inc. clothing prior to trying on the garments.

Limitations

There were several limitations to this study. First, approval was needed by Walmart, Inc.'s legal team for data collection methods, which somewhat limited the data that could be collected and the location of data collection. The sample was limited to only female Walmart, Inc. consumers over the age of 18 located in the mid-southern region of the United States, and participation was voluntary. Due to certain restrictions from a legal aspect, the sample size (N= 55) was small. Results from this study may not be nationally representative, and further research should be collected with an increased sample size and a more diverse population. Participants' responses may have been skewed based on any associations with Walmart, Inc.

Implications

The results from this study provide information regarding consumer perceptions of themselves, as well as of Walmart, Inc. clothing. Consumers' skewed perceptions of their garment size may result in dissatisfaction with fit because they are not purchasing or trying on

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the correct size garments. Based on these results, education of correct size selection is needed for Walmart, Inc. customers.

The increase in fit satisfaction perception from pre try-on to post try-on suggests that consumers' perceived quality of Walmart, Inc. apparel could be negatively impacting the brand equity. If Walmart, Inc. can get more consumers to try on their clothing, the perception of quality may change in their favor. If Walmart, Inc. is able to improve consumers' quality perception, they may be able to increase apparel sales and consumer satisfaction.

Age, size, and garment type all significantly impacted the fit satisfaction of the shirts, but only garment type significantly influenced fit satisfaction of the pants. This suggests that further research is needed to determine specifically how these factors influence fit satisfaction.

Recommendations

This study should be viewed as a preliminary study for future research. Further research needs to be conducted with an increased sample size, and a more geographically diverse population. A larger sample could provide more statistically significant results, or different results. The results suggest that there are different factors influencing fit satisfaction, which should be investigated further. Other major retailers should be included in future studies, based on the type of retailer. Additionally, future research is needed to include men's and junior's sizing and fit perceptions.

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APPENDICES

APPENDIX A: IRB APPROVAL

UNIVERSITY OF ARKANSAS

Office of Research Compliance
Institutional Review Board

April 9, 2015

MEMORANDUM

TO: Nicole Coury
Laurie Apple

FROM: Ro Windwalker
IRB Coordinator

RE: PROJECT MODIFICATION

IRB Protocol #:   14-08-058

Protocol Title: *Consumer Perceptions of Apparel Fit Satisfaction and Sizing Based upon 3D Body Scanning and Block Garment Assessment*

Review Type: ☐ EXEMPT ☒ EXPEDITED ☐ FULL IRB

Approved Project Period: Start Date: 09/15/2014 Expiration Date: 09/02/2015

Your request to modify the referenced protocol has been approved by the IRB. **This protocol is currently approved for 100 total participants.** If you wish to make any further modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

Please note that this approval does not extend the Approved Project Period. Should you wish to extend your project beyond the current expiration date, you must submit a request for continuation using the UAF IRB form "Continuing Review for IRB Approved Projects." The request should be sent to the IRB Coordinator, 109 MLKG Building.

For protocols requiring FULL IRB review, please submit your request at least one month prior to the current expiration date. (High-risk protocols may require even more time for approval.) For protocols requiring an EXPEDITED or EXEMPT review, submit your request at least two weeks prior to the current expiration date. Failure to obtain approval for a continuation *on or prior to* the currently approved expiration date will result in termination of the protocol and you will be required to submit a new protocol to the IRB before continuing the project. Data collected past the protocol expiration date may need to be eliminated from the dataset should you wish to publish. Only data collected under a currently approved protocol can be certified by the IRB for any purpose.

If you have questions or need any assistance from the IRB, please contact me at 109 MLKG Building, 5-2208, or irb@uark.edu.

109 MLKG · 1 University of Arkansas · Fayetteville, AR 72701-1201 · (479) 575-2208 · Fax (479) 575-6527 · Email irb@uark.edu
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APPENDIX B: SURVEY 1 & CONSENT FORM INSTRUMENT

Participant ID #_____

University of Arkansas Quality of Fit Perception Research Study

This study is designed to examine the quality and fit of specific garments based on consumers' perceptions. The study is divided into two parts. The first part will require participants to be body scanned and to complete a brief survey. For the second part, approximately 30% of the participants will be asked at random to try on a set of clothing, fill out an additional survey, and be photographed for further analysis (faces will not be shown). The participant will have to meet certain dress guidelines in order to be body scanned. Detailed information on the dress guidelines can be found on the attached handout. The participant has the right to decline participating in either part of the study. The body scan is a quick, noninvasive process with no associated risks. This research will help to identify the most important aspects of fit from a consumer's perspective, and identify common areas of unsatisfactory fit to allow for improvements to be made.

This study is sponsored by Walmart, therefore the first 100 people who participate in both the first *and* second parts of the study will receive a $5 Starbucks gift card upon completion of participation. The data gathered will be used for commercial purposes, as well as educational purposes. Participants will also have the opportunity to receive a digital copy of their personal scan if they elect to provide their email address, which will be matched with their identification code. Participation is entirely voluntary and only group data will be reported. Participant maintains the right to withdraw from the study at any time. Participants should be at least 18 years old. Both males and females are eligible to participate in the first part of the study, but only females will have the opportunity to complete the second part of the study.

All information from this study will be kept confidential to the extent allowed by applicable State and Federal law. All information will be coded with an identification number and letter to ensure confidentiality of personal data. Data will be kept in a secure location and destroyed upon completion of the study.

At the conclusion of the study, participants will have the right to request feedback about the results of the study. Participants may contact principal researchers: Nicole L. Coury, or Dr. Laurie M. Apple.

For any further questions or concerns, please contact Nicole Coury ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮) or Dr. Laurie Apple (▮▮▮▮▮▮▮▮ lapple@uark.edu), School of Human Environmental Sciences, Dale Bumpers College of Agriculture, Food and Life Sciences, University of Arkansas.

Participants have the right to contact the researchers for any concerns that they may have. Participants may also contact the University of Arkansas Research Compliance office listed below if they have any questions about their rights as a participant, or to discuss any concerns about, or problems with the research.

Institutional Review Board Coordinator Research Compliance University of Arkansas
210 Administration Building Fayetteville, AR 72701 Ph: 479-575-2208 Fax: 4795753846 irb@uark.edu

I have read the above statement and understand the purpose of this study as well as the potential benefits and risks involved. I understand that participation is voluntary. I understand that no rights have been waived by signing the consent form.

Participant Signature_____ Date_____

Body Scanning Dress Guidelines

3D Body Scanning Technology will be utilized to gather data about participants, in conjunction with surveys and photos.

3D_Body_Scanner_Risk_Assessment.pdf
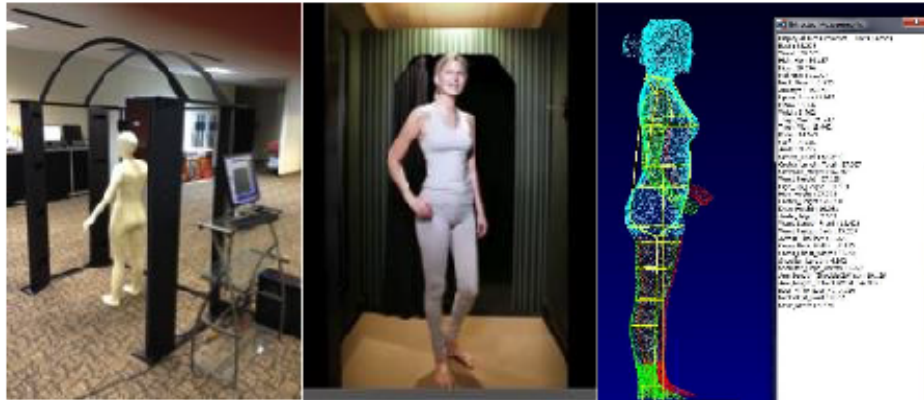
The body scan is a quick (less than 1 minute), non-invasive process from which body measurements can be extracted.

Participants will complete the surveys and body scans in a private setting. There will also be a separate private area to change clothing and to try on garments for the study.

The body scanner is about the size of a dressing room in a retail store and the body scanning area will be private like a dressing room. Participants will have privacy for all procedures involving the body scanning and the trying on of garments.

Privacy for participants will be ensured by the set-up of the scanning area and by the researchers. If a participant does not feel comfortable, accommodations will be made or they may elect to not participate.

Clothing for the scan must be form fitting and should be limited to:

1. Yoga/Exercise Pants or Shorts (fitted, no flared leg)
2. Running/Jogging/Exercise Tank or Bra
3. Fitted Camisole or Tank
4. Undergarments

Participants may elect to use the scan-wear provided by the researchers, or they may wear their undergarments or street clothing if it meets the stated guidelines. If a participant is unsure if they meet the guidelines, they may ask the researcher.

Participation in this study is entirely voluntary, and only group data will be reported. Participants may withdraw from the study at any time.

Questions should be addressed to Nicole Coury ███████████ or Dr. Laurie M. Apple (███████████

Quality and Perception of Fit Survey

Part 1: General

Please provide some information about yourself:

1. What is your current age? _____

2. How would you describe yourself? <u>Please select **only one**.</u>
   a. American Indian or Alaska native
   b. Asian
   c. Black or African American (not Hispanic)
   d. Hispanic or Latino
   e. Native Hawaiian or other Pacific islander
   f. White (not Hispanic)
   g. Other/Combination

3. What size shirt do you *typically* purchase? <u>Please select **only one**.</u>
   a. X-Small
   b. Small
   c. Medium
   d. Large
   e. X-Large
   f. XX-Large

4. What size pants do you *typically* purchase? <u>Please select **only one**.</u>
   a. X-Small/ 0-2
   b. Small/4-6 or men's 28/30
   c. Medium/8-10 or men's 32/34
   d. Large/ 12-14 or men's 36/38
   e. X-Large/ 16-18 or men's 40/42
   f. XX-Large/ 20 or men's 44/46

5. What is your height? _____

6. Which location did you participate at? _____

7. Which Walmart location do you typically shop at?

   _____

8. If you would like to have your body scan sent to you, please include your email address. This will not be linked to your name, and will be coded for confidentiality.

   _____

Part 2: Shopping Preferences

1. Which of these brands do you prefer to buy when shopping at Walmart? <u>Please select **all that apply.**</u>
    - ☐ Faded Glory
    - ☐ Avia
    - ☐ White Stag
    - ☐ Lee Jeans
    - ☐ George
    - ☐ Hanes
    - ☐ Danskin Now
    - ☐ Catalina
    - ☐ Other: _____
    - ☐ N/A (Not Applicable)

2. What qualities are most important to you when deciding which brand to buy when shopping for clothing at Walmart? <u>Please **rank your top three (3)** with one (1) being the most important.</u>
    - _____ Cost
    - _____ Fit
    - _____ Styles offered
    - _____ Availability
    - _____ Accessibility
    - _____ Brand name recognition
    - _____ Other: _____

3. How does Walmart clothing typically fit you?
    - ☐ Poor
    - ☐ Fair
    - ☐ Good
    - ☐ Perfect
    - ☐ N/A (Not Applicable)

4. What makes you choose Walmart over other retailers for your clothing needs? <u>Please select **all that apply.**</u>
    - ☐ Cost
    - ☐ Fit
    - ☐ Styles offered
    - ☐ Availability
    - ☐ Accessibility
    - ☐ Brands offered
    - ☐ Other: _____
    - ☐ N/A (Not Applicable)

Top	Pant

APPENDIX C: SURVEY 2 INSTRUMENT

Participant ID #_____

Quality of Fit Assessment Survey: Fit of top {Electronic}

Instructions: Please read carefully. Each item on this questionnaire is related to quality of fit and the overall quality of clothing. Please rate the clothing provided based on the survey questions below.

Please select the top you are rating (ask the researcher if you are not sure):
-----------Drop Down Menu of Choices: V-Neck or Button-Down----------

Rate each item on a scale of 0: very poor, 1: poor, 2: fair, 3: good, 4: perfect, or 5:N/A (not applicable)

1. Length and shape of the sleeves
     0: very poor   1: poor   2: fair   3: good   4: perfect   5: N/A
2. Neck opening
     0: very poor   1: poor   2: fair   3: good   4: perfect   5: N/A
3. Sleeve/armhole opening
     0: very poor   1: poor   2: fair   3: good   4: perfect   5: N/A
4. The fit of the sleeves on the biceps (upper arm)
     0: very poor   1: poor   2: fair   3: good   4: perfect   5: N/A
5. Fit around the midsection (stomach)
     0: very poor   1: poor   2: fair   3: good   4: perfect   5: N/A
6. The length of the top
     0: very poor   1: poor   2: fair   3: good   4: perfect   5: N/A
7. The fit of the shoulders (tightness)
     0: very poor   1: poor   2: fair   3: good   4: perfect   5: N/A
8. Fit across the chest/bust area
     0: very poor   1: poor   2: fair   3: good   4: perfect   5: N/A
9. Ability to fasten all closures (buttons)
     0: very poor   1: poor   2: fair   3: good   4: perfect   5: N/A
10. Ability to put on and take off the garment
     0: very poor   1: poor   2: fair   3: good   4: perfect   5: N/A
11. Ability to fully move your arms comfortably
     0: very poor   1: poor   2: fair   3: good   4: perfect   5: N/A
12. Coverage when you move (bend, sit, raise arms, etc.)
     0: very poor   1: poor   2: fair   3: good   4: perfect   5: N/A
13. The overall look of the top (style/shape)
     0: very poor   1: poor   2: fair   3: good   4: perfect   5: N/A
14. Overall comfort
     0: very poor   1: poor   2: fair   3: good   4: perfect   5: N/A
15. Overall fit of the top
     0: very poor   1: poor   2: fair   3: good   4: perfect   5: N/A

Quality of Fit Assessment Survey: Fit of pant {Electronic}

Instructions: Please read carefully. Each item on this questionnaire is related to quality of fit and the overall quality of clothing. Please rate the clothing provided based on the survey questions below.

Please select the pant you are rating (ask the researcher if you are not sure):
----------Drop Down Menu of Choices: Legging or China Pant ----------

Rate each item on a scale of 0: very poor, 1: poor, 2: fair, 3: good, 4: perfect, or 5:N/A (not applicable)

1. The length of the pants

| 0: very poor | 1: poor | 2: fair | 3: good | 4: perfect | 5: N/A |

2. The size and shape of the leg of the pant

| 0: very poor | 1: poor | 2: fair | 3: good | 4: perfect | 5: N/A |

3. The size and shape of the ankle opening

| 0: very poor | 1: poor | 2: fair | 3: good | 4: perfect | 5: N/A |

4. The inseam placement

| 0: very poor | 1: poor | 2: fair | 3: good | 4: perfect | 5: N/A |

5. The pocket placement and size

| 0: very poor | 1: poor | 2: fair | 3: good | 4: perfect | 5: N/A |

6. Ability to sit comfortably

| 0: very poor | 1: poor | 2: fair | 3: good | 4: perfect | 5: N/A |

7. Ability to move (bend, sit, walk) comfortably without the pants sliding down or gaping

| 0: very poor | 1: poor | 2: fair | 3: good | 4: perfect | 5: N/A |

8. Ability to put pants on and take pants off

| 0: very poor | 1: poor | 2: fair | 3: good | 4: perfect | 5: N/A |

9. Ability to fasten all closures (buttons/zipper)

| 0: very poor | 1: poor | 2: fair | 3: good | 4: perfect | 5: N/A |

10. Fit on thighs (upper leg)

| 0: very poor | 1: poor | 2: fair | 3: good | 4: perfect | 5: N/A |

11. Fit on calves (lower leg)

| 0: very poor | 1: poor | 2: fair | 3: good | 4: perfect | 5: N/A |

1. Fit on hips (widest area)

     0: very poor   1: poor   2: fair   3: good   4: perfect   5: N/A

2. Fit on waist (most narrow area)

     0: very poor   1: poor   2: fair   3: good   4: perfect   5: N/A

3. Fit on buttocks

     0: very poor   1: poor   2: fair   3: good   4: perfect   5: N/A

4. The overall look of the pants (style/shape)

     0: very poor   1: poor   2: fair   3: good   4: perfect   5: N/A

5. Overall comfort

     0: very poor   1: poor   2: fair   3: good   4: perfect   5: N/A

6. Overall fit of the pants

     0: very poor   1: poor   2: fair   3: good   4: perfect   5: N/A

— Last Page —

This concludes the survey for this study. Thank you for your participation!