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APPAREL SIZING AND FIT FOR GIRLS: VARIATION OF SELECT COMPANIES, AND PARENT OPINIONS

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APPAREL SIZING AND FIT FOR GIRLS: VARIATION OF SELECT COMPANIES, AND PARENT OPINIONS

THESIS

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Retailing and Tourism Management in the College of Agriculture, Food and Environment at the University of Kentucky

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ABSTRACT OF THESIS

APPAREL SIZING AND FIT FOR GIRLS: VARIATION OF SELECT COMPANIES, AND PARENT OPINIONS

The act of shopping for girl's clothes is a delight of most parents. It ignites the pleasure of being a parent. However, many parents and their girls have experienced the frustration of inconsistent sizing and fit of their girl's clothes across brands. The purpose of this study was to understand the sizing and fit problems of girls ages 7-12 and to evaluate how brands utilize the current sizing standards. A structured questionnaire was used to collect data from a population of 150 (N=150) female parents. A survey was administered to help gain a better understanding and assess parent opinion of sizing and fitting problems for girls age 7-12 when shopping for jeans. Laboratory measurement was taken from 12 jeans samples brands category. This study compares and contrasts the sizing and fit of the four popular brands of girl's jeans boot cut groups: Children's Place, Gap, Levi's, and Old Navy. The study also evaluates the published ASTM (American Society for Testing and Materials) standard of the body dimensions of girls wearing the size 12 and compares the measurements to the online size chart. In addition, an examination and the evaluation of the study were to measure the physical jeans in various locations to assess if it conforms to the ASTM standard (ASTM chart) and to discover any variations of the same size 12 jeans to determine any fit and sizing issues.

KEYWORDS: Companies, Body Measurement, Fit, Girls (7-12), Jeans, Sizing.

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May 08, 2020

APPAREL SIZING AND FIT FOR GIRLS: VARIATION OF SELECT COMPANIES, AND PARENT OPINIONS

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DEDICATION

I dedicate this thesis to my mother, who did not abort me but chose to give me a chance to live. I love and appreciate all your sacrifices and teaching me how to read.

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I am grateful to God Almighty for all He has done in my life. This is the LORD'S doing; it is marvelous in my eyes.

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Chapter One

The global market for children's wear is growing with the United States in particular expected to expand, but issues remain around size and fit. In 2017, the global children's wear market was worth approximately 203.4 billion U.S. dollars, and the designer's kid's wear market around 5.89 billion U.S. dollars according to data from Statista (Bedford, 2019). The market is forecast to reach the U.S. $339 billion by 2024, according to Global Industry Analysts (GIA).

For retailers, growing kids equates to increasing sales. The United States children's apparel market expected to reach $70.1billion (34% of the global market) by the end of 2018. So why then has there not been a data-led review of kid's apparel sizing standard in decades? (Statista, 2018). In the United States, parents and grandparents of children reported spending an average of $883 in the spring of 2008 and an additional $1,085 in the fall of 2008 on their teen apparel (Teen spending shifts, 2009). More recent research conducted in 2012 found U.S. family members spent an estimated $208.7 billion a year in purchases for teens (Teenage consumer spending, 2013).

By the time girls reach age six or seven, a sociocultural factor seems to start influencing body dissatisfaction. Body shape changes around this time and, therefore, parents have a hard time when trying to find jeans that fit. By the time girls are in grade school, 40% of elementary school girls want to be thinner. By late elementary school, 50% of girls are dissatisfied with the fit, sizing, weight, and shape and have developed pervasive negative body esteem about fit and sizing. By the end of elementary education, body esteem for girls starts to diverge and remains different throughout the life span. By middle school, 40-70% of girls are dissatisfied with the sizing and fit of their clothing. (Gallivan, 2014)

Background Problem

Fit in a garment is an essential factor that contributes to the confidence and comfort of the child. Well-fitted clothes are considered vital to an individual's psychological and social well-being (Smathers and Horridge, 1978-79). Fit problems continue to be an issue for apparel manufacturers and retailers with no clear resolution. Fit is also a criterion in a consumer's evaluation of apparel products. According to Kurt

Solomon Associates (Kurt Solomon Associates 2000), 50% of women and 62% of men could not find a good fit in apparel. When it comes to children, there are a high percentage of consumers with frustration in clothing sizing and fit. Clothing plays an integral role in the "look" of childhood in every era. Poor-fitting clothing contributes to the perception of an imperfect body and body dissatisfaction (Labat &DeLong, 1990). A consumer's satisfaction with a garment's fit involves the direct relationships between the body, garment dimensions, and the expectations that the wearer has for how a garment should fit. The latter, termed ''fit preference,'' is difficult to measure because it involves individualized perceptions. A consumer may think a garment does not fit even when there is customized fit using 3D body scanned measurements or when a fit expert deems it to be correct (Ashdown & Dunne, 2006; Ashdown & O'Connell, 2006). As most harassed mothers know, size 5 in a little girl's dress can mean almost anything," wrote Katherine Graham in a 1948 Washington Post.

The reason that clothes often do not fit children well is that the sizing system used to manufacture their clothing is not based on a scientific understanding of body shapes and sizes of this group. Children's clothing needs to be functional to accommodate growth, provide comfort, promote safety, and foster a sense of independence (Norsaadah Zakaria, 2011). A goal of the 20th-century mass production and mass distribution systems was to provide apparel for "everybody" (Kidwell & Christman, 1974). However, this has not been the same for children. A research report from ScrapeHero shows that Girls had the second-highest number of products at 9.30k, followed by boys at 7.4k.

Children overgrow quickly, and therefore they have a wide variety of body shapes and sizes. While knowing the child's age is usually easier than knowing his or her height and weight, many children are not in the size that corresponds to their age. The most reliable source for the apparel industry, ASTM D192/D6192M - 19 (Standard Tables of Body Measurements for Girls, Sizes 2 to 20 (Reg. & Slim) and Girls Plus was developed from data published by the U.S. Department of Commerce. The data was based on original research conducted by the U.S. Department of Agriculture2 in the 1930s. The ASTM standard tables take into consideration children's growth patterns reflected in the 1980 charts for the National Center for Health Statistics and the 1977 Anthropometric

study of U.S. Infants and Children conducted by the University of Michigan (Snyder, 1977). ASTM (American Society for Testing and Materials) standards for children's apparel products have little, if any, relationship to real data because of insufficient information on current body dimensions of children. Problems of clothing sizes and fits are commonly reported in the United States.

Children were deemed too difficult to measure either with 3D body scanners or with traditional tape measurements in the national sizing projects. Therefore, there was no way to portray the shapes of the current children's population. Basing the size system on age alone also results in poor representation of actual body dimensions and shapes. Several studies have revealed that children of similar ages may have varying height, shape, and body proportion. Otieno demonstrated that 50% of children did not fit into clothes designed according to the age system. Methods of sizing nomenclature that does not have proper identification also mislead consumers in the selection of well-fitted garments. Research has found that female children face the most problems when it comes to mass-produced clothing as their body shape changes towards entering adulthood. Alexis DeSalva, Retail, and Apparel Analyst, Mintel states, "Retailers need to consider parents' and children's style preferences, especially as kids play a big role in purchase decisions. Those that capture the attention of parents and their kids have a chance to encourage additional self-purchases from parents and retain children as loyal customers when they transition to independent shoppers."

Purpose of Study

The purpose of this study was to understand the sizing and fit problems of girls ages 7-12 and to evaluate how these brands utilize the current sizing standards. The study categorizes four jeans brands and compares sizing and fit to ascertain if it conforms to the ASTM standard.

Research to date provides a limited understanding of consumers' perceptions of clothing fit of jeans for girls because of the complexity of assessing fit; individuals have varied opinions of fit affected by many factors, including body image, body cathexis, and personal comfort preference (LaBat, 1987; Pisut & Connell, 2007), aesthetics (Pisut & Connell, 2007) and current fashion trends, age, gender, body shape, and lifestyle (Brown

& Rice, 2001). In 2016, young consumers spent $560 billion overall and $19 billion on clothing and shoes (Refuel Agency, 2017)

Young consumers reported that retailers (Dickerson, 2003) often ignore their special needs. According to Dickerson (2003), both manufacturers and retailers of children's wear have made more effort to serve this market, recognizing its vast buying power. Current children's body dimensions are considerably different from those of the past. Ever since custom clothing gave way to ready-to-wear, standard sizing has never been standard. Children grow at different paces and in different ways. Because of this, most clothing manufacturers tend to use their sizing guidelines, designing for specific demographics. Children in different age groups have widely varying physical, social, and psychological requirements for their clothing. (Norsaadah Zakaria, 2011). When it comes to fabric preference for their child's clothes, cotton is the preferred fabric overall. Additionally, 71 percent of parents prefer cotton for their kids' bottoms, whether its pants, leggings, denim jeans or shorts.

Research Objective

1. To assess parent satisfaction/dissatisfaction with girl's jeans.
2. To evaluate the ASTM (American Society for Testing and Materials) standard of the body dimensions of girls wearing the size 12 and compare the measurement to the online size charts for girls of four major brands of jeans.
3. To evaluate the measurement of jeans from four major brands of girl's jeans and compare the measurements from brands to brands.

Research Questions

1. How dissatisfied/satisfied are parents with sizing and fit of children's clothing?
2. Are major brands following the standard sizing for body measurements of children's clothing?
3. Are there differences in the sizing of the four brands in size 12?

Justification

Parent's complaints on clothing predominantly focus on sizing and fit for their girls. Parents are struggling to find the right size and fit for their girls because of body image and self-esteem at a younger age. However, a few passionate entrepreneurs think

shopping for clothes should not contribute to the problem. There is a significant change in children's growth between ages 7-12. Ages 7 and 12 have substantial differences in body dimensions and shapes. Since body size varies with little conformance to a so-called "average child," it is difficult to make garments for an eclectic population that is getting healthier but also sedentary (Le Pechoux and Ghosh, 2002).

Parent's frustration would be minimizing by finding the right sizes for their children. As of now, there is no universal child sizing standard that every country and all clothing brands are required to follow. In the United States, different brands have their own set of standards for kids' size charts, and most brands take liberties in how they follow them. It is evident that current sizing system standards for girls age 7-12 for contemporary children's wear are not standardized; it is voluntary. Thus, the brand chart guide should be updated to be able to relate to the present children's wear industry. Brunn (1983) states that "all body measurement charts need to be checked and revised in ten years cycles to keep up with all changes in the characteristics of the population."

Children's clothing manufacturers and retailers would be able to produce children's clothing to fit their body types, proportions, and shapes. Therefore, it is necessary to evaluate the size, fit of jeans and determine whether the selected brands follow ASTM published standard regard to the brand's size chart. The results of this research evaluated four brands of jeans to notify the variation among brands. The results contributed to consumers' knowledge of the influence of brands on perceived size and fit among brands in clothing purchasing decisions.

Assumptions

Girl’s body shapes and sizes may differ significantly in the same age category. Girls also grow at different paces and in different ways. In the United States, clothing sizes are primarily based on age, but as the child grows, height, weight, hip, and inseam of the girl also come into play. It is the assumption that a girl’s age could determine the clothing sizes since more clothing is purchased as a gift from grandparents or other family members. While knowing the child's age is usually easier than knowing her height and weight, many children are not in the size that corresponds to their age. Clothing sizing has never standardized since custom clothing gave way to ready-to-wear (Gersak, 2013). Moreover, clothing manufacturers tend to use their sizing guidelines, so there is no

"standard" when it comes to size labeling and what measurements the clothing is designed to fit. Brands try to cater to their intended customers and design their products to suit that customer group's characteristics (such as typical measurements and body types), as well as their needs and wants (design features, styling, materials, snd pricing,). Size guidelines are just one way that brands can distinguish themselves, and most times, it is very misleading. In this research, it assumes there are differences or variations in the same size 12 jeans between brands.

Limitation

The study was conducted with a large sample of parents and guardians who were the sole purchaser of girl jeans in the United States of America, and participation was voluntary. There are a ton of girl's jean manufacturers in America and other countries. To sort through them and indeed find the best ones for this study, we had a limitation of evaluation criteria in fit, style, Consumer literature, post feedback, and a five-star category but with few negative ratings. The findings are not generalizable to all-girls' regular boot-cut jeans in size 12 in the United States. With in-depth analysis, the study is limited to four brands, due to the choice of research design.

Chapter Two

Literature Review

Apparel Sizing and Fit for Children has been a significant concern in recent years. Due to technological advancement in the ready to wear online shopping experience, consumers and parents are increasingly calling upon apparel companies to take responsibility for a second look at the standard measurement by the ASTM. It is imperative to sum-up and looks into a fit in the ready to wear in the children's industry. Next, the concept of "ready-to-wear" and "fit" is defined concerning the children's apparel industry. Additionally, problems of fit in children's apparel as it relates to children's sizing, in general, are also revised. Moreover, the chapter will explore and analyze the sizing standards, history, and the current state of sizing standards. The study will focus on sizing in children's brands in the numerical, letter, and one fits all sizing. Lastly, the international sizing of children's clothing and online ordering in children's size and fit problems would be review.

Overview of the Children's Wear Apparel Industry

Ready-to-wear in Retail Management is clothing made in a series of standard sizes, rather than made to fit the exact measurements of individual customers. In this sense, the "Ready to Wear' term became factory-made clothing, sold in finished condition in standardized sizes, as distinct from made to measure clothing tailored to a particular person's structure. Most children's ready-to-wear clothing aims to provide a reasonable fit for different body shapes (Tamburrino, 1992; Winks, 1997). In 2018, Carter's, Inc. had net sales of approximately 3.46 billion U.S. dollars worldwide, an increase from around 3.4 billion U.S. dollars in 2017 (O'Connell, 2019). Early this year, statistic shows the net sales of The Children's Place worldwide from 2013 to 2018. In 2018, The Children's Place had net sales of approximately 1.94 billion U.S. dollars worldwide, an increase from around 1.7 billion U.S. dollars in 2015 (O'Connell, 2019).

Today, the children's clothing industry is more inconsistent in the sizing of garments than ever before. New sizing methods have been developed, and the utilization of computers in the garment industry has implemented these new techniques possible (Brown, 1992). Size categories were developed to provide children with a better fit. The

sizes within these categories were separate systems and corresponded with the bust/chest measurement and age. Standard grading practices assume that as one measurement increases, a corresponding measurement increases, and that as a child moves from one graded size to another, they get taller and heavier (Connell & Ulrich, 2005). Statista says the baby and young children's apparel market in the United States was valued at $21 billion in 2018. In addition, with all the effort to appease their kids, American parents have made the U.S. the largest consumer of children's apparel, with 21 percent of the global market, according to web data, provide ScrapeHero.

According to the Children's wear Study, mothers are more prone to being thrifty. At the same time, fathers like to express their sartorial side when picking out kids' clothes. Overall, the top inspiration for purchase comes from what is requested by the child (69 percent), (Mintel, Cotton Incorporated, 2019)

Sizing in Children's Wear

The problem of what size to make and how to size-label garments have existed since clothing was first mass-produced (Minks, 1992). Several suggestions have been offered for standardized sizing. The first in the United States was the voluntary commercial standard in the 1940s (U.S. Department of Commerce, 1958). More recently, the International Organization for Standardization (ISO) has developed a new "open" sizing system (Minks, 1992). However, none of the suggestions for standardization of garments has been successfully implemented into the U.S. garment industry.

In the past 30 years, the International Organization for Standardization (ISO) has developed a size labeling system in which body measurements of key dimensions are listed (Chun-Yoon & Jasper, 1994). Some countries have adopted this system, which uses pictograms to indicate measurements.

However, many countries, including the United States, do not utilize this size labeling system. Numerous researchers have identified two issues that prevent apparel companies from solving their fitting issues: the lack of information concerning fit needs for different body sizes and shapes, and the lack of current anthropometric data for niche markets within the civilian population (Ashdown et al., 2005; Bouchez, 2011; Brock et al., 2010; Clifford, 2011; Connell & Ulrich, 2005; Connell, Ulrich, Brannon, Alexander,

& Presley, 2006; Devarajan & Istook, 2004; Faust, Carrier, & Baptiste, 2006; Goldsberry, Shim, & Reich, 1996; LaBat & DeLong, 1990; Schofield, Ashdown, Hethorn, Labat, & Salusso, 2006; Schofield & LaBat, 2005; Shin & Istook, 2007; Simmons, Istook, & Devarajan, 2004; Tongue, Otieno, & Cassidy, 2008; Workman & Lentz, 2000).

Garment sizing for children is mainly based on age, height, and weight, and an average annual height interval of about 6cm has been observed and is generally utilized in the industry (BSI, 1990a, b; DOB – Gro¨ssentabellen Deutschland, 1994; Tanner and Whitehouse, 1996).

Age. Age alone may not indicate the body dimensions and shape varieties and is, therefore, unreliable (Kunick, 1984; Winks, 1997). Further, children of similar age may have varying height, shape, and body proportion (James and Stone, 1984); for example, smaller children may have a larger stomach (Mortimer-Dunn, 1996). Over half of the children did not fit into the clothes designed for their age (Michelle Ann Tongue, Rose Otieno, Tracy Diane Cassidy, (2010. "These findings concur with Jaffe (1979), Kunick (1984), and Le Pechoux and Ghosh (2002), who states that all children will not necessarily fit in a garment meant for their age. However, age should not be completely ignored, as it is a simple, easy to remember code and acts as a starting point for selecting the right size. Children's garments are often bought as gifts where age is the only known factor. James and Stone (1984) suggest that most parents or customers would know the age of a child. Girls' clothing and follow the same sizing parameters from ages 4 to 6, then split, as the sizes no longer coordinate with age.

Body Measurement. Specialist knowledge is required to analyze body measurements from anthropometric surveys statistically, calculate control measurement, size ranges, body proportions, and size intervals (Beazley, 1997, p. 260; Otieno, 1999). However, the major problem with all size charts and anthropometric data is that people's bodies continuously change due to factors such as diet changes, physical exercise, and migration, which make the measurements obsolete (Jaffe, 1979; Tamburrino, 1992). There is vast variation in shape and size (Le Pechoux and Ghosh, 2002). Since body size varies with little conformance to a so-called "average child," it is difficult to make garments for a general population that is getting healthier but also sedentary (Le Pechoux

and Ghosh, 2002). Brunn (1983) states that "all body measurement charts need to be checked and revised in ten years cycles to keep up with all changes in the characteristics of the population."

Weight. There will always be fit problems with children's clothing as their bodies vary so much in height and weight at any given age, according to their genetic heritage, nutritional habits, and other environmental influences (Jaffe, 1979; Kunick, 1984; Tamburrino, 1992). A rapid rise in weight is most obvious in girls age 7-12; during these times; a tremendous amount of growth takes place in a short time. Nevertheless, growth spurts can occur later, too, though they are usually less noticeable.

When surveying the growing bodies of children, it is mainly the size of the child's skeleton with its age and weight that will be measured. (Renata Hrzˇenjak, Ksenija Dolezˇal and Darko Ujevic´, 2015). The changes in the weight and shape of the population, as well as changes that occur as consumer's age, must be taken into consideration by retailers to meet the needs of their consumers (Alexander et al., 2005; Newcomb & Istook, 2004).

Height. Height is the preferred method of sizing children's clothes as it aids the consistency of pattern grading, and it conforms more readily to children's development. Size charts utilized in the USA and UK also indicate height as a critical dimension. Further, children of similar age may have varying height, shape, and body proportion (James and Stone, 1984), for example, smaller children may have a larger stomach (Mortimer-Dunn, 1996). The one basic principle of a sizing system on which there was agreement was that it must be three dimensional in structure by using the bust girth, waist girth, hip girth, and stature as the main control measurements (Jane E. Workman, 1991).

According to Workman and Johnson (1990), "A sizing system must take into consideration three factors: the number of sizes it should contain, the intervals between sizes, and cover the maximum number of women with the minimum number of sizes". The determination of a sizing system to fit these qualifications often includes the key dimensions of bust, waist, hip, and stature. Based on company proportional theories, manufacturers often develop company-standardized patterns and designate the sizes according to the bust measurement (Workman, 1991).

The measurements associated with a certain size designation vary between manufacturers and within the manufacturer's production over time (Chun-Yoon & Jasper, 1994). Sizing may vary between different lines and from year to year depending on the fashion silhouettes; the companies fit models, and the image of the American children (Workman, 1991). An average of 2 to 3 inches and 3 to 7 pounds each year. Much of the new height comes in the legs, giving the child a leaner, more elongated appearance. (BabyCenter Staff November 25, 2018).

Sizing Standards for Children's Wear

Individual manufacturers in the USA developed their sizing systems until the first sizing standard was published in 1958. In this year, the United States Department of Commerce published Commercial Standard CS 215-58 as a voluntary sizing standard for the apparel industry. The sizes were based on measurements from a 1941 anthropometric study and were divided into different size categories. Sizes in the range were based on age, height, and weight in children's measurements.

Internationally, attempts have been made to design sizing systems utilizing height and body shape. However, these have been formulated for the adult female figure and not the growing adolescent figure. In 1970, a new standard, PS 42-70, was published that incorporated additional anthropometric data from an army study. Both the CS 215-58 and the PS 42-70 sizing standards are based on an assumption of proportional body measurements (Chun-Yoon & Jasper, 1993). Once the population is divided into the various sub-groups, the sizes are identified by bust circumference. All other body dimensions for each size are then generated so that they remain proportional to the bust circumference, which results in a sizing system with a linear relationship between sizes. (Susan P. Ashdown, 1997). The world's population is more mobile than at any other time in history. Many developed countries, such as the U.S. and Great Britain, have populations with diverse ethnic roots and anthropometric measurements due to immigration (Simmons et al., 2004).

Current State of Sizing Standards

Currently, different manufacturers use the size designations for clothing that fits different body measurements. Because of the confusion about size designations,

consumers must try on multiple garments to discover which ones will fit their particular body size and proportions (Susan P. Ashdown, 1997). In the U.S., however, the current sizing system for apparel product development is based upon one body shape, the hourglass (Pisut & Connell, 2007). Pisut & Connell, argue that although anthropologists and demographers study the effects of weight gain on the shape, little of that research has been applied to improving the sizing and fit of apparel in the U.S. In addition to government statistics from the National Bureau of Standards (now the National Institute of Standards and Technology), manufacturers rely on customer surveys, body form companies, and retailer specifications for information to guide them in formulating body measurement specifications for their size charts (Amster, 1985; McVey, 1984). Because results of customer surveys depend on the customers surveyed, and because specifications vary from retailer to retailer, there are widespread differences in measurement specifications for any given size from U.S. apparel manufacturers. Several attempts have been made at standardization, but the variety of sizes and body types in ready-to-wear has interfered with the development of standardized sizing (Price & Zamkoff, 1974). This standardized size, however, assumes an average body weight for its height (Keiser & Garner, 2008).

The American Society of Testing and Materials (ASTM), committee D 13.55, was formed to develop new voluntary standards for the industry (Ashdown, 1997). The goal was to design optimized sizing systems that can be directly compared to ASTM. The American Society of Testing and Materials (ASTM) have developed a new voluntary standard for the apparel industry. The current ASTM size charts have been based on anthropometric measurements dating to the 1940s. They do not reflect the current size, shape, and ethnic diversity present in today's marketplace (Devarajan & Istook, 2004). To date, there has never been a comprehensive sizing study of the U.S. civilian population published (Bye et al., 2006).

In the United States, ASTM standards have been adopted, by incorporation or by reference, in many federal, state, and municipal government regulations. The National Technology Transfer and Advancement Act, passed in 1995, require the federal government to use privately developed consensus standards whenever possible. The Act

reflects what had long been recommended as best practice within the federal government. Other governments (local and worldwide) also have referenced ASTM standards. Corporations doing international business may choose to reference an ASTM standard. ASTM International has no role in requiring or enforcing compliance with its standards. The standards, however, may become mandatory when referenced by an external contract, corporation, or government.

Although ready-to-wear garments have been produced for over 150 years, the technical issue of garment fit has never been adequately addressed (Ashdown & Dunne, 2006). One of the most difficult challenges facing the apparel industry today is the ability to provide well-fitting garments to a broadly defined target market (Ashdown, Loker, & Adelson, 2005). In 2010 alone, poorly fitting garments were a significant contributor to the $198 billion of apparel returns (Clifford, 2011). In the same way, an anthropometric study performed in USA Faust and Carrier (2010) to update the sizing ASTM standards also concluded that a 54% of the population was not satisfied with the fitting of the ready to wear (RTW) cloth (Bye, LaBat, McKinney, & Kim, 2008).

In the U.S., the first recorded attempt at standardizing apparel sizes was during the Civil War. Between the years of 1861 and 1865, soldiers were measured, and the results compiled into size charts enabling the mass production of uniforms (Brown & Rice, 2001). O'Brien and Sheldon conducted further research in 1941 when measurements were taken from 10,042 adult female volunteers (O'Brien & Sheldon, 1941). The data were then updated by the U.S. Department of Commerce (1970). These studies became the basis for the current sizing system published by the American Society for Testing and Materials (Devarajan & Istook, 2004).

Sizing of Children's Brands -Individual Companies Sizing Variations

Many manufacturers have found that slight variations from measurements contained in size charts are required for their garments and their customers (Handford, 1980). Although size charts provide norms for garment fit, they have been a source of confusion and dissatisfaction amongst consumers. This is because, even within the same retailer, there can be a variation of actual measurements in garments, which are labeled with the same size code.

There is even more, size variation amongst different retailers. Norum (1995) suggested that clothing retailers and manufacturers had to seek ways of satisfying consumer needs and wants, including those of children. Children's wear is unique in that the purchaser of the clothing product is typically not the wearer. Customer satisfaction with children's wear is therefore unique, since the adult's satisfaction may be analyzed. Norum (1995) found out that fit was significant, and fit-related problems led to customer dissatisfaction. Most of the time 'for those parents with a hard-to-fit child, sizing becomes of great concern.' The key to creating customer satisfaction is the provision of adequate size and fit (Norum, 1995).

In size-chart specifications, it is clear that companies made similar products; their size charts varied greatly in measurements and selected dimensions for the same product. Companies used varying key dimensions on the garments. The chest girth was used as the key dimension for the blouse. While all companies used the chest as a critical dimension for the dress, ten companies also used the hip, and eight companies used the height. Sizing of clothing that offers satisfaction may, therefore, provide a competitive advantage.

Numerical, Letter, and One Size Fits All in Children's Clothing. ASTM D6192-07 tables list body measurements of girl's sizes. Although these are body measurements, they can be used as a baseline in designing apparel for girls in this size range when considering such factors as fabric type ease for body movement, styling, and fit. The maximum age for the Girl's chart is 12 ½ years old to the size 20. The tables list body measurements for the complete range of Girls sizing. Slim subjects are of the same stature (height), with a slimmer body, and lower body weight than regular subjects, as illustrated by the measurement charts. The values stated in either acceptable SI units or inch-pound units shall be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system must be used independently of the other, without combining values in any way. This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations before use (ANSI, 2019).

Types of Size Versus Age 7-12. Many sizing systems for children were developed by referring to adult sizing systems. Several studies have revealed that children of similar ages may have varying height, shape, and body proportion. One of them also demonstrated that 50% of children did not fit into clothes designed according to the age system. Methods of sizing nomenclature that does not have proper identification also mislead consumers in the selection of well-fitted garments. Thus, it now seems clear that relative judgments are entirely within children's grasp by age 3. (Karen S. Ebeling and Susan A. Gelman 1988).

On average, maturity in growth is reached at the age of 17.4 years for females. It was suggested by Winks that, according to studies on USA populations, at age two, the child has reached about one-half the adult standing height. At age seven, their arms are 25% longer, but adults' arms are 28% longer (Renata Hrzˇenjak, Ksenija Dolezˇal, and Darko Ujevic´, 2015).

Fit in Children's Clothing

Ryan (1966) understood that the first prerequisite for clothes, from a very young child, is that they do not restrict his movements" (Ryan, 1966). Comfort was of the utmost importance. One way to achieve comfortable clothing was to ensure that they fit correctly. "Clothing, which is too tight, may cause discomfort as well as restricting bodily movements." Before 1920s children's garments were produced at home, custom made for each child, with the advent of mass production, however, children's clothes were no longer made to fit individual bodies but rather to fit whichever body dimensions in particular.

As each factory sizes its garments according to its standards, it became apparent that a standardized sizing system was needed. Therefore, O'Brien and Girshich recorded and analyzed the body measurements of children throughout the United States (O'Brien and Girshich, 1939). In 1968, all major American pattern companies introduced new standard body measurements for both children and adult patterns (Sharpe, 1969). Bixby (1967) states that "authorities agree that no matter how fashionable the design, or how becoming the color, regardless of the cost, fit is of the greatest importance in the final evaluation of a garment." Rosen (1983) reported that fit in children's clothing is just not

important. She states that the only fitting required is to tighten elastic in the waist or lengthen the hem. However, there are others such as Jaffe (1972) who realize that preschoolers are very aware of their clothes and acknowledge that one reason a child may refuse to wear a garment is an uncomfortable fit.

There is no precise definition of fit in children's apparel sizing. However, it is clear in the literature that fit can be influenced by the fabric, the style, and the current fashion. (Newbatt, 1991). Stamper, Sharp, and Donnell (1986) state that "Although good fit in an item of apparel is considered by some as elusive, changing, and susceptible to personal opinion, garments that are fitted will have the following characteristics: they are comfortable to wear; allow sufficient ease for freedom of movement; are consistent with current fashion; and are free of undesirable wrinkles, sags, and bulges" Erwin's (1950) standards for judging fit are probably the most quoted. These include grain, set, line, balance, and ease. The grain is the line of the fabric running perpendicular or parallels to the floor. The set is the absence of wrinkles. Balance is the appearance of the body being centrally located within the garment. All these add to the pleasing appearance of the garment. The line of the garment, or how the structural seams follow corresponding body silhouettes and suitable ease, which makes a garment neither too tight nor too loose, both contribute to the comfort and ease of movement in wearing a garment. Saladino's (1970) work examined the fit of pants.

According to Saladino, the comfort must not only be in movement, but sitting ease and the crotch must be neither too tight nor too loose. Erwin (1969) supports this by stating that the crotch must be high enough to prevent sagging, low enough for comfort.

Body size is likely a determining factor in satisfaction with body image, which affects self-esteem (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).

Fit dissatisfaction is a commonly stated problem associated with apparel purchases (Alexander et al., 2005; Kinley, 2009; Newcomb & Istook, 2004). Additionally, the mood the wearer wishes to communicate with apparel will affect her

behavior, whether this trait is consistent with the wearer's personality or she is experimenting with a desired or ideal personality (Moody, Kinderman, & Sinha, 2010).

If a consumer is not satisfied consumer believes that the retailer is to be blamed for their disappointment, and 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. Probably one of the best known of the wasteful and archaic practices, which can still be found at times despite our scientific progress in the industry, is how ready-to-wear clothing is marked for size.

In a study of returned goods made by Ada Lillian Bush of the U. S. Department of Commerce, women and children's clothing accounted for over 40 percent of the merchandise returned. For all merchandise, the reason for the return given most frequently was the wrong size. The majority of consumers stressed the lack of uniformity in measurements and proportions of similar products produced by different manufacturers.

At present, definite plans have been formulated for a scientific study of body measurements to be conducted under the supervision of Ruth O'Brien, of the U. S. Bureau of Home Economics. The project calls for the measurement of 100,000 children of both sexes at 11 age levels, 4 through 14, in eight selected regions of the United States. With the idea of using this study to establish an "American Standard" for sizes of children's garments, a sectional committee has been set up by the American Standards Association. A staff of statisticians and trained anthropometrics is supervising the fieldwork of the study. If the results of the study prove that a system of scientific body measurements provides a more practical and usable basis for children's clothing patterns and sizes than present methods, there will then be a good reason to expect that the same technique, when applied to the solution of the sizing problems in adults' ready-made clothing, will be successful. B. S. YANE. (Industrial Standardization, Vol. 9, No. 4.). Overall, more than 4 in 5 U.S. consumers (83 percent, up significantly from 71 percent in

2018), say they would like brands and retailers to offer additional fits and sizes, according to Monitor™ research.

Fit is a common reason given for returns. Several manufacturers stated that standardization would be beneficial in return situations with retailers. If standards were utilized, the manufacturers would have some recourse to defend themselves against this problem with the returned merchandise. These benefits were revealed as the appealing side of a standardized size scale for apparel manufacturers. Manufacturers would appreciate some of the structure and consistency that a standardized size scale for apparel manufacturing would bring to their business. However, manufacturers were still skeptical and found many reasons why they would only appreciate a suggested standard, not an enforced standard.

Consumer satisfaction with the shopping experience and quality of children's garments is directly related to sizing and fit problems, and clothing marketers have to develop strategies to increase satisfaction (Norum, 1995). A significant factor for dissatisfaction with fit is the variation of what good fit is; this is widely varied and complex. In the U.S., parents, and grandparents of children reported spending an average of $883 in the spring of 2008 and an additional $1,085 in the fall of 2008 on their teen apparel (Teen spending shifts, 2009). More recent research conducted in 2012 found U.S. family members spent an estimated $208.7 billion a year in purchases for teens (Teenage consumer spending, 2013). However, the U.S. is not the only country where teen apparel purchases continue to be financed by extended family members. Several studies in other countries support this fact. Satisfaction or dissatisfaction with one's body is a key determinant in apparel preferences (Alexander, Connell, & Presley, 2005; Kaiser, 1990). A good fit is an essential element of customer satisfaction (Marshall et al., 2004), and poorly fitting garments accounted for a significant amount of the $198 billion of apparel returns in 2010 (Clifford, 2011).

According to Michelle Ann Tongue, Rose Otieno, Tracy Diane Cassidy, (2010), a significant factor for dissatisfaction with fit is the variation of what good fit is; this is widely varied and complex. It is, therefore, difficult for any given manufacturer or retailer to get all the perceptions correct all the time. The perceptions of good fit range from a

desire for a garment to conform loosely to the body to provide comfort, improvement of appearance to a whole range of other psychological comforts, and appearance issues (Frost, 1988).

Online Ordering: Girl's Size and Fit Problems. Online shopping is growing in the United States and represents 4.7% of the total retail trades in 2011 (U.S. Census Bureau, 2013) and might grow to 10% in 2017 with an average annual growth rate of 9% (Forrester, Mulpuru, Johnson, & Roberge, 2013). Moreover, brick and mortar retailers tend to add online retailing to their activities, and people are more and more digitally connected (U.S. Census Bureau, 2013) and find online shopping more convenient than traditional shopping.

In today's digital society, parents are more informed than ever before about where what and how they buy their children's clothing and purchasing online is no different. They are increasingly using digital tools to supplement their in-store shopping. Millennial parents, in particular, appreciate these highly convenient services. Parents are active online shoppers, and their varied needs cause them to shop a variety of items and retailers. Their reasons for buying are also intentional, to fulfill the sizing and fit issues with a desire to save time and money, creating loyalty challenges for retailers.

A research-savvy cohort, more than three in four parents, agree that the internet has changed the way they get information about products and services, according to a February 2019 release from Simmons Research. Besides, as technology evolves, these parents have more diversified digital tools at their disposal.

Online shopping is growing so fast that in the U.S. alone, the online shopping market size is expecting to have 300 million online shoppers in 2023. That is 91% of the entire country's population! So far, 69% of Americans have shopped online, and 25% of Americans shop online at least once per month. The majority (59%) of these shoppers bought clothing items.

According to an October 2019 survey of U.S. online users, 70 percent of respondents stated that competitive pricing was the most crucial factor that influenced them to shop with a particular online retailer. A further 62 percent of respondents

reported that when shopping online, free shipping was also a significant consideration when picking a retailer to buy from. (Clement, 2020)

Summary

According to an industry survey, parents spend two-thirds more money shopping online and three-quarters more time shopping online than their non-parent counterparts do. (Plante, 2017). Finding the same fit from one children's clothing brand to another is almost impossible, even when the labels say the same size. Many children aged (7-12) may try on two or four pairs of a size ten jeans in the same brand because they all fit differently.

Clothing manufacturers tend to use their sizing guidelines, so there is no "standard" when it comes to size labeling and what measurements the clothing is design to fit. The use of the body measurement information by ASTM D6192 / D6192M - 19 for girls sizes 2 to 20 (Regular & Slim) and Girls Plus assist manufacturers in developing patterns and garments that are consistent with the current anthropometric characteristics of the population of interest. According to the ASTM, this should reduce or minimize consumer confusion and dissatisfaction related to apparel sizing. (ISO 3635 Size Designation Procedures).

However, clothing companies' brands try to cater to their intended customers and design their products to suit that target market as well as their needs and wants. Size guidelines are just one way that brands can distinguish themselves. (Chrissy, 2011). In size-chart specifications, it is clear that companies made similar products; their size charts varied greatly in measurements and selected dimensions for the same product. Sizing of clothing that offers satisfaction may, therefore, provide a competitive advantage. Children's wear is unique in that the purchaser of the clothing product is typically not the wearer. Customer satisfaction with children's wear is therefore unique, since the adult's satisfaction may be analyzed. Norum (1995) found out that fit was significant, and fit-related problems led to customer dissatisfaction.Girls aged 7-12 are apparel customers who cannot be ignored. These aged group girls' exhibit a stronger interest in apparel and wield considerable financial influence (Boris, 2013; Koester & May 1985). Apparel plays a significant part in the psychological and social development

of adolescents and can affect how they are perceived and treated by their peers and others (Francis, 1992; Ryan, 1966; Rutherford-Black et al., 2000).

According to the literature review, the body size is likely a determining factor in satisfaction with body image, which affects self-esteem (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). In a study of returned goods made by Ada Lillian Bush of the U. S. Department of Commerce, women and children's clothing accounted for over 40 percent of the merchandise returned. For all merchandise, the reason for returns given most frequently was the wrong size. The majority of consumers stressed the lack of uniformity in measurements and proportions of similar products produced by different manufacturers. Sizes are always different, and parents of children (7-12) struggle with both size variances among brands the rapid growth with their children. To solve the fitting issues currently experienced by parents and children's brands should understand the fit problem and offer precise measurements for their target customers. In this light, up-to-date anthropometric survey data must be collected, a comprehensive understanding of fit issues experienced by the target customer must be achieved, and new methodologies for standardizing sizes must be developed.

Additionally, a better understanding of the particular fitting issues experienced by girls (7-12) and what they desire in their apparel is necessary and supported by previous studies (Apeagyei et al., 2007; Brock et al., 2010). More than one-half of all parents (51 percent) say fabric has "some/a great deal" of influence on their purchase, according to the Childrenswear Study. Furthermore, 83 percent of parents check fabric content at least some of the time before purchasing kids' clothes, with 2 in 5 checking's "always/usually." (Mintel, Cotton Incorporated, 2019). When it comes to fabric preference for their child's clothes, cotton is the preferred fabric overall. Additionally, 71 percent prefer cotton for their kids' bottoms, whether its pants, leggings, denim jeans or shorts. According to ScrapeHero, bottoms (including jeans) are the most popular children's clothing at 6.3k. (Mintel, Cotton Incorporated, 2019).

Chapter Three
Methodology

This chapter comprises of the research design, an overview of the survey methodology, how the sample was collected, development of the instrument, procedures to administer the survey, laboratory evaluation, description of a sample of the jeans, techniques, and process of the measurement, and the summary of data, survey, and measurement analysis are discussed in more details. The body and shape of girls have distinctive physical characteristics changes constantly until adulthood. Girls in different age groups have widely varying physical, social, and psychological requirements for their clothing. For that matter, it cannot be emphasized enough that size charts, which can be representative of any girls precisely, are required.

The purpose of this study was to understand the sizing and fit problems of girls ages 7-12 and to evaluate how brands utilize the current sizing standards. The study compared the sizing and fit of four major brands of girl's jeans categories (Children's Place, Gap, Levi's, and Old Navy). The survey was created and made accessible to a sample population of consumers (N=150) to examined, evaluated, and determined the sizing variations among brand and parents' opinions. Areas of fit and sizing issues that repeatedly appear in the online review of jeans were structured and developed into a questionnaire based on customer reviews, complaints, comments, and feedback. The second purpose is to compare to ascertain if the ASTM published standard conforms to the above brands sizing categories.

Research Design

Mixed research designs were used to conduct the research for this study. First, a qualitative research design was used to collect data through a questionnaire (Appendix C) to answer research question one to determine how satisfied/dissatisfied parents are with sizing and fit issues of children's clothing for the four major brands categories. The second phase of the study utilized a quantitative methodology (quasi-experimental method) to compare four brands of girl's jeans. This phase was to answer the research question two and three to determine if the four major brands are following the published standard sizing for body measurements of children's clothing. In addition, to see if there

are differences, consistencies, inconsistencies, or variances in the sizing of the four brands in size 12 girls' jeans. ASTM chart and the sizing charts of the brands were used to compare differences in sizing.

Methodology: Survey

The survey was distributed by Qualtrics online software off campus to help gain a better understanding of sizing and fitting problems for girls age 7-12 when shopping for jeans. The survey was estimated to take approximately 15 minutes to complete. The University of Kentucky IRB reviewed the survey, and after all necessary corrections were made, the IRB approval was received on November 29, 2019, before forwarding the survey to Qualtrics (Appendix C). Qualtrics distributed the survey on December 12, 2019, and the survey results were made available within 24 hours

Sample. Sample populations were parents who have a girl ages 7-12 from any background. The goals of one hundred and fifty participants (N=150) were sought to fill out a survey through qualtrics. Non-random samplings were used to gather a voluntary sample. To qualify for participation in the survey, parents should have the sole responsibility of purchasing jeans for a girl between the ages of 7 and 12 years old and must be at least 18 years old. The girl should wear jeans and the parent's shop either for her or with her to purchase jeans. Participants were recruited from various sources by sending an email invitation or prompted on the respective survey platform to proceed with a given survey. The typical survey invitation is generally straightforward and generic. It provides a hyperlink, which will take the respondent to the survey as well as mention the incentive offered.

Instrument. To construct the survey, multiples product reviews, feedback, and comments were collected and examine to help understand consumer's (parents) complaints and frustrations with sizing, particularly with online and in-store experience of children's clothing websites. Problems and complications frequently identified in consumer written literature such as product review, comments, and posts were noted and grouped into categories based on similarities. To comprehend the written literature of reoccurring problems and complaints from product reviews, comments, and feedback, which qualify as a 4-5 star category, it was evident that the above variable was centered

on fits and sizing issues. The categories were group according to Renata Hrzˇenjak, Ksenija Dolezˇal and Darko Ujevic´, (2015), which revealed that children of similar age might have varying height, shape, and body proportion. The illustration in figure 1 depicts three children of the same age. However, the illustration shows that they have varying height, shape, and body proportion. Therefore, the questionnaire questions were designed to help us gain a better understanding of sizing and fitting problems for girls age 7-12 when shopping for jeans. Girls were selected based on the population of female parents who frequently complained about their girl's fit issues and their frustration on the brand's website.

The questionnaire was divided into two parts. In the first segment of this study, a survey was developed to screen the demography of the population. In the second segment, the survey was developed to measure parent's satisfaction and dissatisfaction to determine which specific area girls age 7-12 have fit problems.

Part one begins with demographic information of the parents of girls within this age range. In this part, there were five survey questions where the consumers were asked to designate whether the participates were the sole purchaser of clothing for girls age 7-12. Consumers were asked to select one choice from mother, grandmother, father, or other and to specify whom there were to ensure they are the sole purchaser of clothing for their girls.

Since age is a factor in sizing, there are two questions in this category. There was a "Yes and No" answer where participants were required to answer whether they shop for a girl between the ages of 7-12. This question was followed by how old the child was to help understand the age category of the participate child. There was a six-age category to choose from (7, 8, 9, 10, 11, and 12).

The major demography question was for the participates in checking the ethnic group(s) they consider themselves a member of. They were asked to check all that apply to them, from White/European American, African American/Black, Hispanic American/Latina, Asian, and or other. The last survey question in part one concluded by asking if they have a child who wears jeans. If not, they should discontinue the survey. This question contains a "Yes and No" answer.

The part two section of the survey is on research on apparel sizing and fit for girls age 7-12. Participants were asked to think about their experiences when shopping for jeans for their children. There are thirteen questions in this section. Participants were asked where they usually shop for jeans for their children. In-store, online, catalog, or other was the four possible answers they were to choose from. The fourth answer was an option where to specify the particular channel they shop for jeans for their girl.

In order to understand the brand that parents and guardians prefer, participates were asked what brand(s) of jeans they usually purchase for their child. Based on the online reviews and comment the brands such as Children's Place, Gap, Old Navy, Arizona, Levi's, Lee, Guess, Lucky, Designer Brand, and others to specify the type of brand they would purchase for their girls.

The style of a jean makes a big difference in the selection and sizing process. Big girls from ages 7-12 are old enough to have opinions about the fit and styles that they prefer. Therefore, this study is curious to comprehend what is in the style of a pair of jeans in girls who are obsessed with the style of jeans. The survey questionnaire asked what style of jeans parents/guardians would usually purchase for their child. Four possible answers were presented, such as straight, boot-cut, skinny, jegging, and others for participants to select or specify their preferred choice.

In this study, it is imperative to understand how far parents would go to purchase, prefer jeans; because of this, it is important to know how a parent will pay for a pair of jeans for their girl. Due to this, parents were asked how much they typically pay for one pair of jeans for their child. The answer to this survey question ranges from $5-15, $16-25, $26-35, $36-45, and others to specify how they would spend.

For this study, fit style is another major problem encountered during the online review, comments, and feedback. The survey asked parents to select or specify what size of jeans that the child would wear. Regular in size (7, 8, 10, 12, 14), Slim 7, 8, 10, 12, 14), Plus 7, 8, 10, 12, 14), or other for the participants to specify. Children grow and develop at different rates; therefore, they may have a slightly heavier weight and varying height in the same age category. Parents were asked to write down the child's height in feet and inches, and weight in pounds.

The design features would determine how the fit of the jeans would look like in jeans. For this reason, comments, feedback, and reviews from the online research, parents were asked to identify what design features of jeans would be preferable for their girls.

According to one survey, 80% of the time, customers did not buy an item, the reason was that they could not find a garment that fits correctly or that the price was too high (Curry, 1983). Parents were asked which of the following best describes why they purchase the brand (s) of jeans selected in question two. The potential answers presented for this question were fit, price, quality, the popularity of the brand name (Many of my child's friends wear this brand), or to specify what is not on the lists of answers.

Two questions were using the Likert five-point-scale. The first prompted parents to answer how important it is 'fit' in the following (inseam, outseam, Crotch Depth, Waist, Bottom Leg Opening, Hips, and overall length) locations when selecting jeans for their child. Very Unimportant, Unimportant, Neutral, Important, and Very important were the likely answers. The participants were given a chance to select all that applies to this importance. The second urged parents to select fit issues in the following locations (inseam, outseam, Crotch Depth, Waist, Bottom Leg Opening, Hips, and overall length) when trying jeans on their child. Parents were to agree strongly, agree, neutral, disagree, and strongly disagree.

The survey asked parents whether their child tries on garments in the store or purchase according to the size. Yes, try on jeans in the store; No, do not try on jeans in the store; Yes, purchase jeans according to size; No, do not purchase according to size; Sometimes, try on garments in the store or purchase according to size; and other was to specify. The last survey question was directed as an open question for the participants to write down what they do when they cannot find jeans that fit their child.

Procedures. Data were collected by Qualtrics online software off campus to help gain a better understanding of size and fitting problems for girls age 7-12 when shopping for jeans. The survey was estimated to take approximately 15 minutes to complete. The University of Kentucky IRB reviewed the survey. An after all necessary correction, the IRB approval was received before forwarding the survey to the Qualtrics (Appendix D).

The survey was advertised, and announcements were made to collect the data. Participants are recruited from various sources, including website intercept recruitment, member referrals, targeted email lists, gaming sites, customer loyalty web portals, permission-based networks, and social media, and so on. The participants join from a variety of sources. Including airline customers who chose to join in reward for SkyMiles, retail customers who opted in to get points at their favorite retail outlet or general consumers who participate in cash or gift cards, and so on. When participants were invited to take a survey, they are informed of what they will be compensated. After that, the participants were sent an email invitation or prompted on the respective survey platform to proceed with a given survey. The typical survey invitation is generally straightforward and generic. It provides a hyperlink, which will take the respondent to the survey as well as mention the incentive offered.

Qualtrics distributed the survey on December 12, 2019, and the survey results were made available within 24 hours. The survey was launched to both mobile and desktop respondents based on the specified screening parameters. The study was strictly voluntary, the parent/guardian may opt-out of participation with no consequence, and there were minimal to no risk involved. By completing the questionnaire, parents' consent to participate in the study (Appendix B). The participants must be at least 18 years old. The participant was awarded (add what qualtrics offer to take the survey, Average age, and demography and then show table from the data).

Methodology: Laboratory Evaluation

The measurements were taken in the conference room of the Retail and Tourism Department of the University of Kentucky. The body dimensions for apparel sizing followed the processes. The measurements were taken in inches, documented, and recorded for each brand category. Standard Tables of body measurements for girls, size 2 to 20 (Regular & Slim) and girls plus[1], from the American Society for Testing Material (ASTM), ASTM D6192 / D6192M – 19 to defined the evaluation and measurement locations and procedure for the examination.

The tables were developed from data published by the U.S. Department of Commerce. The body measurement in the table can be used as a baseline in this age range

for the study when considering factors such as style and fit. The examination and the evaluation in this study were to measure the physical jeans in salient locations to assess if it conforms to the ASTM standard and to discover any variations of the same size 12 jeans to determine any fit and sizing issues. Body measurement locations areas include circumference of waist, crotch depth (front and back), hip (front and back), inseam (right and left), knee width (right and left), leg opening circumference (right and left), outseam (right and left), and overall length (right and left).

Sample. Several studies have revealed that children of similar ages may have varying height, shape, and body proportion (Renata Hrzˇenjak, Ksenija Dolezˇal, and Darko Ujevic´, 2015). One of them also demonstrated that 50% of children did not fit into clothes designed according to the age system. This age factor misleads consumers in the selection of well-fitted jeans.

Admittedly, finding styles that are both on-trend and a good fit can be a daunting task. After painstaking research and online reviews, feedback, and comments, four pairs of jeans styles each from four different brands were selected to compose the sample. In making the process easier, regular size 12 boot-cut jeans were selected from four brand categories; the selection was based on the fit, style, and popularity of the brand. Another criterion of the selection is whether the selected brand carries the fit and style in the same age category and the quantity needed to complete the research. Three sample girls' jeans were ordered online from the brand website directly except for Levi's, which was purchased on the Walmart online store.

The following explained the rationale behind the selection: Girls, Jeans, Boot-cut, Regular, and size 12.

Girls. Girls' clothing sizes are a bit more complicated than the boys' sizes. The reason for this is that girls develop hips and chests at different ages. It is often the case that a girl will develop hips and a chest suddenly, without any corresponding growth in height. Another reason for selecting girls for this study is that in general, girls' sizes assume an hourglass figure, which means that chest and hip measurements become larger than the waist measurements. It also means girls who do not fit this body type may have difficulty finding well-fitting clothing. Therefore, pointers are the key meaning of

shopping for this age group to considering the cut of clothing to fit a specific body type. Girls' self-esteem peaks at nine years old.

Jeans. The iconic American-style garment denim/jeans have always been a tried-and-true staple item in the U.S. and around the world. Denim is timeless, versatile, and has been around since the country's gold rush days or in 1873 when Levi Strauss and Jacob Davis got the U.S. patent for riveted denim work pants (Lincoln, 2016). For both young (girls) and old jeans, remain the top bottoms wear items available at any retail store. According to the Cotton Incorporated Lifestyle Monitor™, the global denim jeans market was valued at $58 billion in 2014. Here in the U.S., more than 518 million pairs of men and women's jeans were sold in 2015 (Technavio, 2016). Jeans are the most popular for running errands (50 percent), work (32 percent), and dinner (31 percent). The study selected jeans due to its popularity, comfortability, affordability, and functionality and which can last forever. Customers look for mobility, comfort, abrasion resistance, and longevity in their products, and denim is no exception. Customers live a very active life, so denim has to work from the trail to the tavern. Consumers hike, climb, bike, and play in jeans (Lincoln, 2016). Jeans are a popular item for parents of school-age kids (Berardelli, 2016). In 2016, Market Watch expected families with kids ranging from kindergarten through 12th grade to have spent $27.3 billion in the past back-to-school season. On average, consumers, in general, own about nine denim garments, six of which are denim jeans, according to the Cotton Incorporated Lifestyle Monitor™ Survey.

Style: Boot-Cut. The boot-cut style of jeans was the most classic, the top half of the style considered a straight and slim cut. The circumference widens over so slightly around the ankles to accommodate high-heeled shoes and boot. Boot-cut jeans flare out slightly starting at the knees and are named so because they are often worn with boots, naturally. The boot-cut style fit is suitable for all girls' body types because they take body shape and fit well.

Regular. Typically, this study needed jeans that will sit straight on the hip to satisfy the fit style of interest in this study. Moreover, regular fit jeans were one of the jeans fit types that fit straight from hip to thigh. This type of fit style has a mid-rise and

has a large leg opening, fit, and sits squarely on the hip. Therefore, it was worn and referred by girls who are neither skinny nor think.

Size 12. According to ASTM (American Society for Testing and Materials), D6192 / D6192M – 19 Standard Table of Body Measurement 1.2, the maximum age for a girl's chart is 12 ½ years old to the size 20. Therefore, since the age group in this study was between 7-12, it is prudent to single out the maximum, which was size 12 for the sample size for the evaluation. Another reason for selecting this age group (7-12) was that after age 6, girls' clothing follows the same sizing parameters from ages 4 to 6, then split after age 6. The sizes no longer coordinate with age. Around this age, girls are mature enough to form their own opinions about many things, including clothing sizing and fit. At the same time, many girls also develop a preference for a certain kind of jeans style. They have pretty much agreeable personality with what they want to wear and how it should fit. Measurements other than weight become more important in determining clothing sizes at this point.

In the light of accuracy and precision, between the size ranges (7-12), only one size was selected for the evaluation, which is size 12. The sample was comprised of girl's regular boot-cut jeans in the same size (12) from four brand categories and three jeans from each brand (Table 3:1).

Description of Samples

Overall, there were a total of 12 girls regular boot cut jeans, precisely three jeans in size 12 girls regular boot-cut from the Children's Place, three sizes 12 girls regular boot-cut Gap, three sizes 12 girls regular boot-cut Levi's, and three sizes 12 girls regular boot-cut Old Navy. The retail categories have been known to stand the taste of time.

Table 3.1

Description of Samples

Brand	Size	Fit Style	Style of Jeans	Design Features	Color	Fiber Content	Purchase Price
Children's Place	12	Regular	Boot-Cut	Inner Adjustable Waist Tabs	Medium Worn Stone Wash	73% Cotton 26% Polyester 1% Spandex	Was: $19.50 Sale: $ 7.99
Gap	12	Regular	Boot-Cut	Conceal Adjustable Waist	Medium Wash	92% Cotton 7% Lycra Elasterell 1% Lycra Spandex	Was: $44.95 Sale: $20.00
Levi's	12	Regular	Classic Boot-Cut	Adjustable Waistband	Wading Waters	72% Cotton 26.5% Polyester 1.5% Spandex	Was: $40.00 Sale: $20.00
Old Navy	12	Regular	Boot-Cut	Sits Low on Waist	Medium Denim Wash	85% Cotton 13% Polyester 2% Spandex	Was $22.99 Sale: $18.00

According to the Wall Street Journal, Children's Place Inc. has consolidated its position as the leading specialty chain for children's clothing. In March, Children's Place agreed to acquire the assets and intellectual property of rival chains Gymboree and Crazy 8, both owned by Gymboree Group Inc., which liquidated the stores after a second foray into bankruptcy protection earlier this year (Kapner, S. 2019). Children's Place has six specific size ranges sections one of which this research sample falls under "Big Girls and Big Boys (4-16)". The retail stores are located in and around regional malls, but also include some strip shopping centers, outlets, and street stores. The majority of the stores are small, traditional mall stores, although some Children's Place outlets are in a big-box format.

Gap Inc. is a leading global retailer offering to clothe, including children under the Old Navy, Gap, Banana Republic, Athleta, Intermix, Janie and Jack, and Hill City brands. The fiscal year 2018 net sales were $16.6 billion. Gap Inc. products are available for purchase in more than 90 countries worldwide through company-operated stores,

franchise stores, and e-commerce sites (Gap Inc. Blogs, 2019). Since Gap is under the Old Navy brand, it is imperative to be selected to evaluate the sizing standard to see if there is any discrepancy between the two brands.

The sample selection will not be complete and whole without the Jeans makers/ inventors. Levi Strauss, a classic symbol of the American West, is the world's oldest surviving pair of jeans dates from around 1879. Levi Strauss & Co. is one of the world's largest apparel companies and a global leader in jeans. There are about 500 stores worldwide, and the brand products are available in more than 100 countries. Levi's® brand is just part of the American story and home to Dockers® and Denizen. Levi Strauss and Jacob Davis patented their riveted design on 20 May 1873 (Levi's 2019).

Old Navy's pedigrees date to 1993, when Gap sensed that the stigma around bargain-priced clothes was squandering, and in 1994, the first Old Navy stores opened. As a subsidiary of Gap, Old Navy operates approximately 850 clothing stores, promoting itself as a low-priced provider of apparel. Old Navy accounts for approximately 40 percent of The Gap, Inc.'s $15.8 billion in sales. The chain operates throughout the United States and in Canada, home to more than 30 stores. The formula for this brand is quality and low price (Old Navy, 2019).

In all, the samples were in the same size 12 with a regular fit style and a boot-cut style. The sample jeans sold individually and therefore were ordered online as such. Three from each brand were purchased to be measured to evaluate the differences in the fit and to compare if it meets the ASTM published standard.

The Children's Place sample was hand-sanded for a lived-in, abraded look. Snap closure with zipper fly for sizes 4-7; button closure with zipper fly for sizes 8-16. Five-pocket styling with a fitted thigh; slight boot cut leg opening, Inner adjustable waist tabs for a custom fit, and a tagless label (Imported). Gap pair of denim in the sample is part of the brand's water-saving Washwell™ program. According to Gap, compared to conventional wash methods, Washwell™ has saved millions of liters of water since 2016. The gap sample brand is the stretches, softest, and most comfortable denim. Premium 1969 denim with high stretch, Medium indigo wash with fading and whiskering, button closure at waist, zip fly, and five-pocket styling are the hallmark of this type of jeans.

Included in Levi's sample description were girls thick stitch boot cut jeans, which is stretchable with an adjustable waistband. The jeans sit below the waist with a slim through the hip and the thigh. The sample jeans were whiskering at the front, with light fading throughout. The jeans have a thick contrast stitching, 5-pocket styling, belt loops, zip fly with front button closure, and originated from Kenya.

The Old Navy samples were a medium denim wash with whiskering and two-tone topstitching. Samples detailed snap-button closure and zip fly. They show riveted scoop pockets and coin pocket in front; patch pockets at the back. Embroidered fit label inside back waist for added comfort and style, sat low on the waist with a fitted through hip and thigh and were imported.

Table 3.2

Sample Numbering

	Children's Place	Gap	Levi's	Old Navy
Sample 1	CP1	-	-	-
Sample 2	CP2	-	-	-
Sample 3	CP3	-	-	-
Sample 1	-	G1	-	-
Sample 2	-	G2	-	-
Sample 3	-	G3	-	-
Sample 1	-	-	L1	-
Sample 2	-	-	L2	-
Sample 3	-	-	L3	-
Sample 1	-	-	-	ON1
Sample 2	-	-	-	ON 2
Sample 3	-	-	-	ON 3

Samples were numbered one through three in each of the four brands, as shown in Table 3.2. Each brand was represented and coded with its first and first-last-two letters.

Procedures. The table lists the procedures of the product measurement locations for the complete body measurement locations. ASTM D5219-15 published standard terminology relating to body dimensions for apparel sizing were utilized as a guide for

the measurement locations. Horizontal and vertical measurements grouped the measurement location for the procedure. The locations are listed in alphabetical order to explain the procedure, as shown on the table.

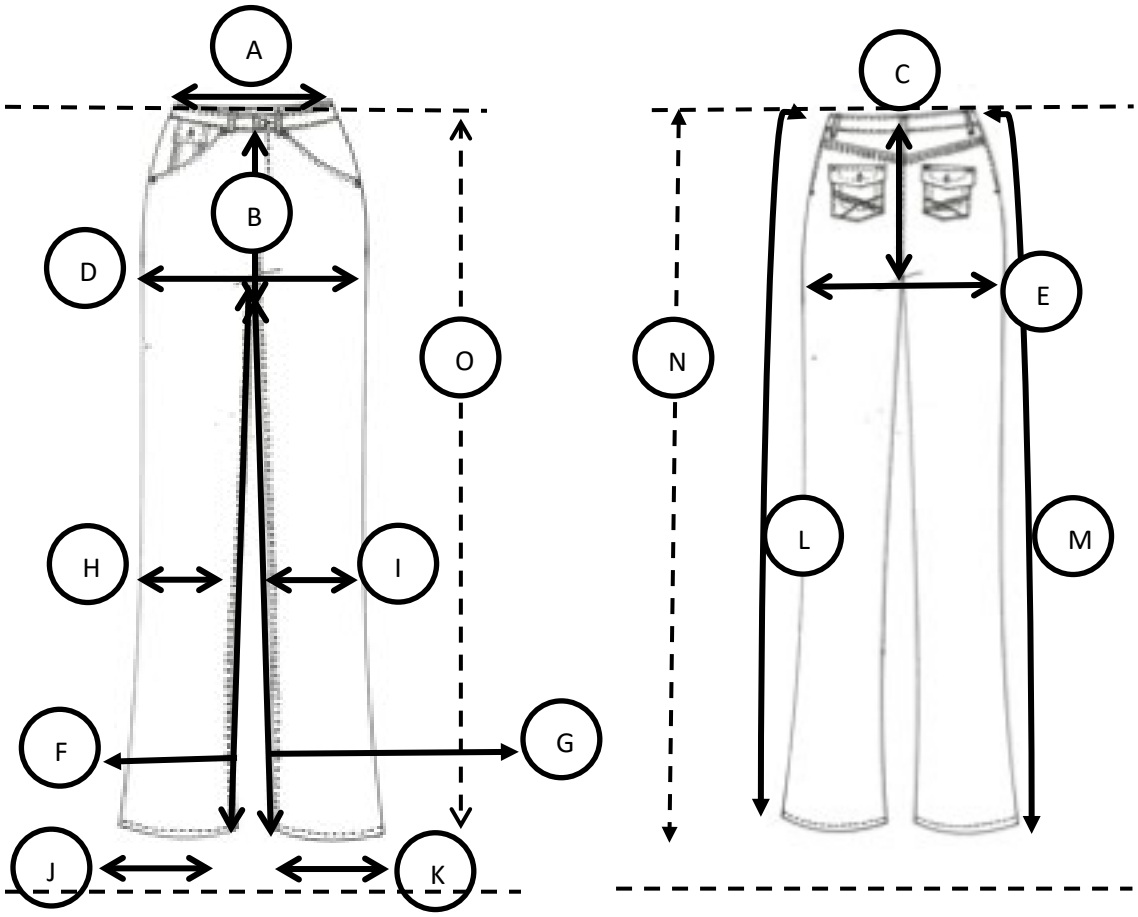
The first process is to measure the three brand jeans from the four various brands. This was done by laying the jeans on a clean flat surface or table and smoothing out any wrinkles or creases. Then, measure with a flexible 10-Foot Inch/Metric Soft fiberglass Tape Measure. The measurements were taken in the conference room of the Retail and Tourism Department of the University of Kentucky. The body dimensions for apparel sizing followed the processes. The measurements were taken in inches, documented, and recorded for each brand category.

The second part of this study is to compare measurements in the sizing charts of the four companies to that of the American Society for Testing and Materials (ASTM chart). The sizing charts include measurements of the circumference of the waist, crotch depth front and back, hips front and back, inseam right and left, knee width right and left, leg opening circumference right and left, outseam right and left, and overall length right and left of the jeans. The sizing chart from both the select brands and the ASTM standard was documented and compared descriptively for similarities and differences.

The next segment was to measure the physical garment (jeans) by measuring the circumference of the waist from one side of the waistband (first button the jeans up) to the other. Furthermore, double that number to get the waist measurement. Next, the crotch seams down to the hem of the pants were measured to get the length. The front rise was measured by starting from a crotch seam spot to the spot of the waistband. For the hip, measurements were taken across the hip area. The thigh was measured at the crotch seam and ending 1–2 inches below the hip area. The lengths were measured from the top of the waistband to the edge of the leg opening. The knee was measured across the knee area. Inseam from the gap from the crotch, at the spot where the front and back seams meet. The leg opening was measured from one side of the leg opening to the other side of the leg opening, respectively.

The process was followed by the body dimensions for apparel sizing according to the ASTM D5219-15 published standard terminology relating to body dimensions for

apparel sizing. The measurements were taken in inches, documented, and recorded for each brand category. In general, the measurements were taken both in the vertical and horizontal measurements. The points of measurement locations are displayed in Figure 3.1. Also, the Garment Measurement Locations and procedure are presented in Table 3.3A and Table 3.3B.



Front Flat View

Back Flat View

Circumference of Waist	A	Knee Width Left	I
Crotch Depth Front	B	Leg Opening Circumference Right	J
Crotch Depth Back	C	Leg Opening Circumference Left	K
Hips Front	D	Out Seam Right	L
Hips Back	E	Out Seam Left	M
Inseam Right	F	Overall Length Right	N
Inseam Left	G	Overall Length Left	O
Knee Width Right	H		

Figure 3.1

Garment Measurement Locations

Table 3.3A

Garment Measurement Locations and Procedure

Garment Measurement Locations	
Measurement Locations	Procedure
Horizontal Measurements	
Circumference of Waist A	From one side of the waistband (first button the jeans up) to the other. To get the correct accurate measurement, the numbers were doubled to get the whole waist measurement.
Hips Front D	For the hip, the measurement was taken across the hip area. These were done by measuring across the jeans at the base of the zipper. Making sure tape measure is at the point of the edge of each seam (at the point 3 ½ inches up from inseam).
Hips Back E	For the back hip, measurement is taken across the back hip area by measuring in a slight V along the cross-grain from edge to center front to edge (at the point 3 ½ inches up from inseam).
Knee Width Right H	The right knee widths were measured by first measuring 13 inches from the waistband to the kneecap. After that measurement was taken across right leg horizontally from edge to edge of the jeans, the number is double to get the overall knee width
Knee Width Left I	The left knee widths were measured by first measuring 13 inches from the waistband to the kneecap. After that measurement was taken across the left leg horizontally from edge to edge of the jeans, the number is double to get the overall knee width.
Leg Opening Circumference Right J	Measurements were taken along the right bottom, opening from edge to edge. The numbers were doubled to get the right leg-opening circumference.
Leg Opening Circumference Left K	Measurements were taken along the left bottom, opening from edge to edge. The numbers were doubled to get the left leg-opening circumference.

Table 3.3B

Garment Measurement Locations and Procedure

Garment Measurement Locations	
Measurement Locations	Procedure
Vertical Measurements	
Crotch Depth Front B	Lay jeans flat. The front crotch depths were measured by starting from crotch seam spot/point to the spot of the waistband on the front view of the jeans with rising seam flat.
Crotch Depth Back C	Turning the jeans on the back flat surface, the back-crotch depths were measured on the curve by starting from the crotch seam spot/point to the spot of the waistband.
Inseam Right F	The measurements were taken from the right crotch point on inside leg seam down to the hem of the jeans to get the length.
Inseam Left G	The measurements were taken from the left crotch point on inside leg seam down to the hem of the jeans to get the length.
Out Seam Right L	Excluding the waistband, the outseam was taken by measuring from the waist the right seam point to bottom edge on outside leg seam.
Out Seam Left M	Excluding the waistband, the out seams were taken by measuring from the waist the left seam point to bottom edge on outside leg seam.
Overall Length Right N	The overall right lengths were measured from the top of the waistband seam to the hem of the jeans.
Overall Length Left O	The overall left lengths were measured from the top of the waistband seam to the hem of the jeans, respectively.

Data Analysis

In this section, the survey data and measurement data analysis are described in more detailed. For the survey analysis, a descriptive summary was used. Frequencies and percentages of parents and guidance satisfaction and dissatisfaction responses were reported. Data from the online brand's size charts, product measurement locations, and the ASTM published standard body measurement were analyzed using the Statistical Package for SAS (Statistical Software Suite). The product measurement evaluation results were recorded in excel software. Average and standard deviation were recorded and reported. Descriptive statistics, including means, standard deviation, and percentages, were calculated and presented. Procedural results from the product measurement locations and evaluations were presented in either table or figure format. In the SAS System, the GLM procedure was used to show the Least Squares Means and Adjustment for Multiple Comparisons.

For the analysis, the data was exported into SAS System, and the GLM procedure was used to show the Least Squares Means and Adjustment for Multiple Comparisons: where descriptive statics and one-way ANOVA were utilized. Statistical significance was determined by using a 95% confidant interval with a significant level (a) of 0.05. Through one-way ANOVA, pairwise confidence interval comparison of the data was used. Analysis of Variance (ANOVA), the F-statistic, independent sample t-test, and p-value to a = 0.05 was used for identifying any significant differences in sizing between the four brands categories. The measurement results were followed by a discussion of the differences and comparisons among the four major jeans brands to conclude the study.

Chapter Four

Results

The purpose of this study was to understand the sizing and fit problems of girls ages 7-12 and to evaluate how these brands utilize the current sizing standards. It is imperative to investigate where individual brand stand met the ASTM published standard or not. The survey samples include 150 parents that have girls between this age group. Moreover, the research evaluates, compared, and contrasts the sizing and fit of four major brands of girl's jeans categories.

The samples included in the research were from Children's Place, Gap, Levi's, and Old Navy. Furthermore, this research compares and contrasts to ascertain if the ASTM published standard conforms to the above brand's body dimensions and size categories. After online written literature, which qualifies as a 4-5-star category, rearising problems, and complaints from product reviews, comments, and feedback. It was evident that the above variable was centered on fits and sizing issues. This problem and frustration-impeding consumer's ability to satisfy girl's needs and want in the jeans they loved to wear. Also, solidifying the problems which have been identified by Renata Hrzˇenjak, Ksenija Dolezˇal, and Darko Ujevic´, (2015), which showed that children of similar age might have varying height, shape, and body proportion.

The evaluation of the four brands (12 pairs in total) included laboratory analysis of the sizing charts, size, age, height, weight, waist, hip, and inseam. Additionally, the evaluation of the laboratory product sample analysis the measurement of the circumference of the waist, crotch depth, hips, inseam, knee, leg-opening circumference, outseam, and overall length.

The evaluation measurement was completed on the jeans sample one through three on each brand. In all 12 jeans were evaluated in size 12 range. All jeans were made from denim fabric with a fiber content of cotton, polyester, spandex, lycra elastane, and lycra spandex. Fit style is regular with a boot cut style. The features were inner adjustable waist tabs, conceal adjustable waist, adjustable waistband, and sits low on the waist.

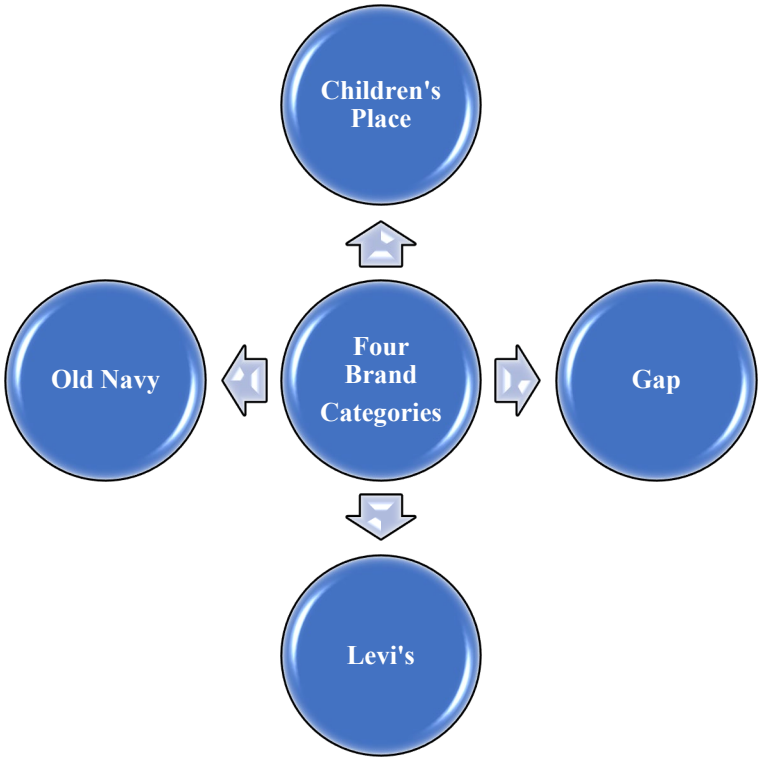


Figure: 4.1

Four Brand Categories

In this section, the design specification, size charts, product measurement, followed by an in-depth evaluation of both the quantitative and qualitative results and discussions, were used to answer the research question. The chapter concludes with a summary of the key findings.

Design Specifications

The design specification of the jeans, including size summary, fit style, jeans style, design feature, color fiber content, and the retail prices was discussed to give a general overview of the product description. The overview of the fit and style is presented in Table 4.1 All four brands were in size 12, a regular fit style. Specifically, the four brands category was labeled boot-cut style except for Levi's, which was labeled classic boot cut. The design features were Inner Adjustable Waist Tabs for children's place, Conceal Adjustable Waist for the gap, and Adjustable Waistband for Levi's. Old navy was the only brand with the design feature, which sits low on the waist. The color ranges from the medium worn stone wash, medium wash, wading waters, and medium

denim wash. Children's place has a fiber content of 73% cotton, 26%polyester, and1% spandex. gap jeans content was 92% cotton, 7%lycra elasterell, and 1% lycra spandex. Levi's shows 72% cotton, 26.5% polyester, and 1.5 spandex. Old Navy fiber content consists of 85% cotton, 13% polyester, and 2% spandex.

Table 4.1

Fit and Style Summary, Four Brands Category

Design Specifications	Children's Place	Gap	Levi's	Old Navy
Size	12	12	12	12
Fit Style	Regular	Regular	Regular	Regular
Style of Jeans	Boot-Cut	Boot-Cut	Classic Boot-Cut	Boot-Cut
Design Features	Inner Adjustable Waist Tabs	Conceal Adjustable Waist	Adjustable Waistband	Sits Low on Waist
Color	Medium Worn Stone Wash	Medium Wash	Wading Waters	Medium Denim Wash
Fiber Content	73% Cotton 26%Polyester 1% Spandex	92% Cotton 7%Lycra Elasterell 1% Lycra Spandex	72% Cotton 26.5% Polyester 1.5 Spandex	85% Cotton 13% Polyester 2% Spandex
Purchase Price	Was: $19.50 Sale: $ 7.99	Was: $44.95 Sale: $20.00	Was: $40.00 Sale: $20.00	Was: $22.99 Sale: $18.00

Table 4.2

Product Summary for Children's Place

Children's Place Product Description*	
Description: Five-pocket styling with a fitted thigh; slight flare leg opening. Hand sanded for a lived-in, abraded look.	**Design Features:** Inner adjustable waist tabs for a custom fit. Button closure with zipper fly for sizes 8-16
Brand Name: Children's Place	**Fabric Category:** Woven
Fit Style: Boot-Cut	**Color:** Medium Worn Stone Wash
Size: 12 (Regular)	**Fiber Content:** 73% cotton, 26% polyester and 1% spandex
Label: Tagless label	**Item #:** 2024535_93
Item Category: Jeans	**Care Instruction:** None
Country of Origin: Imported	***Note**: details may vary from image

Front view

Back View

Button closure with zipper fly
Adjustable waist tabs

Pocket Styling

*Https://www.childrensplace.com/us/p/Girls-Basic-Bootcut-Jeans---Medium-Worn Stone-Wash-2024535-93?cid=email-_-190926-_-trig-_-ordconf-_-main, Copyright 2019 by Children's Place Brand INC.

Table 4.3

Product Summary for Gap

<table>
<tr><th colspan="4">Gap Product Description*</th></tr>
<tr><td colspan="2" rowspan="2">Description: Better denim. Better planet. This pair of denim is part of our water-saving Washwell™ program. Compared to conventional wash methods, Washwell™ has saved millions of liters of water since 2016. Our stretchiest, softest, most comfortable denim yet.</td><td colspan="2">Design Features: Concealed adjustable waist. Mid-rise. Slim through the hip and thigh. Boot cut leg opening—Premium 1969 denim with high stretch. Medium indigo washes with fading and whiskering.</td></tr>
<tr><td colspan="2">*Kids Boot Jeans with Fantastiflex</td></tr>
<tr><td>Brand Name: Gap</td><td colspan="2">Fabric Category: Woven</td><td>Item #: 494994</td></tr>
<tr><td>Fit Style: Boot-Cut</td><td colspan="2">Color: Medium Wash</td><td>Care Instruction: None</td></tr>
<tr><td>Size: 12 (Regular)</td><td colspan="2">Pocket: Five-pocket styling</td><td>Item Category: Jeans</td></tr>
<tr><td colspan="2">Country of Origin: Imported</td><td colspan="2">Button / Zip: Button closure at waist and zip fly.</td></tr>
<tr><td colspan="4">Fiber Content: 92% Cotton, 7% Lycra Elasterell, and 1% Lycra Spandex</td></tr>
<tr><td colspan="3"> 
Front view
 
Back View</td><td> 
Button closure at waist and zip fly.
 
Fit</td></tr>
</table>

*Https://www.gap.com/browse/product.do?pid=494994002&pcid=999, Copyright 2019 by

Gap Brand INC.

Table 4.4

Product Summary Levi's

<table>
<tr><th colspan="3">Levi's Product Description*</th></tr>
<tr><td colspan="2">Description: Levi's boot cut jeans are the ultimate girly girl jeans. Cut slim in the thigh and flared at the leg for a classic boot cut look. To finish the jeans off, and make them her favorite, thick stitching sets the jeans aside as a fashionista.</td><td>Design Features: Adjustable waistband, sits below the waist, slim through hip and thigh medium wash, whiskering at the front, light fading throughout, thick contrast stitching
belt loops
*Kids Boot Jeans with Fantastiflex</td></tr>
<tr><td>Brand Name: Levi's</td><td>Fabric Category: Woven/ Stretch Denim</td><td>Item #: 570623909</td></tr>
<tr><td>Fit Style: Boot-Cut Leg</td><td>Color: Wading Waters</td><td>Care Instruction: Machine Wash</td></tr>
<tr><td>Size: 12 (Regular)</td><td>Pocket: 5-Pocket Styling</td><td>Item Category: Jeans</td></tr>
<tr><td colspan="2">Country of Origin: Kenya</td><td>Zip/ Bottom: Zip Fly With A Front Button Closure</td></tr>
<tr><td colspan="3">Fiber Content: 72% Cotton, 26.5% Polyester, and 1.5 Spandex</td></tr>
<tr><td colspan="2"> 
Front View</td><td> 
Back View</td></tr>
</table>

*Levi's Thick Stitch Boot Cut Jeans (Big Girls) Https://www.walmart.com/ip/Levi-s-Thick-Stitch-Boot-Cut-Jeans-Big-Girls/774947031, Copyright 2019 by Gap Brand INC.

Table 4.5

Product Summary for Old Navy

<table>
<tr><th colspan="3">Old Navy Product Description*</th></tr>
<tr><td colspan="2">Description: Medium-Wash Boot-Cut Jeans for Girls</td><td>Design Features/Details: Medium denim washes with whiskering and two-tone topstitching. Sits low on the waist. Fitted through hip and thigh. Boot-cut leg</td></tr>
<tr><td>Brand Name: Levi’s</td><td>Fabric Category: Woven/Denim</td><td>Item #: 556325</td></tr>
<tr><td>Fit Style: Boot-Cut Leg</td><td>Color: Bright Authentic</td><td>Care Instruction: Machine Wash</td></tr>
<tr><td>Size: 12 (Regular)</td><td>Pocket: Riveted scoop pockets and coin pocket in front; patch pockets in back</td><td>Item Category: Jeans</td></tr>
<tr><td colspan="2">Country of Origin: Imported</td><td>Bottom / Zip: Snap-button closure and zip fly</td></tr>
<tr><td colspan="2">Label: Embroidered fit label inside back waist for added comfort and style</td><td>Fiber Content: 85% cotton, 13% polyester, and 2% spandex</td></tr>
<tr><td> 
Front View</td><td> 
Back View</td><td> 
Fit</td></tr>
</table>

*Https://oldnavy.gap.com/browse/product.do?pid=556325012&pcid=999#pdp-page-content, Copyright 2019 by Old Navy Brand Co.

Table 4.6

Product Summary of Brands

Brand	Size	Fit Style	Style of Jeans	Design Features	Color	Fiber Content	Purchase Price
Children's Place	12	Regular	Boot-Cut	Inner Adjustable Waist Tabs	Medium Worn Stone Wash	73% Cotton 26% Polyester 1% Spandex	Was: $19.50 Sale: $ 7.99
Gap	12	Regular	Boot-Cut	Conceal Adjustable Waist	Medium Wash	92% Cotton 7% Lycra Elasterell 1% Lycra Spandex	Was: $44.95 Sale: $20.00
Levi's	12	Regular	Classic Boot-Cut	Adjustable Waistband	Wading Waters	72% Cotton 26.5% Polyester 1.5 Spandex	Was: $40.00 Sale: $20.00
Old Navy	12	Regular	Boot-Cut	Sits Low on Waist	Medium Denim Wash	85% Cotton 13% Polyester 2% Spandex	Was $22.99 Sale: $18.00

Survey Results

A total of 160 participants responded to Qualtrics online software survey for the research. Four participants did not satisfy the required criteria of does your child wear jeans. For this reason, the final sample included 156 mothers' participants who met the survey criterion of shopping for girls ages 7-12 who wears jeans. The demographic

information of parents of girls within the age range is presented in Table 4.7.

Demographic. The demographic characteristics requested included parents who shop for girls between the ages of 7-12, generations of the children, ethnicity, and whether the girls wore jeans. In the demographic screening, the researcher and the survey launchers enforced screening criteria of mothers with children age 7-12. This resulted in 100% of mothers who indicated they shop for girls aged 7-12. These mothers were the sole purchaser of jeans for their girls, which also occurred at 100%. The survey asked participants to indicate the age of their daughter. Of the girls between the ages of 7-12, 27% were twelve years old. The response result is reported in Figure 4.2.

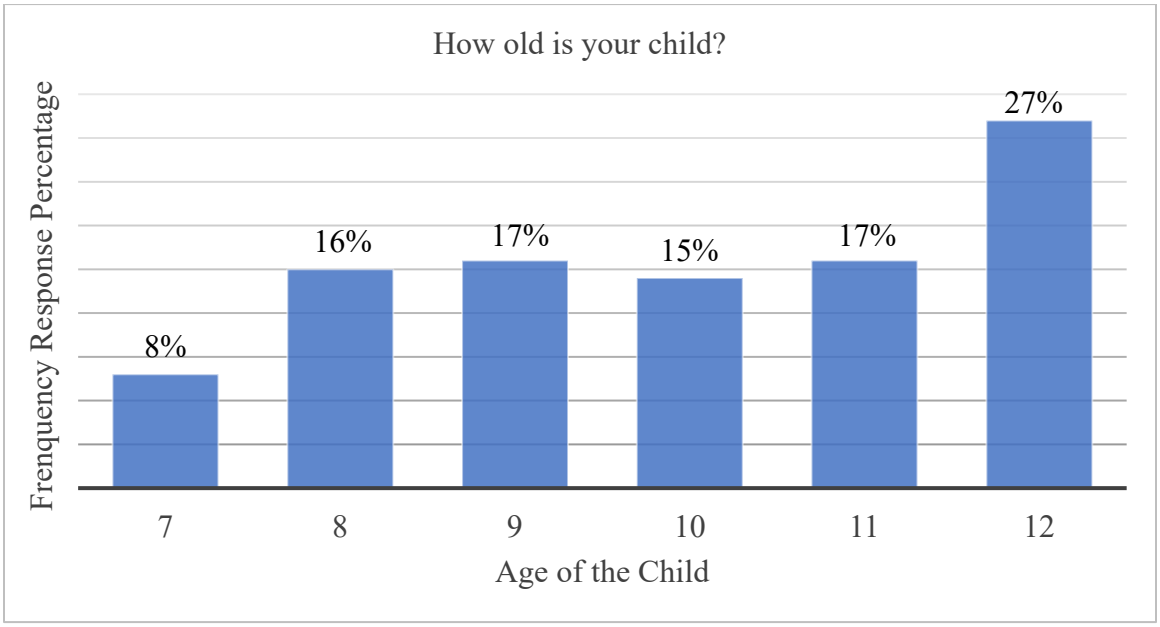


Figure 4.2

Age (Years)

Reflecting the ethnicity demographics of the region in which the research sample was conducted, 71% of the 156 participants reported their ethnicity as White/European American. The complete breakdown of the demographic ethnicity of the sample is presented in Table 4.7 and Figure 4.3

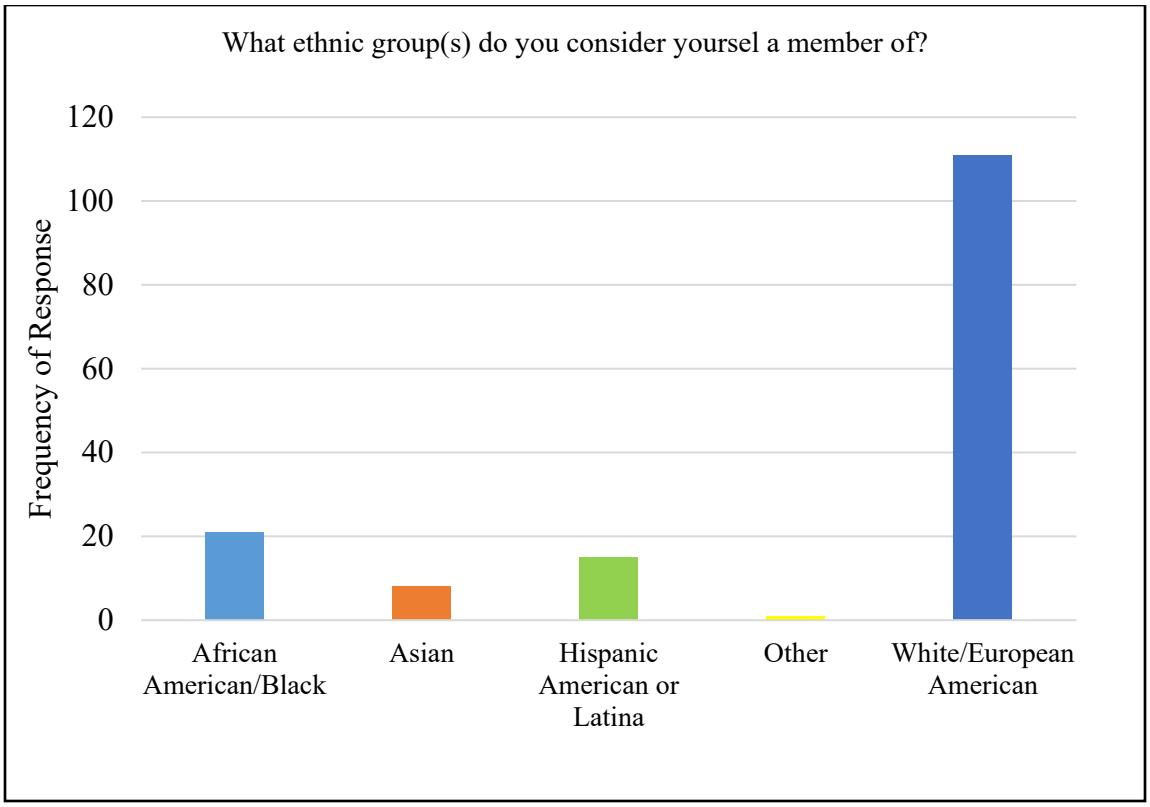


Figure 4.3

Ethnicity Information

Finally, in the demographic screening section, the participants were to indicate if their girls wore jeans. Four participants answered no; therefore, they could not continue the survey. A population of 97% (156) completed the survey. Figure 4.8 reports the result. The complete summary of the demographic information is shown in Table 4.7.

Table 4.7

Summary of Demographic Characteristics for the Sample (N=156)

	Number of Participants	Percent (%)
Shop for girls between the ages of 7-12	156	100
Participants of Parent	156	100
Age of the child in years		
Seven	13	8.0
Eight	26	16.0
Nine	28	18.0
Ten	30	19.0
Eleven	21	13.0
Twelve	41	26.0
Ethnicity		
White/European American	111	71.0
African American/Black	21	13.0
Hispanic American or Latina	15	10.0
Asian	8	8.0
Other (Mixed and Irish/Italian)	1	1.0

Shopping Channel. After the demographic screening, participants were asked to ponder and think about their experiences when shopping for jeans for their daughters. The survey begins with the question, "where do you usually shop for jeans for your daughters?" The population was presented with four possible answers to select or specify. The potential answer was in-store, Online, catalog, and others. Overall, 131(84%) participants, indicate they shop in-store. The result is shown in figure 4.4.

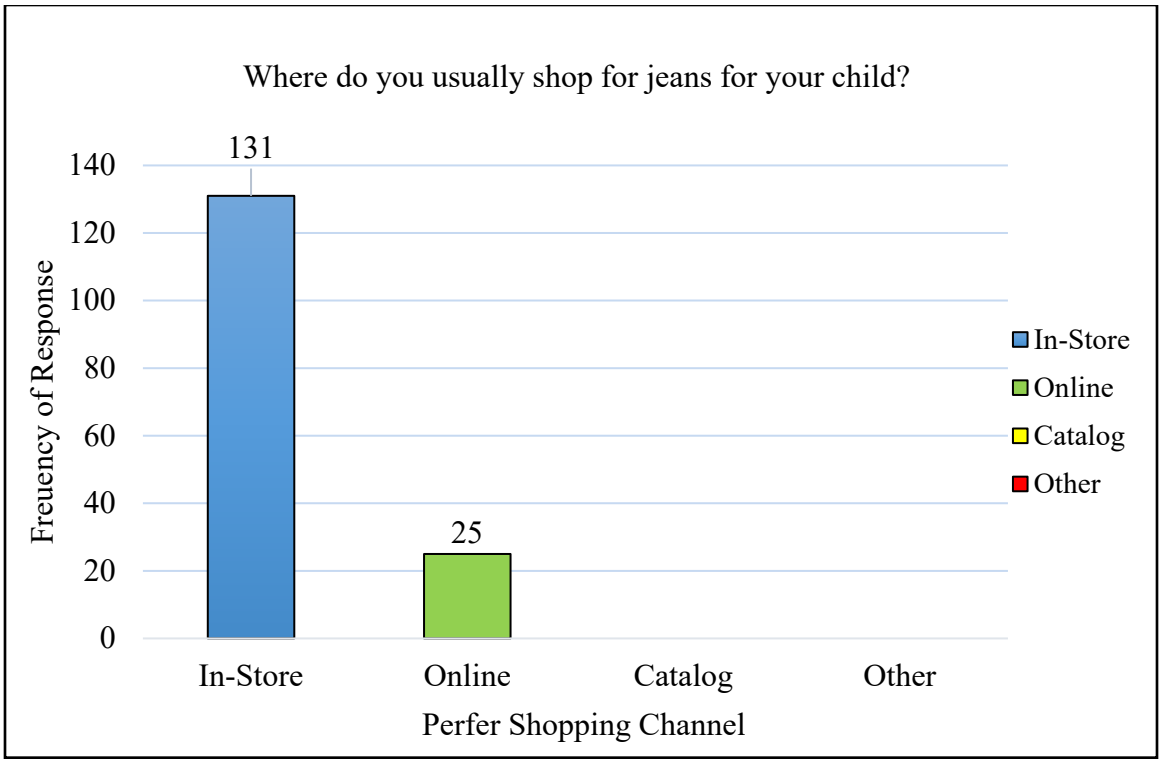


Figure 4.4

Shopping Channel

Brand Purchase. Today parents and their children address the fit issue through brand association. For this reason, the survey question asked participants, "What brand(s) of jeans do you usually purchase for your child?" The participants were presented with nine multiply jeans brands choices to select. The brands listed were Children's Place, Gap, Old Navy, Arizona, Levi's, Lee, Guess, Lucky, Designer brand, and others for the participant to specify. In the 156 response, the Old navy reported 43 (28%) responses. The complete result is presented in figure 4.5.

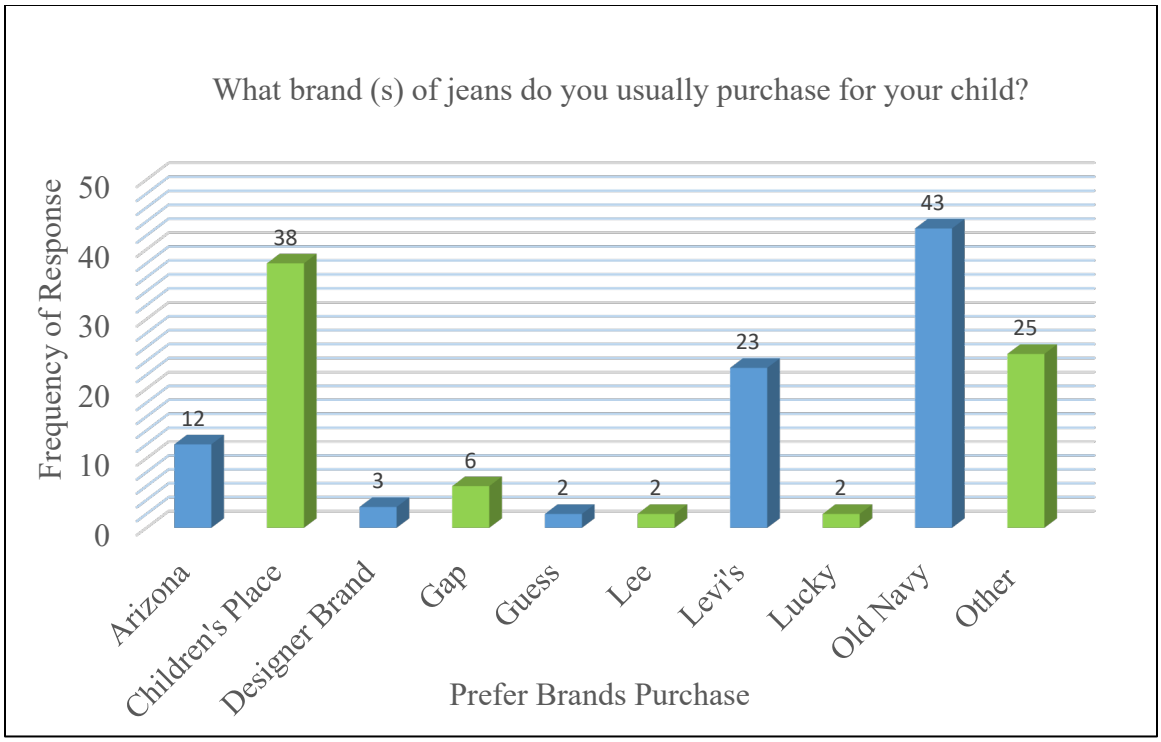


Figure 4.5

Brand Purchase

Style Purchase. The participants were requested to answer the question, "What style jeans do you purchase for your child?" There were four styles of jeans to choose from (straight, Boot-cut, Skinny, jeggings) and others to specify. Participants overwhelmingly selected skinny jeans with 66 (42%) responses. The frequency response result is presented in figure 4.6.

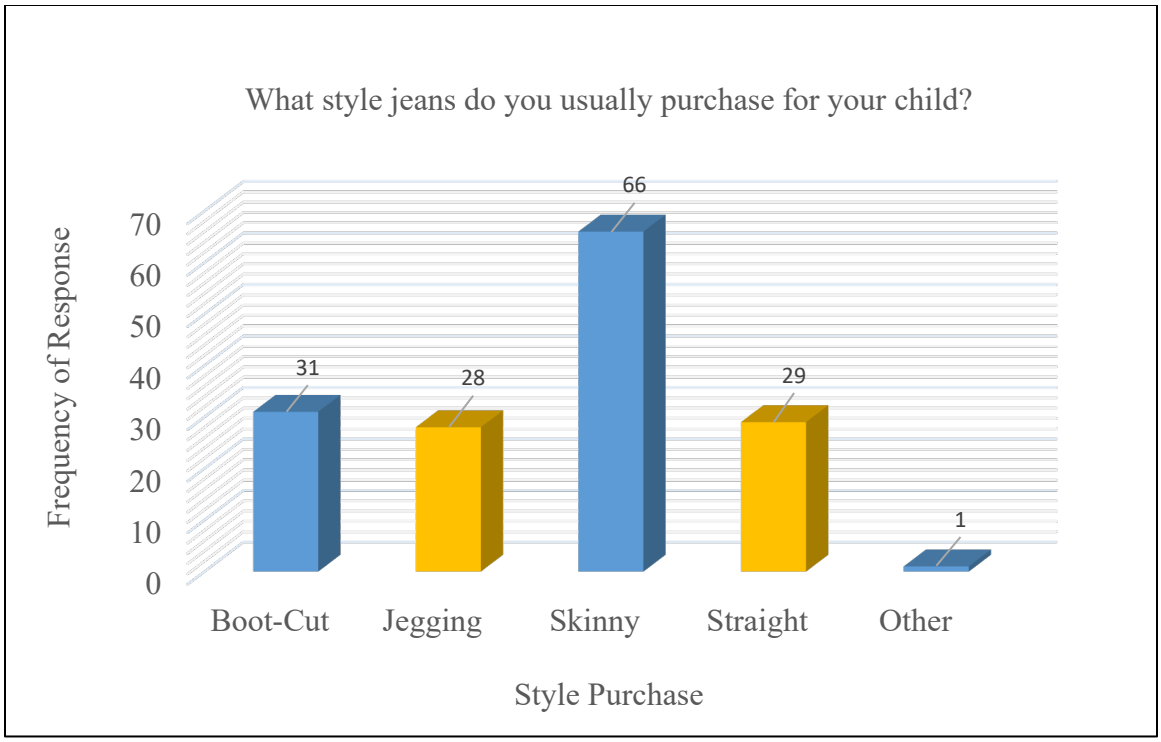


Figure 4.6

Style Purchase

Price Point for a Pair of Jeans. Consumers are drawn to brands by the price point offered to them. The participants were asked, "How much do you typically pay for one pair of jeans for your daughter?" The participants were to choose from price ranges of $5-15, $16-25, $26-35, $36-45, and others to specify. According to the data, most of the mothers would pay $16-25 (72 responses) for a pair of jeans for their daughter. The result is shown in Figure 4.7.

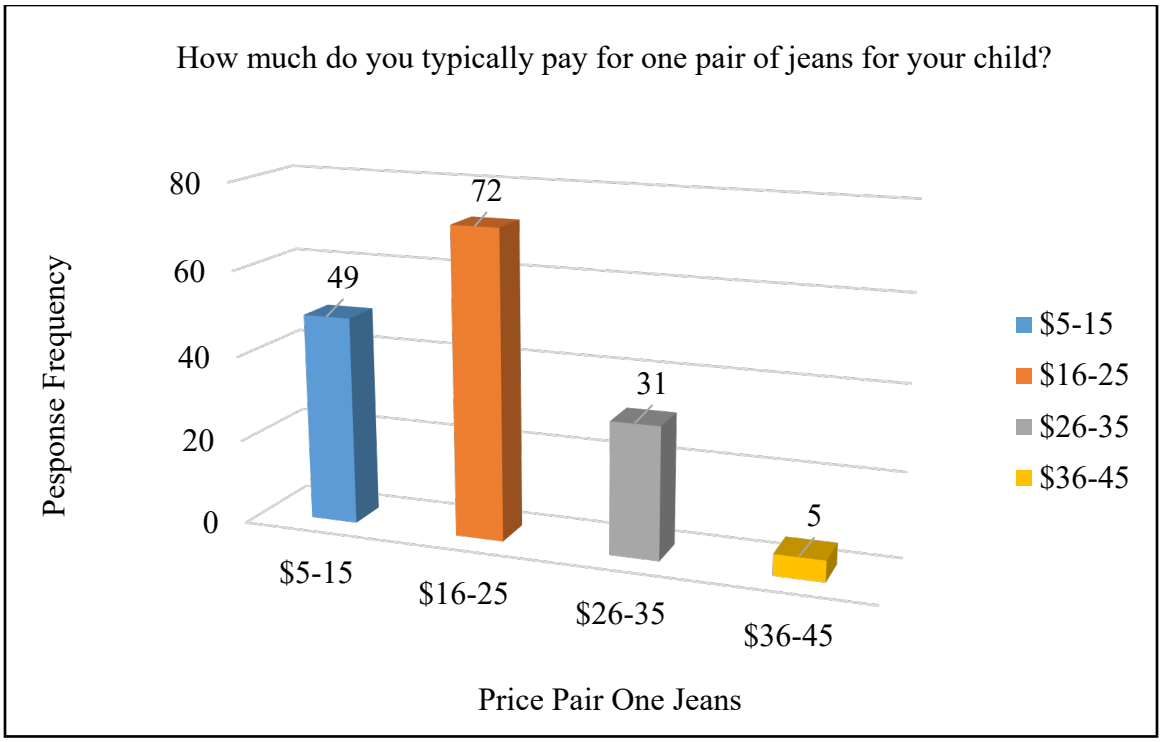


Figure 4.7

Summary of Price per Jeans.

Size Affiliation of Jeans Category. The participants were asked to report, "What size jeans does their daughter wear? A possible answer to the question was regular, slim, plus (7, 8, 10, 12, and 14). The size designation was grouped according to ASTM standard tables of body measurements for girl's size 2 to 20 (regular and slim) and girl's plus1. The results were grouped into regular (sizes 7, 8, 10, 12, and 14), slim (sizes 7, 8, 10, 12, and 14, and plus (sizes 7, 8, 10, 12, and 14). The size designation for regular sizes 7 through 14 yielded 122 responses (78%). Figure 4.8, through Figure 4.11, presents the sizes and the associated frequency in more detail.

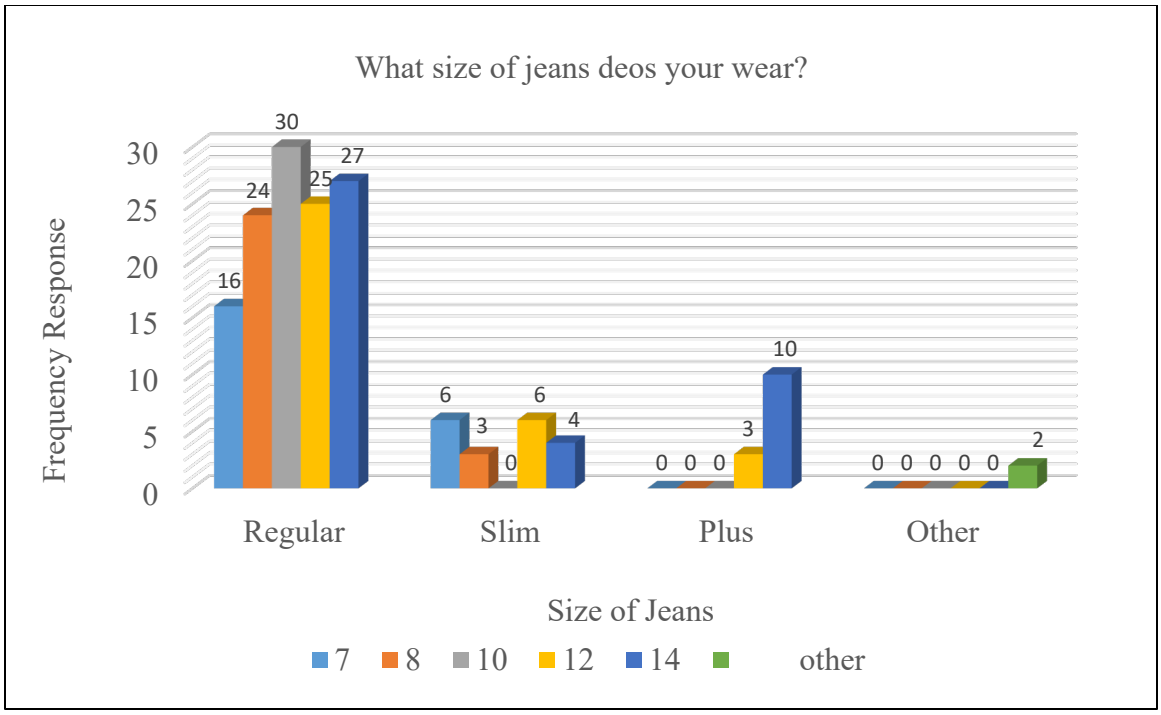


Figure 4.8

Summary of Size

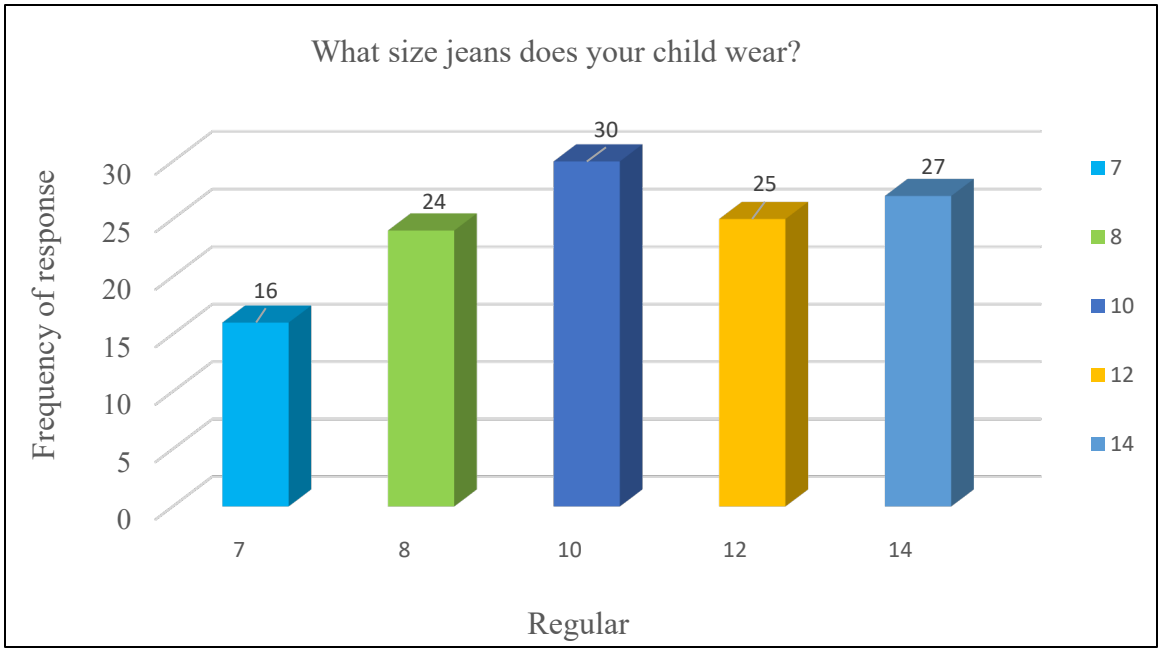


Figure 4.9

Regular Size

Figure 4.10

Slim Size

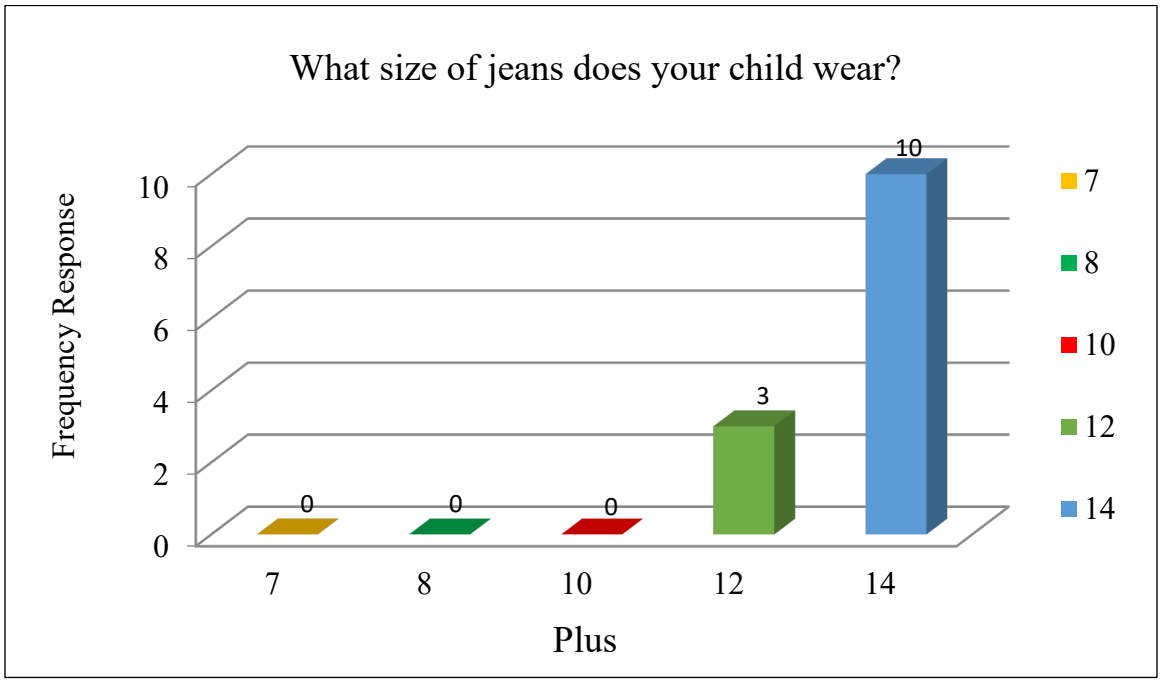


Figure 4.11

Plus Size

Height. The survey asked participants, “what is your child’s height in feet and inches?” In all, one hundred and fifty-four participants responded to the question by reporting the height of their children. The complete response was in feet and inches, which were corrected into inches to arrive at the total height. The height was grouped into ranges based on ASTM published standard. Table 4.8 presents these heights, percent, and the associated range as compared to ASTM published standard.

Table 4.8

Height Affiliation Based on ASTM Published Standard (N=156)

Height Category	Size	ASTM Standard (Units)
Regular	Size 7	50.5
	Size 8	52.5
	Size 10	55
	Size 12	58
	Size 14	61
Slim	Size 7	50.5
	Size 8	52.5
	Size 10	55
	Size 12	58
	Size 14	61
Plus	Size 7	50.5
	Size 8	52.5
	Size 10	54.5
	Size 12	57.5
	Size 14	60.5

*ASTM Designation: D6192/D6192M-19: Standard Tables for Girls, size 2 to 20 (Reg & Slim) and Girls Plus

Participants' reported height ranges from 30 through 79 inches. Fifty percent (77 participants) ranged in the height of 30 to 79 inches. The table above reports the actual participant's height for girls between the ages of 2-14 and the ASTM published height standard in regular, slim, and plus. The participant's height range begins with 30-79 inches, whereas the ASTM begins with 50.5 through 61. This means that the participant's

height 30-49 is below the ASTM standard, and 62-79 was above the ASTM standard. Figure 4.12 depicts the result in detail.

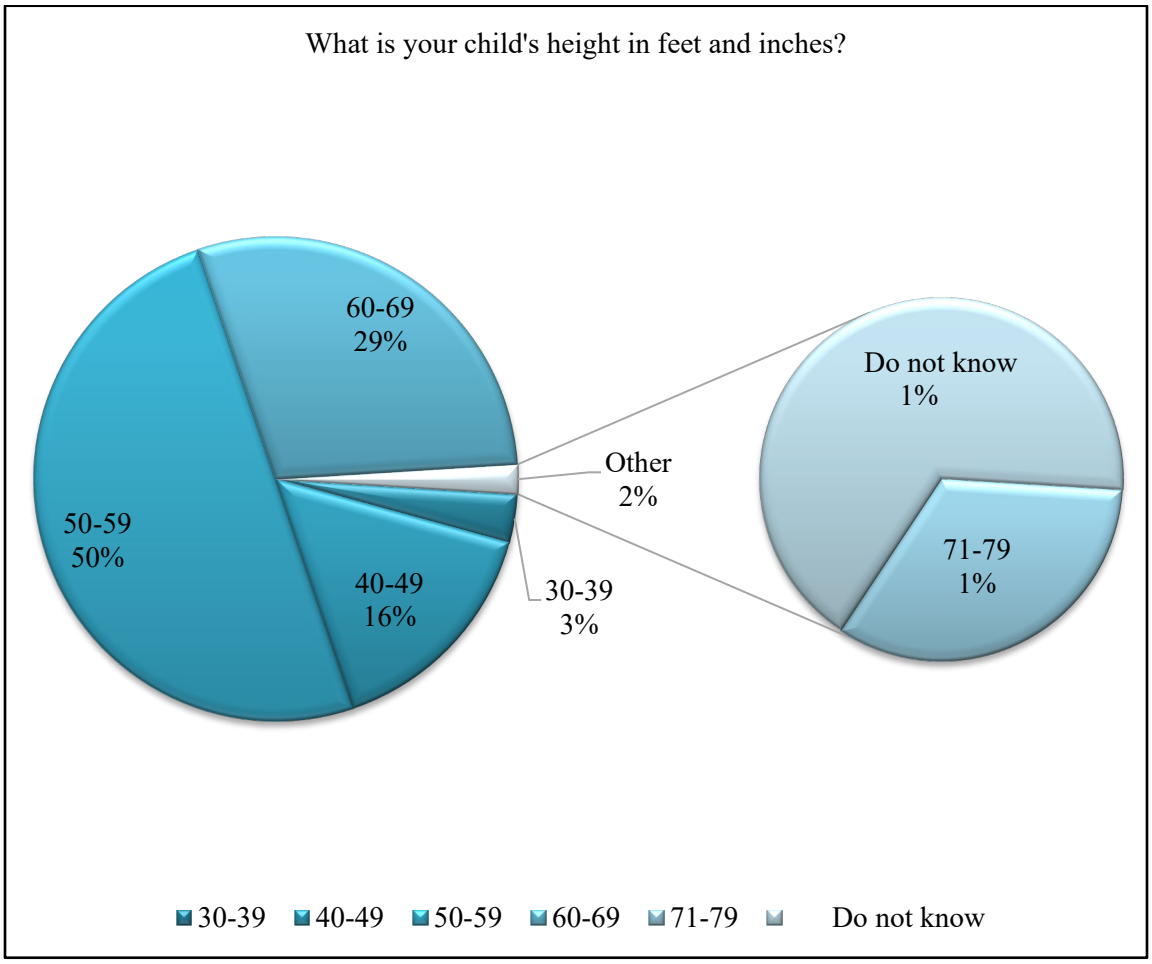


Figure 4.12

Girl's Height Response (N=156)

If this is so as it is in this research analysis, then the following figure 4.16 will explain the notion better.

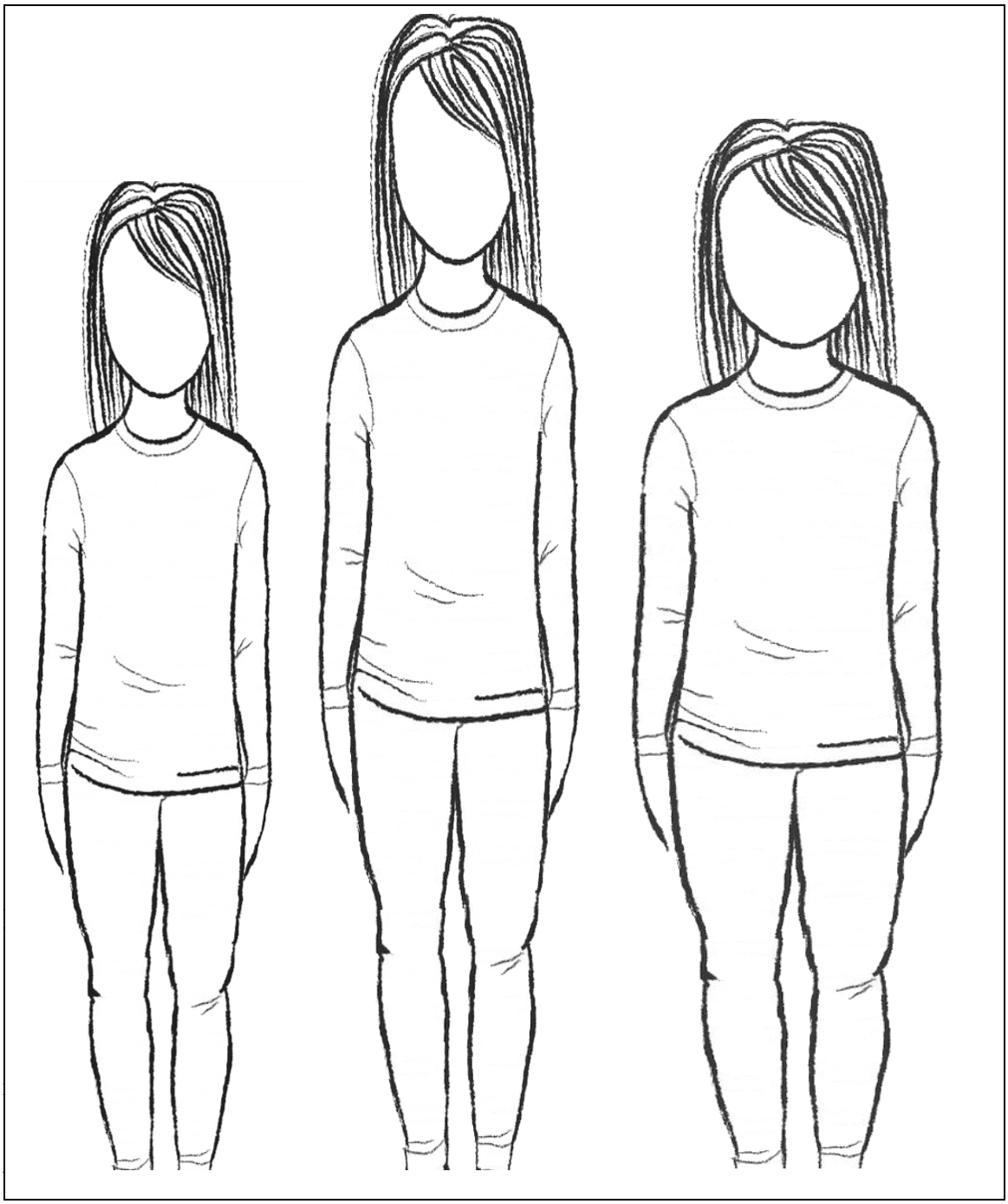


Figure 4.13

Height comparison of the three children of the same age size 12

Weight. According to ASTM (D5219-15) published standard terminology relating to body dimensions for apparel sizing, bodyweight is measured on a calibrated scale taken with the subject in undergarments. In the United States, children's sizes are based on age, but as the child grows, the weight of the girl also comes into play. For this research to be authentic and meet its objectives, participants were asked, "What is your child's weight in pounds?" One hundred and fifty- six responded to this question. The response was grouped in the range based on ASTM D6192/D6192M – 19 Standard Tables of Body Measurements For Girls, Sizes 2 To 20 (Regular & Slim), And Girls' Plus.

Table 4.9

Participants Weight Affiliation under the ASTM Girls Body Measurement D6192/D6192M-19

ASTM Girls Body Weight (Range), Ib Pound Units					
Size Number	7	8	10	12	14
Regular	52-58	61-68	71-87	85-95	99-110
Slim	46-52	55-62	65-81	79-89	93-104
Plus	63-71	72-80	81-90	91-108	109-120

*****ASTM Designation: D6192/D6192M-19: Standard Tables for Girls, size 2 to 20 (Reg & Slim) and Girls Plus[1]

Weight range of 80-89 carries the majority of 25 participants with 16%. ASTM Girls Body Weight (Range), for size number 7 to 15 years old, begins from 52-110 for regular size, 46-104 for the slim size, and 63-120 for plus girls. The participant's response grouped in range indicates that the weight starts from 50 to 225 pounds. This

means that the weights of girls above 120 to 225 are above the ASTM weight published standard. The complete results are shown in Figure 4.14.

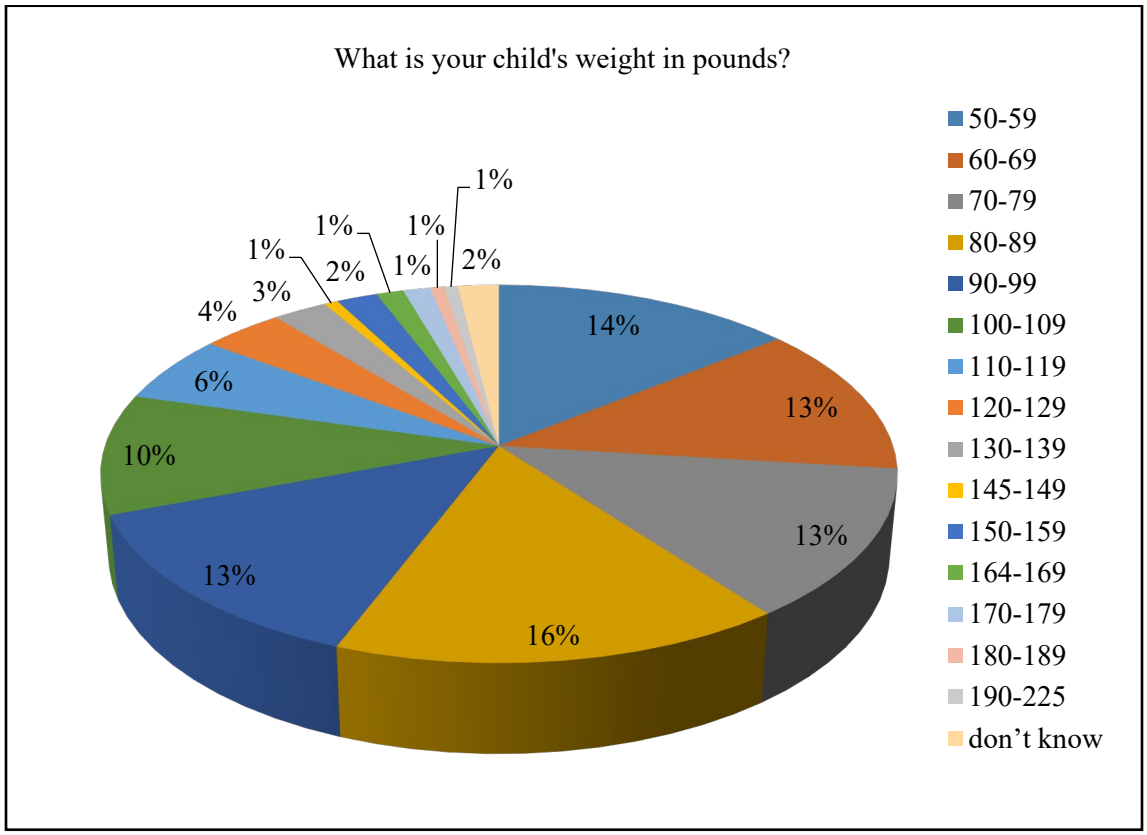


Figure 4.14

Participant's Weight affiliation based on brand chart size category (N=156)

Design Features. Consumers make decisions regarding the design features they want in their products. The survey asked participants, **"**What design features does your child prefer in jeans?" Five questions addressed design features: fabric with stretch, elastic waistband, cuffs, pockets, and an option to specify others. In the responses, 51% of participants said they seek fabric with stretch. The result is presented in Figure 4.15.

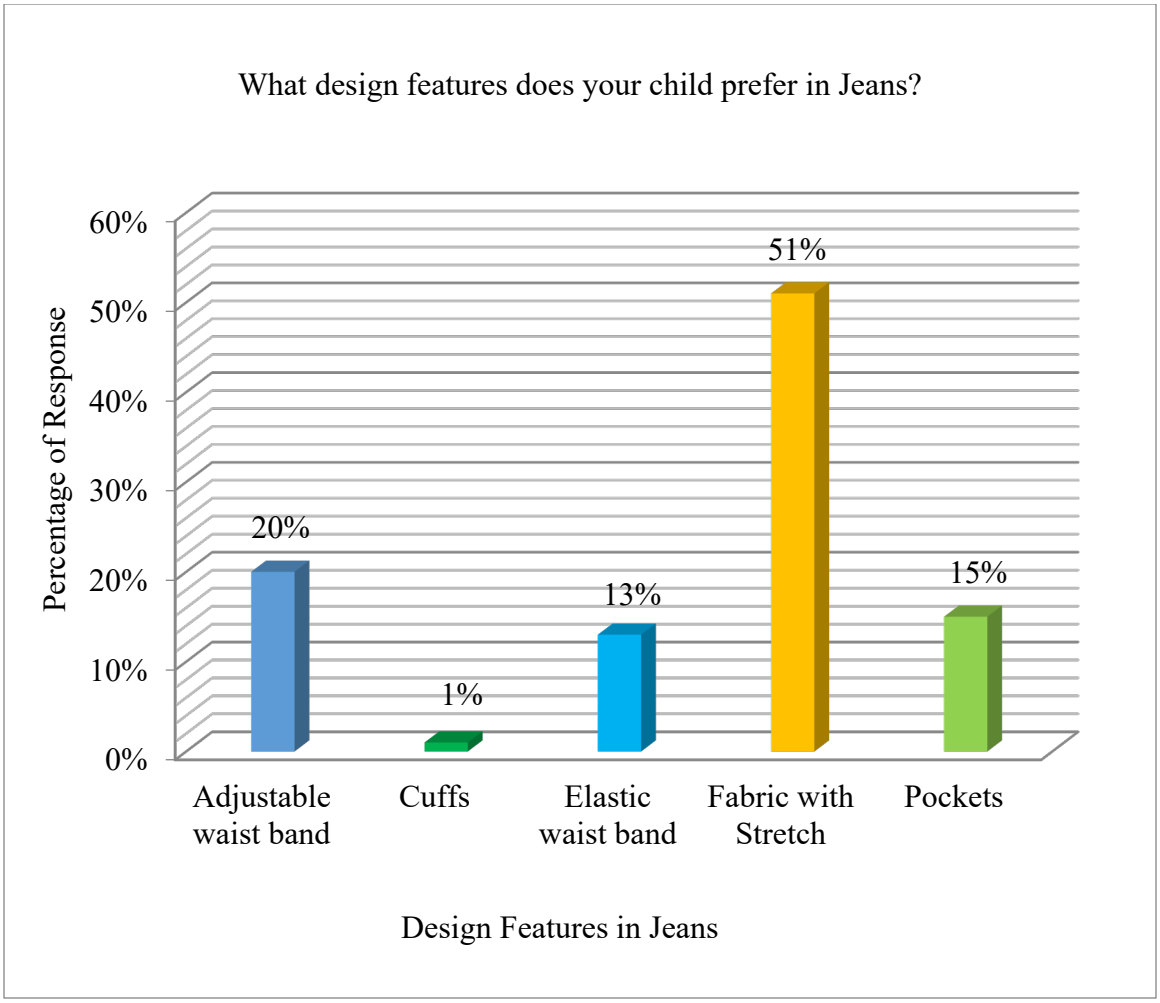


Figure 4.15

Summaries of Design Features

Reasons for Brand Purchases. The survey asked, "Which of the following reasons best describes why you purchase the brand(s) of jeans selected?" There were four possible lists to choose: fit, price, quality, and popularity of the brand name (many of my child's friends wear this brand). This survey reported 74 participants (48 percent) purchase the selected brand due to fit. The result is reported in figure 4.16

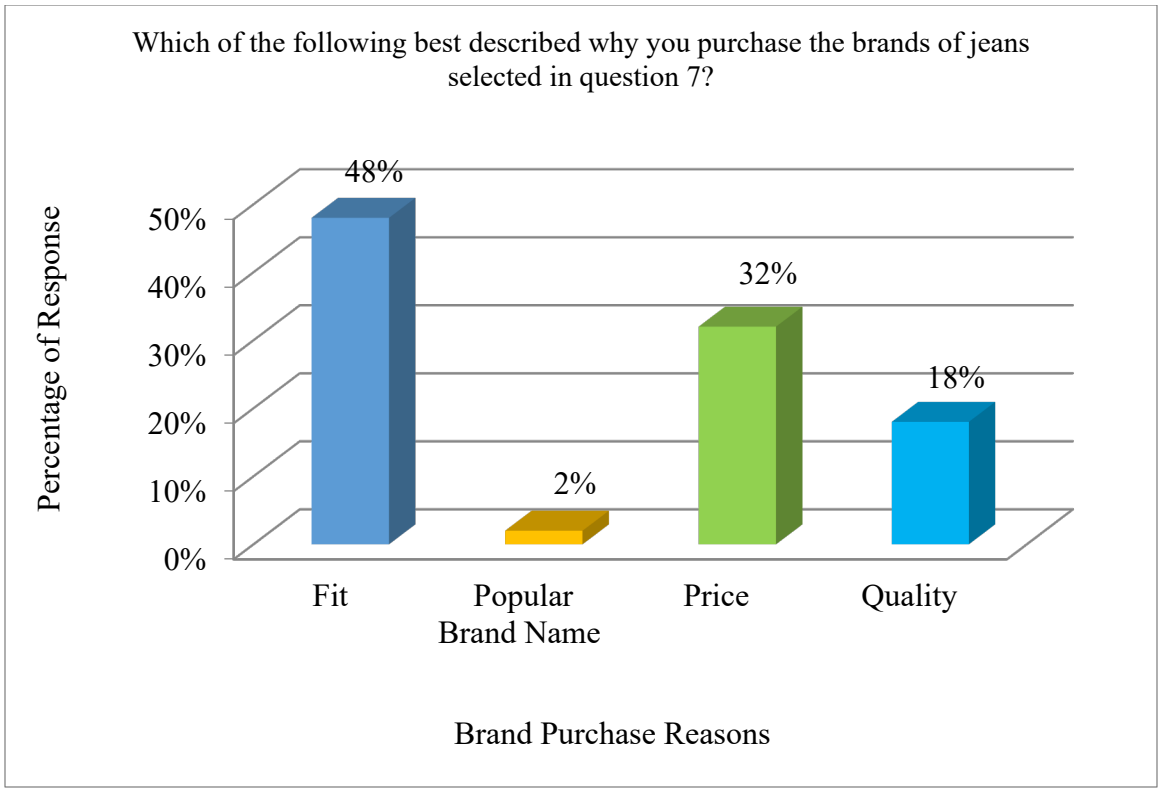


Figure 4.16

Brand Purchase Reasons

Fit. The survey question asked participants, "How important is 'fit' when selecting jeans for your daughter?" Fit is measured using locations on the jeans such as inseam, outseam, crotch depth, waist, bottom leg, hips, and overall length. The participants were to indicate extremely important, neutral, not at all important, slightly important, or very important. Based on the data rating of all of the locations on the jeans, the waist category was extremely important to the participant at 56 percent of the sample. The results can be seen in Figure 4.17.

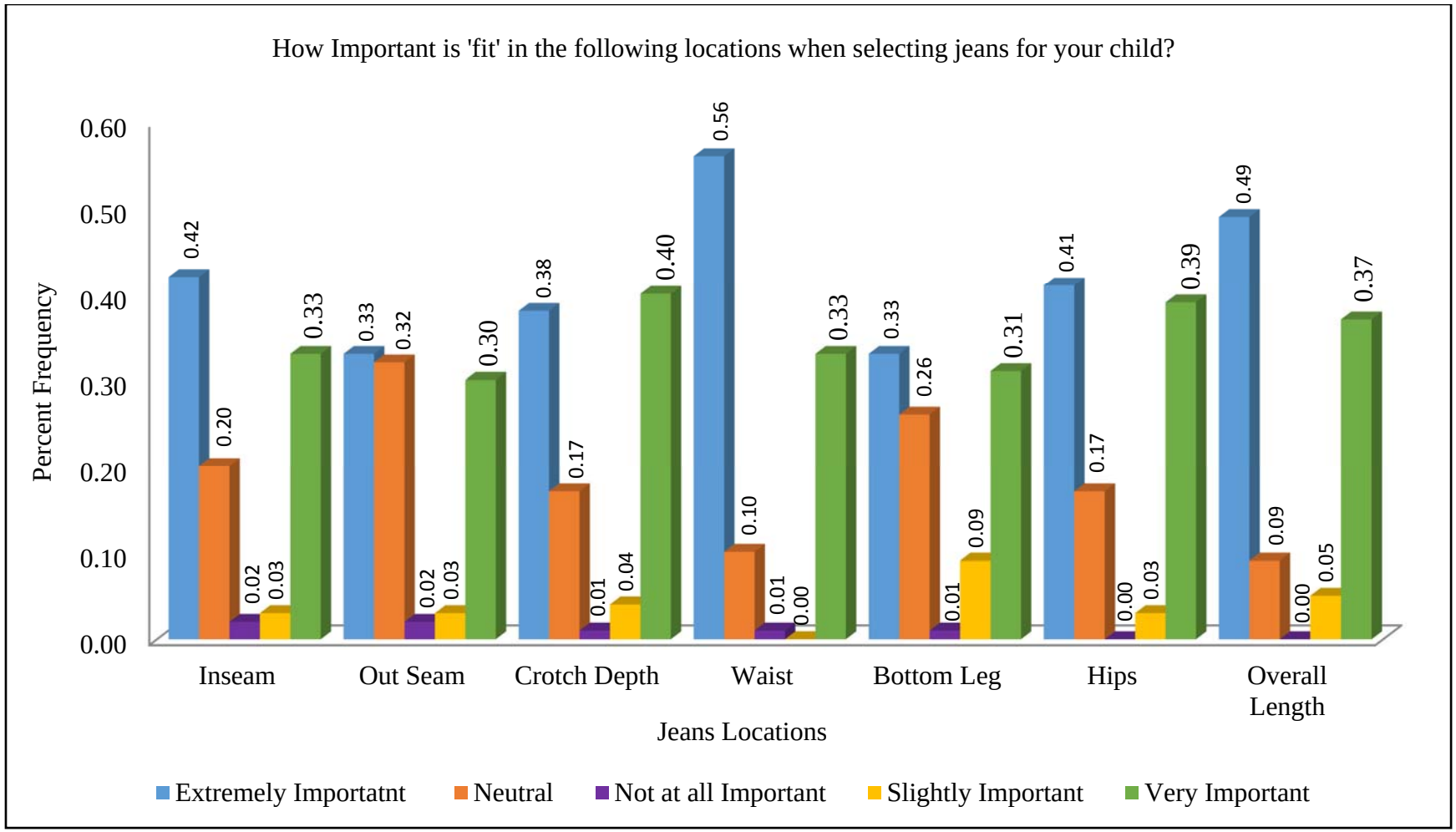


Figure 4.17

Importance of Fit

Importance of 'Fit 'Analysis and Interpretation. After the recorded frequency, the response data were plotted into the SAS 9.4 system (software) by using the Glimmx procedure to interpret the average score for each of the categories along with the standard deviations. During this analysis, the p-values and significantly different were obtained. Linear mixed models were used to account for the repeated measures within subjects. Table 4.10A shows the average score for each of the categories along with the standard deviations. Since the p-value is less than 0.05, which is the typical cutoff for significance, this concludes that there are statistically significant differences between variables with respect to the locations measured.

Table 4.10A

Analysis of the Least Squares Means of Fit

Category Least Squares Means					
The label of Former Variable	Estimate	Standard Error	DF	t Value	Pr > |t|
Bottom Leg Opening	3.6839	0.08957	466	41.13	<.0001
Crotch Depth	3.9484	0.08957	466	44.08	<.0001
Hips	4.0258	0.08957	466	44.94	<.0001
Inseam	3.9419	0.08957	466	44.01	<.0001
Outseam	3.5946	0.09029	477	39.81	<.0001
Overall Length	4.2645	0.08957	466	47.61	<.0001
Waist	4.3366	0.08975	468.7	48.32	<.0001

The table below uses Tukey's method to compare the means for each of the categories. The means are sorted along with lettering, which tells if two means are not significantly different. For instance, the waist had the highest average score, but this score was not significantly different from the overall length (both are marked with A). The waist is, however, significantly different from hips, crotch depth, inseam, bottom leg opening, and outseam. Table 4.12B shows the profile of each means.

Table 4.10B

Analysis of the Significant of Fit

Tukey-Kramer Grouping for category Least Squares Means (Alpha=0.05)			
LS-means with the same letter are not significantly different.			
The label of Former Variable	Estimate	Letter	
Waist	*4.3366		A
Overall Length	4.2645	B	A
Hips	4.0258	B	C
Crotch Depth	3.9484	D	C
Inseam	3.9419	D	C
Bottom Leg Opening	3.6839	D	E
Outseam	3.5946		E

Fit Issues. Seven key locations were selected for fit issue problems based on the online review and parent complaints. The survey asked participants 'When trying jeans on your daughter, "which of the following are 'fit' issues?" The data collected indicated (48 percent) of participants strongly agreed that the waist was considered an important fit issue. The result is displayed in Figure 4.18.

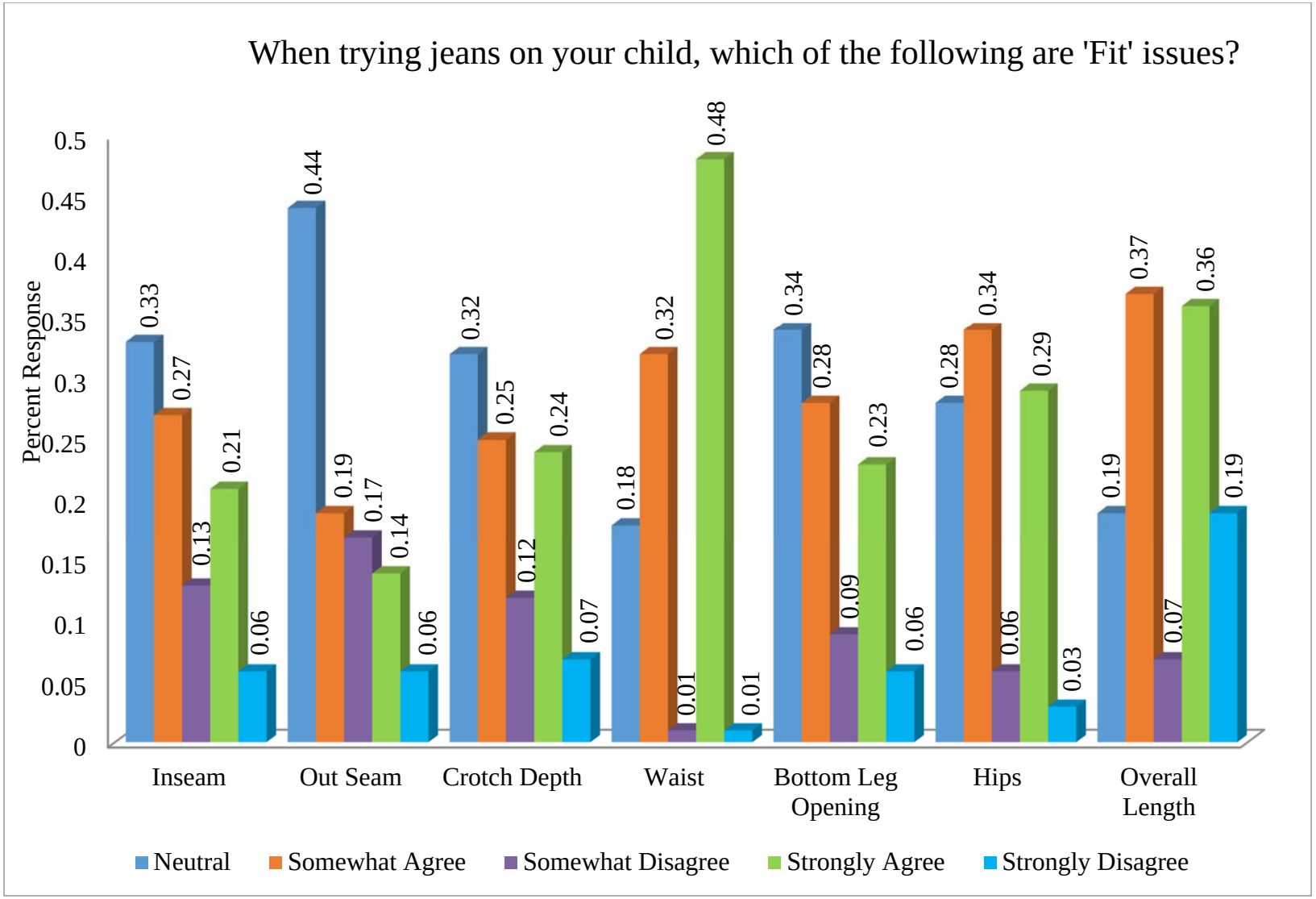


Figure 4.18

Fit Issues in Key Jeans Location

Analysis of Variables of Fit. The interpretation of this analysis results was the same as in Table 4.13. The recorded frequency of the 'fit' issues response data was also plotted approximately in the SAS 9.4 system (software). The Glimmx procedure was followed to interpret the average score for each category along with the standard deviations. During this analysis, the p-values were obtained. Linear mixed models were used to account for the repeated measures within subjects. Table 4.11 reports the average score for each of the categories along with the standard deviations. Table 4.11A indicates the Statistical Analysis of Variables (Fit).

Table 4.11A

Statistical Analysis of Variables (Fit)

Category Least Squares Means					
The label of Former Variable	Estimate	Standard Error	DF	t Value	Pr > |t|
Bottom Leg Opening	3.5264	0.08591	496.8	41.05	<.0001
Crotch Depth	3.5134	0.08590	496.8	40.90	<.0001
Hips	3.7943	0.08591	496.8	44.17	<.0001
Inseam	3.4552	0.08590	496.8	40.22	<.0001
Outseam	3.2750	0.08590	496.8	38.12	<.0001
Overall Length	3.9960	0.08609	499.7	46.42	<.0001
Waist	4.2063	0.08608	499.7	48.86	<.0001

Table 4.11B

Statistical Analysis of Variables (Fit)

Tukey-Kramer Grouping For Category Least Squares Means (Alpha=0.05)			
LS-Means With The Same Letter is Not Significantly Different.			
The label of Former Variable	Estimate	Letter	
Waist	4.2063		A
Overall Length	3.9960	B	A
Hips	3.7943	B	C
Bottom Leg Opening	3.5264	D	C
Crotch Depth	3.5134	D	
Inseam	3.4552	D	
Outseam	3.2750	D	

***** Waist is significantly different from all locations but not significantly different from overall length.

Try on a garment in-store or purchase according to size. To determined jeans' shopping experience and purchase preference based on size, participants were asked, "Does your child try on garments in the store, or do you purchase according to size?" Participants were presented with five lists of questions: Yes, try on jeans in the store; No, do not try on jeans in the store; Yes, purchase jeans according to size; No, do not purchase according to size; Sometimes, try on garments in the store or purchase according to size or to specify. Figure 4.19 shows the percent of each subject.

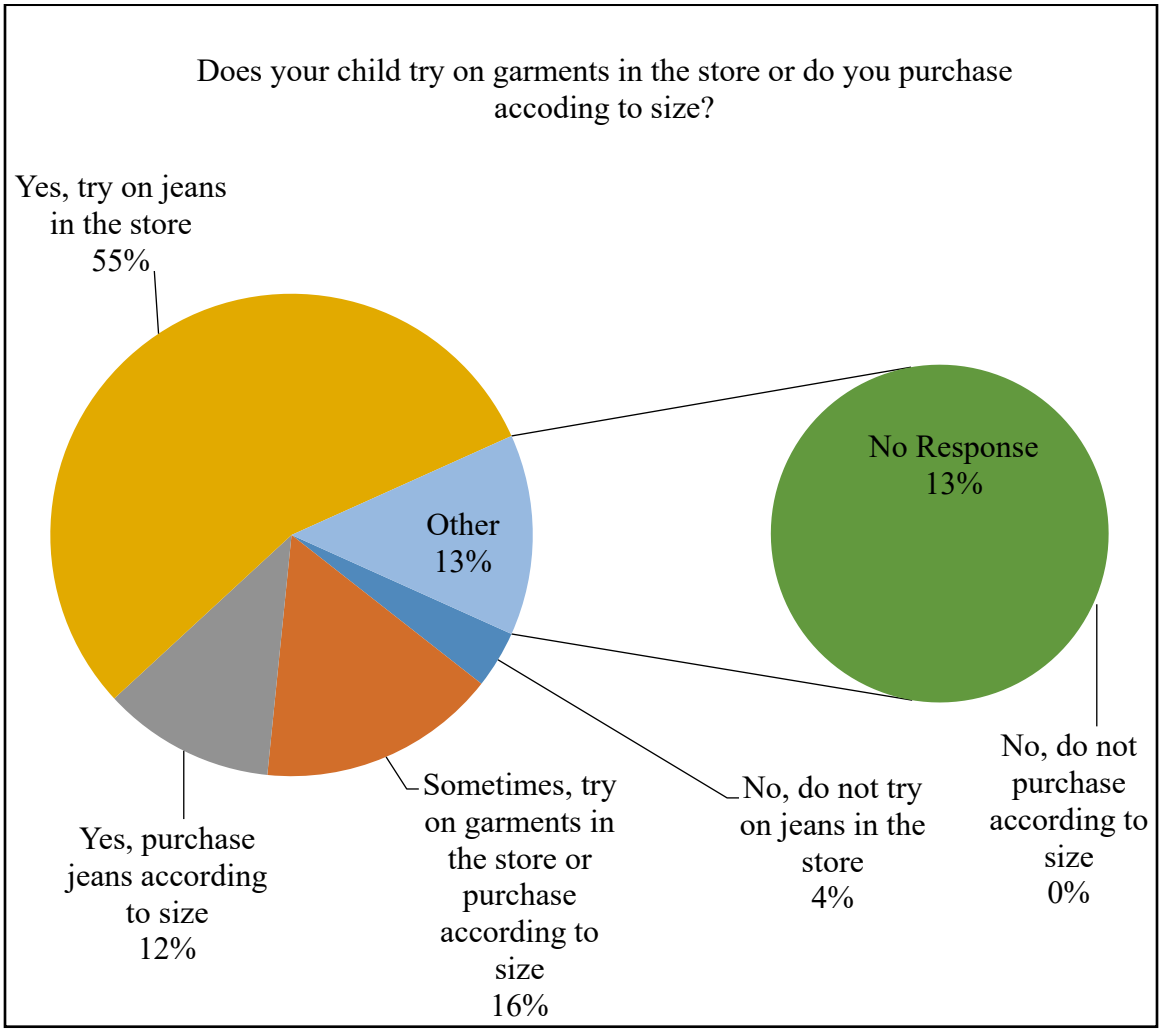


Figure 4.19

Try on Garments in the Store or Purchase According to Size.

The survey found out that a fairly high percentage (55%) of parents responded yes, try on jeans in the store.

Fitting Dilemma.

The questionnaire asked participants, “What do you do when you cannot find jeans that fit your child?” The population was to state or write down (in their own words) what they usually do in the case of an undesirable or unpleasant choice of not finding jeans size that does not fit. The entire results response is grouped in alphabetical order (not by percent) in table 4.12. Respondents indicate to buy a different brand 15%. In addition, the respondent will not buy any; find a pair that does; or have not had this issue amount to 3%, respectively. Two percent indicate to buy stretch pants (2%) or do not know (2%). Other participants in the 1% each category were those who said they would ask for help, purchase bigger ones, exchange, frustrated, always can find jeans that fit, still trying to figure out what to do, look for another style, return, can wear my jeans-around the same size, and tell my mom. All in separate 1% categories (see Figure 4.20)

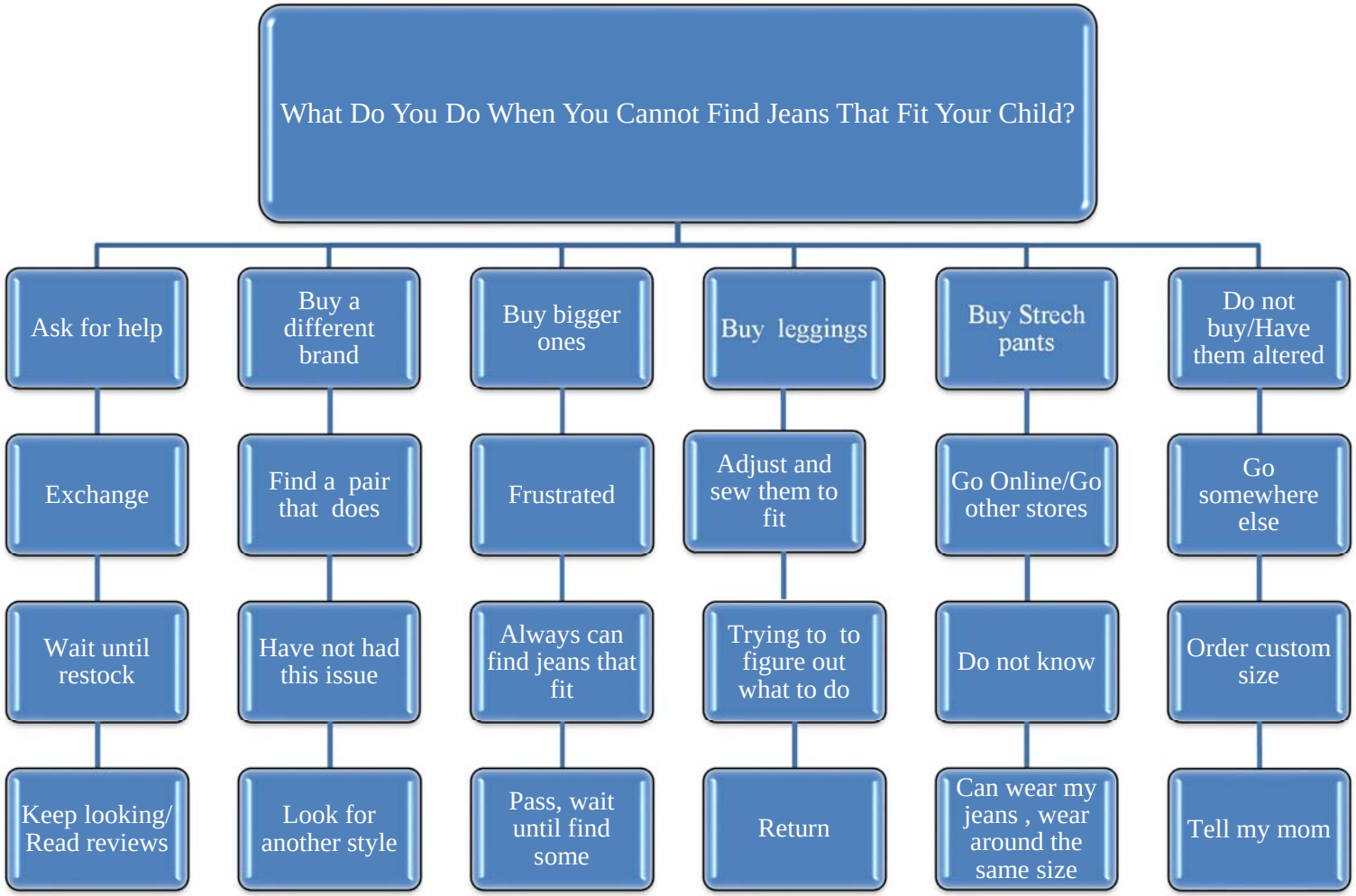


Figure 4.20

*Response was sorted alphabetically from A-T for reporting purposes and does not represent frequency response, percentage or hierarchical relationship.

Laboratory Evaluation Result

The laboratory evaluation was in two parts, a review and analysis of the online sizing charts for each brand verses the ASTM standard and the laboratory measurements evaluation of the four brands. The online brands sizing charts were compared to the ASTM body measurement standard and the laboratory measurements evaluation of the four brands to evaluate the consistency and inconsistencies of the sizes.

Online Brands Chart Evaluation. The evaluation examined sizing charts from four brand categories. Four brands, namely Children's Place, Gap, Levi's, and Old Navy to compare the brand's sizing chart standard to the ASTM published standards. Size 12 was selected from the brand's chart to compare the consistency and inconsistencies, and any discrepancy among the brands compare to the ASTM standard. The following table 4.12 shows the four brands' online chart measurement compared to the ASTM standard in size, age, height, weight, waist, hip, and inseam. The original brand online charts data tables of each brand are presented in Appendix E.

The ASTM Standard Table of Body Measurements for girls sizes 2 to 20 (Regular and Slim) and Girl's Plus list body measurement of girl's sizes. Although these are body measurements, they can be used as a baseline in designing apparel for girls in this size range when considering factors such as fits and style. The table indicates the size columns section in size 12 brands category according to the ASTM standard.

However, three brands, such as Children's Place, Gap, and Old Navy, uses both numerical and letter numbering L (large) and XL (Extra Large) to represent the size category. It is interesting to note that even though Gap and Old Navy were similar companies, Gap jeans size 12 was labeled XL, and Old Navy was labeled as L.

Table 4.12

Summary of Online Brand Size Chart and ASTM Published Standard for Girl's

Brand/Standard Name	Size (Letter)		Age	Height	Weight	Waist	Hip	Inseam
				Inches	Pounds (Ibs.)	Inches		
ASTM Standard Regular	12	-	12	58	85-95	26	32	-
Children's Place Bottom/Regular	12	(L)	9 - 10 Years	55 - 58	75 - 86	25 - 26	30 - 32	26 -27.5
Gap Bottom/Regular	12	*XL	12 Years	57 - 60	82 - 93	25 ¼	31½	-
Levi's Bottom/Regular	12	-	-	58 - 61	85 - 95	25	32	-
Old Navy Bottom/Regular	12	(L)	-	-	-	25 ½	32	-

The ASTM Standard Chart indicates Age 12 in the age category. With the samples collected for this study, Gap is the only brand, which indicates the age of 12 years. Children's Place indicates a range of age, which was 9-10 years. Levi's and Old Navy did not specify any age group for this brand category. This indicates that there were differences in age and size range across the four brands as to the ASTM standard.

The height for the ASTM standard was 58 inches. Three brands, such as Children's Place, Gap, and Levi's, recorded the height in ranges. The ranges of the heights differed as 55-58, 57- 60, and 58-61, respectively. Old Navy did not list the height in this brand category.

In the weight columns was a pattern of ranges except for Old Navy, which did not report of any weight in the brand category. The range of weight differed as follows: ASTM standard shows 85-95, Children's Place 75 - 86 Ibs., fail to adhere to the standard, Gap was 82 - 93 Ibs. which was within the range, and Levi's 85 - 95 Ibs., which passes the standard in this category. In the waist columns, the ASTM standard shows 26 inches. The Gap was 25 ¼, Levi's 25 inches, Old Navy was 25 ½ inches, except for Children's Place, which indicates the weight in a range category between 25-26 inches. The four brands were within or slightly close to the standard. The required ASTM standard for the hip measurement was 32 inches. Children's place was the only brand category that

specifies the measurement in the range from 30 to 32 inches. Gap hip measurement was short by a half inch with the hip measurement as 31½, Levi's shows 25 inches on the brand chart with about 7inches less than the required measurement. Old Navy is the only brand in this category, which passes the body measurement requirement with 32 inches. The ASTM standard table of body measurement for girls, size 2 to 20, did not designate inseam on the chart; however, many brand charts do designate inseam on size charts. Children's Place assigned 26-27.5 on the brand size chart, Levi's was 32, Gap and Old Navy had no information about inseam on the brand's size chart.

Size and Fit. The laboratory evaluations of technical flat garment measurements for the twelve jeans are presented in Figure 3.1. Details of the garment points of measurement location are in Appendix D; the measurement is included for comparison. The laboratory evaluation examined three brands from each category. In all, a total of twelve jeans samples were purchase, three each from children's Place, Gap, Levi's, and Old Navy for measuring. This research selects girl's size 12 regular, boot-cut style jeans. The design features included in the samples are inner, conceal adjustable waist tabs, and waistband, which sits low on the waist. The color ranges from the medium worn stone wash, medium wash, wading waters, and medium denim wash. The fiber contents are a combination of cotton, polyester, spandex, lycra elasterell, and lycra spandex.

Evaluation of Laboratory Measurement

The measurement evaluation begins by measuring horizontal and vertical measurements. Each brand category has three regular sizes, 12 jeans, and the results averaged to ensure accuracy. The horizontal measurement is circumference of waist, hips front, hips back, knee width right, knee width left, leg opening circumference right, and leg opening circumference left. The vertical measurement locations are crotch depth front, crotch depth back, inseam right, inseam left, outseam right, outseam left, overall length right, overall length left. The horizontal and vertical measurement locations of each pair of jeans were used to determine which ASTM body dimensions and size most closely conformed to the brand average measurement. Details results of all mean average are in appendix D.

Comparison of Sample Measurements. The jeans sample lab measurements and the three-sample measurement from each four brands Children's Place, Gap, Levi's, and Old Navy were compared. This was done to evaluate and compare each pair of the jean to each other, in the same brand to see if the same brand varies or differ in the same brand category. The measurement was taken from fifteen locations of the jeans. However, only eleven measurement locations were used to compare the variance to tolerances. The locations included the waist circumference, front and back crotch depth, front and back hip, right and left inseam, right and left outseam, and right and left the overall length of the twelve jeans. The points of measurements were selected to be compared based on the online review literature and complaints about the fitting issue along with these areas. The results of the laboratory measurement locations are presented in Appendix D.

Comparisons within Samples Measurements: Children's Place (CP). Children's Place 'Sample' was coded as CP. Sample one was represented by CP1, sample two, CP2, and sample three, CP3. The results are presented in Table 4.13.

Table 4.13

Comparison of Measurements of the three Children's Place Jeans

Measurement Location	Children's Place Jeans Size Number: 12					
	Sample Product CP 1	Sample Product CP 2	Sample Product CP 3	Average	SD	*Allowable Tolerance + / -
	Inches	Inches	Inches	Inches	Inches	Inches
Circumference of Waist	27.63	28.25	27.25	27.71	0.51	0.50
Crotch Depth Front	8.75	9.00	8.63	8.79	0.19	0.25
Crotch Depth Back	11.25	11.63	11.38	11.42	0.19	0.25
Hips Front	16.38	16.75	16.50	16.54	0.19	0.50
Hips Back	16.38	16.75	16.25	16.46	0.26	
Inseam Right	27.75	26.75	26.50	**27.00	0.66	0.25
Inseam Left	26.38	27.50	26.50	**26.79	0.61	
Out Seam Right	33.50	33.50	33.25	33.42	0.14	0.38
Out Seam Left	33.50	33 38	32.88	33.24	0.33	

*Tolerance adapted from Apparel Design & Production Hand Book from The Fashiondex, Inc. pp. 7.10 (2001) **Measurement is Outside of Tolerance Range

CP1 waist circumference was 27.63 inches; CP2 was 28.25 inches, and CP3 27.25. The average for all three was 27.71, and a standard deviation of 0.51. It is clear that CP2 was about an inch larger than CP1 and CP2.

The front crotch depth for CP1 was 8.75 inches, CP2 9.00 inches, and CP3 8.63 inches. The average was 8.79, and the standard deviation was 0.19. For back crotch depth, the recorded measurement was 11.25, 11.63, and 11.38 for CP1-CP3. The average was 11.42 inches, with an SD of 0.19. The hips lab measurement for the CP1 and CP2 share some similarity for both the front (16.38) and back (16.75) measurement; however, CP3 was measured 16.50 inches. The average was 16.54 (front), 16.46 (back) for all three with an SD of 0.19 and 0.26 in that order.

The Inseam for CP2 was 26.75, and CP3 was 26.50 for the front measurement and CP1 26.38 and CP3 of the left measurement. CP1 right inseam recorded 27.75, and CP2 left inseam recorded 27.50. The Average for CP 1 was 27.00 for right inseam and 27.50 for left inseam. The SD was 0.66 (right) and 0.61 (left). The CP1, CP2 (outseam right), and CP1 (outseam left) were 33.50 inches. CP 3 (33.25), CP 2 (33 38) and CP 3 (32.88). The average for right outseam was 33.42 and SD of 0.14, while the left outseam average was 33.24, and SD was 0.33.

These indicate that the three samples from the same brands differ slightly but not very much in this case. However, there was a significant difference between waist circumferences of the samples compared to the same brand. In comparing the average samples and the SD to the tolerance, the variability between the three jeans, the right and left inseam locations exceeded the recommended tolerance.

Comparisons within Samples Measurements: Gap (G). The Gap jeans waist circumferences were all in the 26 inches range with small increments for G1 (26.75), G2 (26.50), and G3 (26 .75). The overall average was 26.67 inches, with an SD of 0.14. Crotch depth front measurement was the same for G1 and G2 (8.38 inches). G3 was 8.25 inches. The average was 8.33 inches and SD of 0.07. The Crotch depth back was in the same range measurement with G2 and G3 for 11.50. G1 (11.63). The result is presented in Table 4.14.

Table 4.14

Comparison of Measurements of the three Gap *Jeans*

Measurement Location	Gap Jeans Size Number: 12					
	Sample Product G 1	Sample Product G 2	Sample Product G 3	Average	SD	*Allowable Tolerance + / -
	Inches	Inches	Inches	Inches	Inches	Inches
Circumference of Waist	26.75	26.50	26 .75	26.67	0.14	0.50
Crotch Depth Front	8.38	8.38	8.25	8.33	0.07	0.25
Crotch Depth Back	11.63	11.50	11.50	11.54	0.07	0.25
Hips Front	16.13	15.63	16.00	15.92	0.26	0.50
Hips Back	16.00	15 88	15.88	15.92	0.07	
Inseam Right	27.63	28.00	28.00	27.88	0.22	0.25
Inseam Left	27.50	28.00	27.88	**27.79	0.26	
Out Seam Right	33.63	33.50	33.63	33.58	0.07	0.38
Out Seam Left	33.13	33.50	33.38	33.33	0.19	

*Tolerance adapted from Apparel Design & Production Hand Book from The Fashiondex, Inc. pp. 7.10 (2001) **Measurement is Slightly Outside of Tolerance Range

The average was 11.54, and SD of 0.07. The lab measurement was G1 (16.13), G2 (15.63) for the hip front. G3 (hip front) and G1 (hip Back) were 16.00. Sample G2 and G3 measured 15.88 on the back hip. The average for both hip front and back was 15.92, with an SD of 0.26 and 0.07 in that order.

The inseam is the same for G2. G3 (right) and G2 (left), which is 28.00. G1 (right) was 27.63, with an average of 27.88 and SD of 0.22. In the inseam left, 27.50 was recorded for G1 and 27.88 for G3. The average was 27.79 and SD of 0.26. Outseam (OS) on the right for G1 and G3 recorded 33.63 each. G2 on the right and G2 on the left recorded 33.50 each. OS on the left G1 was 33.13 and 33.38 for G3. The average for OS right was 33.58 inches, with an SD of 0.07. The average for OS left was 33.33 inches with an SD of 0.19.

The sample jeans differ in some ways. These increments are small, that it is difficult for the consumer to notice these variations. The average and the SD for Gap clearly show that the variability between the three jeans was within the tolerance range except for the left inseam, which is slightly outside the recommended tolerance.

Comparisons within Samples Measurements, Levi's (L). The three samples purchased from the website measured 28 inches each for L1 and L3. L2 was 29.25, with an average of 28.42 and an SD of 0.72 for all three samples. In the Crotch Depth, the front measured L1 (7.25), L2 (7.00), and L3 (7.88). The back recorded L1 (11.13), L2 (11.25), and L3 (10.75). The average for the front was 7.38, with an SD of 0.45. The average for the back was 11.04, with an SD of 0.26. The hip measure indicated on the brand size guide was 32 inches. The results in the lab evaluation recorded for the hip front was L1 (15.50), L2 (16.75), and L3 (16.13). The average was 16.13inches and an SD of 0.63. For the back hip measurement, L2 and L3 logged at 16.88 each, and L1 was 16.00. The average was 16.58 and an SD of 0.51. Details of each recorded measurement are given in Table 4.15.

Table 4.15

Comparison of Measurements of the three Levi's Jeans

Measurement Location	Levi's Jeans Size Number: 12					
	Sample Product L 1	Sample Product L 2	Sample Product L 3	Average	SD	*Allowable Tolerance + / -
	Inches	Inches	Inches	Inches	Inches	Inches
Circumference of Waist	28.00	29.25	28.00	**28.42	0.72	0.50
Crotch Depth Front	7.25	7.00	7.88	**7.38	0.45	0.25
Crotch Depth Back	11.13	11.25	10.75	**11.04	0.26	0.25
Hips Front	15.50	16.75	16.13	**16.13	0.63	0.50
Hips Back	16.00	16.88	16.88	16.58	0.51	
Inseam Right	28.63	28.63	28.50	28.58	0.07	0.25
Inseam Left	27.88	28.00	28.00	27.96	0.07	
Out Seam Right	33.63	34.63	33.25	**33.83	0.71	0.38
Out Seam Left	33.38	34.13	33.13	**33.54	0.52	

*Tolerance adapted from Apparel Design & Production Hand Book from The Fashiondex, Inc. pp. 7.10 (2001) **Measurement is Outside of Tolerance Range

The inseam for the right recorded 28.63 inches each for L1 and L2. L3 was 28.50; this total the average to 28.58 inches and the SD of 0.07. On the left inseam, L2 and L3 recorded at 28.00, L1 registered 27.88 inches. The average was 27.96 inches and the SD of 0.07.

Out Seam on the right of L1 and L2 measured 33.63 inches each, L3 was 33.25 inches, which total an average of 33.83 inches and an SD of 0.71. On the left outseam, L1 was 33.38, L2 34.13, L3 (33.13), with an average of 33.54 inches and an SD of 0.52. It is worth noting that in Table 4.17, the average samples and the SD to the tolerance for all locations are outside the tolerance (exceeded the recommended tolerance), except for right and left inseam, which was within the recommended tolerance range.

Comparisons within Samples Measurements Old Navy (ON). Values obtained from the Old Navy brand measurement data indicate waist circumference for ON 1 26.75 inches, ON 2 26.50, and ON 3 27.25. The average was 26.83 and the SD of 0.38. While ON1 and ON2 differ slightly, ON3 was about 1 inch bigger than ON1 and ON2. For the crotch depth in the front, all three samples were in the same range with small increments. ON1 and ON3 both recorded 8.75 inches each. ON2 note down 8.63 inches with an average of 8.71 and SD of 0.07. Crotch depth on the back also in the same range of 12.13 inches for ON1, ON2 and ON3 logged at 12.25 inches with an average of 12.21 inches and an SD of 0.07. The measurement obtained from the three samples shows the hip front and back. ON1 (right) and ON1 (left) measured 16.25 inches each. ON3 (right) and ON 3 (left) 16.50. Sample ON2 (right) was 16.13, and ON 2 (left) was 16.38. The average for the front hip was 16.29, and an SD of 0.19. The detail of each recorded measurement is presented in Table 4.16.

Table 4.16

Comparison of Measurements of the three Old Navy Jeans

Measurement Location	Old Navy Jeans Size Number: 12					
	Sample Product ON 1	Sample Product ON 2	Sample Product ON 3	Average (Inches)	SD	*Allowable Tolerance + / -
	Inches	Inches	Inches	Inches	Inches	Inches
Circumference of Waist	26.75	26.50	27.25	26.83	0.38	0.50
Crotch Depth Front	8.75	8.63	8.75	8.71	0.07	0.25
Crotch Depth Back	12.13	12.25	12.25	12.21	0.07	0.25
Hips Front	16.25	16.13	16.50	16.29	0.19	0.50
Hips Back	16.25	16.38	16.50	16.38	0.13	
Inseam Right	29.75	29.63	30.38	**29.92	0.40	0.25
Inseam Left	29.50	29.38	29.75	29.54	0.19	
Out Seam Right	35.25	35.00	36.00	**35.42	0.52	0.38
Out Seam Left	35.38	35.13	36.00	**35.50	0.45	

*Tolerance adapted from Apparel Design & Production Hand Book from The Fashiondex, Inc. pp. 7.10 (2001). **Measurement is Outside of Tolerance Range

The back hip recorded an average of 16.38inches and an SD of 0.13. Inseam measurement recorded on ON1 (right) and ON 3 (left) shows 29.75 inches each. The right ON 2 recorded 29.63, ON 3 (30.38), and the average for all three was 29.92 and an SD of 0.40. On the left, ON1 was 29.50, ON 2 (29.38), and an average for all three of 29.54, and an SD of 0.19. Sample three (ON3) shows higher measurement, which is an about 1-inch interval. Both the outseam for ON3 (right) and ON3 (left) recorded 36.00 inches. The outseam on the right ON1 was 35.25inches, and ON2 was 35.00. The average was 35.42 inches, with an SD of 0.52. The left ON1 recorded 35.38 inches and ON2 35.13inches. The above variables revealed that there are little similarities between the three samples from the same brands.

The variability between the three jeans from Old Navy's samples average and the SD to the tolerance is visible on the right inseam, right and left outseam, which exceeded the recommended tolerance. The rest of the locations are within the recommended tolerance.

Analysis of Brands' Mean and Significant Deference

In the comparison of the four brands (Children's Place, Gap, Levi's, and Old Navy), Statistical Package for SAS (Statistical Software Suite) was used to determine which means amongst a set of means differ from the points of the measurement locations (POML). For the analysis, there are fifteen points of measurement locations; therefore, it is appropriate to use one-way analysis of variance (ANOVA) to evaluate whether there is any evidence that the four brands differ in any way. Tukey multiple comparison tests were used to compare the difference between each brand in the set of all pairwise comparisons and to find if they are significantly different from each other. In the SAS System, the GLM procedure was used to show the Least Squares Means and Adjustment for Multiple Comparisons: Tukey. The model used for this analysis was a one-way ANOVA. The results are as follows. In this section, the study analyzed the eleven variables: Waist circumference, front and back crotch, front and back hips, right and left outseam, right and left inseam, and right and left length (Points of measurement locations) to compare the difference in the measurement locations.

Waist Circumference. The waist circumference of the brands model a mean square of 1.98842222, F Value of 8.44, and the Pr > F 0.0073 for the four different brands. The results are shown in Table 4.17.

Table 4.17A

Waist Circumference Mean

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	5.96526667	1.98842222	8.44	0.0073
Error	8	1.88460000	0.23557500		
Corrected Total	11	7.84986667			

The means table of brands for significantly different shows that Levi 28.41667 and Children's Place 27.71000 are not significantly different. The same applies to Old Navy 26.83333 and Gap 26.66667 brands. The result is displayed in Table 4.17B.

Table 4.17B

Waist Circumference Significant

Tukey Comparison Lines for Least Squares Means of brand				
LS-means with the same letter are not significantly different.				
Letter		Circumference_of_Waist LSMEAN	Brand	LSMEAN Number
	A	28.41667	Levi's	3
B	A	27.71000	Children's Place	1
B		26.83333	Old Navy	4
B		26.66667	Gap	2

Crotch Depth. The crotch depth front was plotted in the SAS software for all four brands. The model means square resulted in 1.26529722, F Value of 20.11, and the Pr > F of 0.0004. The result is exhibited in Table 4.18A

Table 4.18A

Front Crotch Depth Mean

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	3.79589167	1.26529722	20.11	0.0004
Error	8	0.50340000	0.06292500		
Corr. Total	11	4.29929167	-		

The Tukey Comparison Lines for Least Squares Means of Front Crotch Depth depicts 8.7933333 for Children's Place, 8.7100000 for Old Navy, 8.3366667 for Gap, and 7.3766667 for Levi's. This means that children's Place, Old Navy, and Gap are not significantly different. However, there is a significantly different from Levi's brand between the front crotch depth areas. The result is exhibited in Table 4.18B

Table 4.18B

Front Crotch Depth Significant

Tukey Comparison Lines for Least Squares Means of brand			
LS-means with the same letter is not significantly different.			
Letter	Crotch_Depth_Front LSMEAN	Brand	LSMEAN Number
A	8.7933333	Children's Place	1
A	8.7100000	Old Navy	4
A	8.3366667	Gap	2
B	7.3766667	Levi's	3

The study continued the distribution on the back crotch depth. The model mean square resulted 0.70918611, F Value of 24.48, and the Pr > F of 0.0002. The result is exhibited in Table 4.19A.

Table 4.19A

Result of the Back Crotch Depth Mean

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	2.12755833	0.70918611	24.48	0.0002
Error	8	0.23173333	0.02896667		
Corrected Total	11	2.35929167	N/A		

The Least Squares Means of brands back crotch depth portrays 12.21000 for Old Navy, which is significantly different from the other three brands. Gap logged in 11.54333, and Children's Place projected 11.42000, which are not significantly different. Levi's shown 11.04333, however significantly different from Gap and Children's Place brands. The result is unveiled in Table 4.19B

Table 4.19B

Back Crotch Depth Significant

Tukey Comparison Lines for Least Squares Means of brand				
LS-means with the same letter are not significantly different.				
Letter		Crotch_Depth_Back LSMEAN	Brand	LSMEAN Number
	A	12.21000	Old Navy	4
	B	11.54333	Gap	2
C	B	11.42000	Children's Place	1
C		11.04333	Levi's	3

Hip Measurement. In another development, the front hips measurement was constructed into the model. The model means square resulted in 0.20863056, F Value of 1.58, and the Pr > F of 0.2693. The result is put on a display in Table 4.20A

Table 4.20A

Front Hip Measurement Mean

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.62589167	0.20863056	1.58	0.2693
Error	8	1.05840000	0.13230000		
Corrected Total	11	1.68429167	-		

The front hip measurement for Children's Place 16.54333, Old Navy 16.29333, Levi's 16.12667, and Gap 15.92000. These four brands are not significantly different from each other. Table 4.20B displays the front hip measurement results.

Table 4.20B

Front Hips Measurement Significant

Tukey Comparison Lines for Least Squares Means of Brand			
LS-Means With the Same Letter is Not Significantly Different.			
Letter	Hips_Front LSMEAN	Brand	LSMEAN Number
A	16.54333	Children's Place	1
A	16.29333	Old Navy	4
A	16.12667	Levi's	3
A	15.92000	Gap	2

The model for the back hip for the four brands Mean Square was 0.25291944. The ANOVA table shows an F Value of 2.93 and the Pr > F 0.0999. The outcome is shown in Table 4.21A below.

Table 4.21A

Back Hips Measurement Mean

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.75875833	0.25291944	2.93	0.0999
Error	8	0.69173333	0.08646667		
Corrected Total	11	1.45049167	-		

For the back hips measurement obtained from the means of the four brands shows Levi's at 16.58667, Children's Place 16.46000, Old Navy 16.37667, and Gap 15.92000. This means that the mean for the back hip measurement is the same and is not significantly different as shown in Table 4.21B.

Table 4.21B

Back Hips Measurement Significant

Tukey Comparison Lines for Least Squares Means of brand			
LS-mean with the same letter is not significantly different.			
Letter	Hips_Back LSMEAN	Brand	LSMEAN Number
A	16.58667	Levi's	3
A	16.46000	Children's Place	1
A	16.37667	Old Navy	4
A	15.92000	Gap	2

Inseam Measurement Result. The result from the mean model for the right inseam Mean Square was 4.56738611, the F Value 28.06, and the Pr > F 0.0001. Table 4.17A displays the results.

Table 4.22A

Right Inseam Result Mean

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	13.70215833	4.56738611	28.06	0.0001
Error	8	1.30213333	0.16276667		
Corrected Total	11	15.00429167	-		

Tukey Comparison Lines for Least Squares Means of the four brands from the right inseam for Old Navy was 29.92000, Levi's 28.58667, Gap 27.87667, and Children's Place 27.00000. This means that Levi is and Gap are not significantly different. However, Old Navy and Children's' Place are significantly different from each other as well as Levi's and Gap. Table 4.22B depicts the results.

Table 4.22B *Right Inseam Result Significant*

Tukey Comparison Lines for Least Squares Means of brand				
LS-mean with the same letter is not significantly different.				
Letter		Inseam_Right LSMEAN	Brand	LSMEAN Number
	A	29.92000	Old Navy	4
	B	28.58667	Levi's	3
C	B	27.87667	Gap	2
C		27.00000	Children's Place	1

The result from the mean model for the left inseam Mean Square was 3.88020833, the F Value 31.89, and the Pr > F was <.0001. The result is shown in Table 4.23A.

Table 4.23A

Left Inseam Brand Comparison Mean

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	11.64062500	3.88020833	31.89	<.0001
Error	8	0.97340000	0.12167500		
Corrected Total	11	12.61402500	-		

Tukey Comparison Lines for Least Squares Means of the four brands from the left inseam for Old Navy was 29.54333, Levi's 27.96000, Gap 27.79333, and Children's Place 26.79333. This means that Old Navy is significantly different from Levi's, Gap, and Children's Place. Children's' Place also is significantly different from Old Navy, Levi's, and Gap. However, Levi's and Gap are not significantly different. The result is compiled in Table 4.23B

Table 4.23B

Left Inseam Brand Comparison Significant

Tukey Comparison Lines for Least Squares Means of brand			
LS-means with the same letter are not significantly different.			
Letter	Inseam_Left LSMEAN	Brand	LSMEAN Number
A	29.54333	Old Navy	4
B	27.96000	Levi's	3
B	27.79333	Gap	2
C	26.79333	Children's Place	1

Outseam. The model for the right outseam for the four brands Mean Square was 2.52827500. The ANOVA table shows an F Value of 12.56and the Pr > F 0.0021.Table 4.24A reveals the results.

Table 4.24A

Right Outseam Mean

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	7.58482500	2.52827500	12.56	0.0021
Error	8	1.61086667	0.20135833		
Corrected Total	11	9.19569167	-		

Least Squares Means exhibit Old Navy 35.41667, Levi's33.83667, Gap33.58667, and Children's Place 33.41667. This means that Levi's, Gap, and Children's Place are not significantly different. Yet, Old Navy's right outseam was significantly different from the remaining brands. Table 4.24B discloses the results.

Table 4.24B

Right Outseam Significant

Tukey Comparison Lines for Least Squares Means of brand			
LS-means with the same letter are not significantly different.			
Letter	Outseam_Right LSMEAN	Brand	LSMEAN Number
A	35.41667	Old Navy	4
B	33.83667	Levi's	3
B	33.58667	Gap	2
B	33.41667	Children's Place	1

The model for the left outseam for the four brands Mean Square was 3.43064444. The ANOVA table shows an F Value of 22.30 and the Pr > F 0.0003. This is presented in Table 4.25A below.

Table 4.25A

Left Outseam Mean

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	10.29193333	3.43064444	22.30	0.0003
Error	8	1.23046667	0.15380833		
Corrected Total	11	11.52240000	-		

Least Squares Means reveal Old Navy 35.50333, Levi's 33.54667, Gap 33.33667, and Children's Place 33.25333. This means that Levi's, Gap, and Children's Place are not significantly different. Nonetheless, Old Navy's right outseam was significantly different from the remaining brands. This is displayed in Table 4.25B.

Table 4.25B

Left Outseam Significant

Tukey Comparison Lines for Least Squares Means of brand			
LS-means with the same letter is not significantly different.			
Letter	Outseam_Left LSMEAN	Brand	LSMEAN Number
A	35.50333	Old Navy	4
B	33.54667	Levi's	3
B	33.33667	Gap	2
B	33.25333	Children's Place	1

Overall Length. The right length of the four samples means square 3.08827500, F Value 38.06, and the Pr > F <.0001. Table 4.26A depicts the aftermath.

Table 4.26A

Overall Right Length Mean

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	9.26482500	3.08827500	38.06	<.0001
Error	8	0.64920000	0.08115000		
Corrected Total	11	9.91402500	-		

The Tukey Comparison Lines for Least Squares Means of brand right Length revealed Old Navy for 36.83667, Gap 35.00000, Levi's 34.86667, and Children's Place 34.62667. This means that Old Navy was significantly different from the other three brands, Gap, Levi's, and Children's Place since there are not significantly different from each other. Table 4.26B depicts the result.

Table 4.26B

Overall Right Length Significant

Tukey Comparison Lines for Least Squares Means of brand			
LS-means with the same letter is not significantly different.			
Letter	Length_Right LSMEAN	Brand	LSMEAN Number
A	36.83667	Old Navy	4
B	35.00000	Gap	2
B	34.86667	Levi's	3
B	34.62667	Children's Place	1

The left length of the four samples means square 3.63692222, F Value 39.90, and the Pr > F <.0001. The result is in Table 4.27A.

Table 4.27A

Overall Left Length Mean

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	10.91076667	3.63692222	39.90	<.0001
Error	8	0.72920000	0.09115000		
Corrected Total	11	11.63996667	-		

The Tukey Comparison Lines for Least Squares Means of brand right Length from the ANOVA analysis revealed Old Navy for 37.08333, Levi's 35.37667, Children's Place 34.75667, and Gap 34.75000. This means that Old Navy was significantly different from the other three brands, Gap, Levi's, and Children's Place since there are not significantly different from each other. The result is in Table 4.27B.

Table 4.27B

Overall Left Length Significant

Tukey Comparison Lines for Least Squares Means of brand			
LS-means with the same letter is not significantly different.			
Letter	Length_Left LSMEAN	Brand	LSMEAN Number
A	37.08333	Old Navy	4
B	35.37667	Levi's	3
B	34.75667	Children's Place	1
B	34.75000	Gap	2

Style. The styles of the jeans were also examined. For the lab evaluation, the four jeans brands were analyzed to determine if the styles conform to the online descriptions from the brand online site. The data reported that all four brands were labeled as boot-cut jeans; however, the style of Levi's drastically looked like a flare type of style rather than a boot-cut. This is misleading to consumers since a cut style change can also affect, imparts, and influences the size and fit of the jeans. As the above picture depicts, Levi's jeans should be labeled as FLARE JEANS instead of boot-cut jeans. The style of the four brands is presented in Table 4.28.

Table 4.28

Laboratory Product Examination Style Results

Children's Place (CP)  Front View Back View Item #: 2024535_93 Copyright 2019 by Children's Place Brand INC.	Gap (G)  Front View Back View Item #: 494994 Copyright 2019 by Gap Brand INC.
*Levi's (L)  Front View Back View Item #: 570623909 Copyright 2019 by Gap Brand INC.	Old Navy (ON)  Front View Back View Item #: 556325 Copyright 2019 by Old Navy Brand Co.

Research Questions

In this section, each research question is answered separately integrating the results from the survey questions and the laboratory evaluation data. The survey questions were used to answer the research questions one and three. The laboratory evaluation was used to answer research question two. The outcome of the research questions is as follows.

Research Questions #1. *How satisfied/dissatisfied are parents with sizing and fit of children's clothing?*

Fit Satisfaction. Fit is an important criterion in a consumer's evaluation of apparel products. The frequency responses revealed that 84% would be satisfied to purchase their girl's jeans instore oppose to online (16 %). Parents prefer to purchase skinny jeans (42 %). According to the literature review, the body size is likely a determining factor in satisfaction with body image, which affects self-esteem (Kinley, 2010). On a scale of five, the parent was asked to state how important is fit in the key location of the jeans. The data revealed that parents are satisfied with the waist, overall length, and the inseam of the jeans they potentially purchase for their girls. This is so only if these locations fit within their required expectations. They specified that they are satisfied 56 % of the time on the waist locations, 49 % in the overall length, and 42% in the inseam area of the jeans for extremely important. Hip (41%), crotch depth (38%), outseams, and bottom leg (33%), respectively. They also considered locations such as the crotch depth 40 % and hip (39%) as one of the locations they consider very important for a brand of jeans they purchase. The mothers reported that if these locations are considered satisfactory, then they are satisfied with the brand of their choice. However, the parents indicated that if they encounter any fit issues in the locations such as the waist (48%), overall length (36%), and the hip (29%), they will be dissatisfied and would not purchase the brand. When this happens, they would buy a different brand such as leggings, stretch pants, or go somewhere else for jeans.

Fit Dissatisfaction. The parent indicated that if there are fit issues in the locations such as the waist (48%), overall length (36%), and the hip (29%), they will be dissatisfied and would not purchase the brand. The survey asked the parents to evaluate fit issues by indicating the level of agreeability when trying jeans on their children. To gauge the

dissatisfaction of size and fit. The responses revealed that 48% "strongly agree" that waist is the fit issue they encounter. Overall length is the next fit issue with (36%), Hip (29%), crotch depth (24%), opening leg (23%), Inseam (21%), and outseam (14%). This means that if these locations are not met, then dissatisfaction is experienced. Also, parent states that if they are dissatisfied, they get frustrated and seek to order customize made or alter the jeans to fit. To the extreme, some parents would have the jeans altered or adjusted and sew them to fit. Some of the responses (in their own words) are as follows:

> *Ask for help. Buy a different brand, Buy bigger ones, Buy her leggings, Buy stretch pants, Do not buy any, Go to a different store or wait until they restock, Exchange, Find a pair that does, Go online, Go other stores, Go somewhat else, I always can find jeans that fit, Have not had this issue, I am still trying to figure out what to do, I do not know, I order custom size for it. Keep looking. Look for another style. Pass, wait till we find some. Return. She can wear my jeans; we are around the same size. Tell my mom.*

In pursuit of taking desperate measures to have jeans that fit their children, parent's response (in their own words) echoed the following dissatisfaction:

> *Go to a different store or take them to have them altered. I have to adjust and sew them to fit. Keep searching for other retailers. Look somewhere else, or have to go hem or take them in. Put a tuck in the waist myself. Sew them. Find an alternative store. Find at a different store. I try another store. Try to find other jeans that fit better. Read reviews for other jeans.*

Research Questions #2. *Are major brands following the standard sizing for body measurements of children's clothing?*

To answer research question #2, the online chart guide from the four brands and the laboratory measurement and the ASTM (American Society for Testing and Materials) published standard was used.

ASTM and Online Size Chart Guide. The ASTM is the international standard that was developed in accordance with internationally recognized principles on

standardization established in the Decision on Principles for the Development of International Standard, Guide, and Recommendation issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee. According to the Standard Tables of Measurements for Girls, Sizes 2 to 20 (Regular & Slim) and Girls Plus[1] (D6192/D6192M - 19), the body measurements information will assist manufactured in developing patterns and garments that are consistent with the current anthropometrics characterizes of the population of interest. This practice should, in turn, reduce or minimizes consumer confusion and dissatisfaction related to apparel sizing. The table indicates the number size (selected 7-12 for this research) body weight, height, waist, hip, inseam, and many more.

The four brands indicate size 12; however, Children's Place and Old Navy designates letter-size L (Large) to their brand as well as Gap, which indicates *XL. This means that brands indeed designate their size labels and do not follow the standard as published. The ASTM Standard Chart indicates Age 12 in the age category. In the age category, Gap is the only brand, which indicates the age of 12 years. The other three brands indicate a range of ages, which was 9-10 years for Children's Place, Levi's, and Old Navy did not specify any age group. This indicates that there were differences in age and size range across the four brands as to the ASTM standard.

The height observation shows that ASTM has a single suggested height. The four brands specified their heights in ranges. Children's Place begins the height below the supposed standard and cut off on the exact recommended standard. In the same way, the Gap brand started just below the ASTM standard to slightly above it. Levi's was the only brand, which started on the exact height of the ASTM voluntary standard but unfortunately passed the range in height. Old Navy is the only brand, which did not indicate height on the brand chart guide. This suggests that the brands are totally different from each other in the height guide. Therefore, different brands would appeal to different segments of the population, which deems to associate with the brand fit and style. The "height factor" in this study suggests that the height can vary slightly in range across brands, and all brands except Old Navy have specified height that covers the ASTM standard with a little allowance in height. The sizes stated by these brands except Old

Navy have all taken into consideration the ASTM standard; this suggests height is irrelevant to their size guide.

The ASTM weight standard range was satisfied for one brand, Levi's. Gap closely matched the standard as well, but Children's Place was off the standard by about 9points to the lower end. The implications may be that Children's Place attracts girls of a lower weight range than Gap and Levi's. The weight data may also suggest that for Old Navy, weight may be irrelevant to the brand.

The waist requirement was satisfied for each of the brands. All the brands, therefore, follow the ASTM Standard as recommended for brands. This may imply that most girls have a waist size that conforms to the recommended ASTM standard.

The ASTM hip standard was met by all brands, as shown by the data. There were slight variations for Children's Place and Gap, but Levi's and Old Navy both met the recommendation. This implies that across all the brands, the hip sizes for girls of this age are very standard.

Research Questions #3. *Are there differences in the sizing of the four brands in size 12?* The laboratory evaluation between the four brands was evaluated after the laboratory measurement to determine if the jeans vary from brand to brand and also if the same size 12 jeans differ in any way. All the measurements were completed following the ASTM standard and were steered under a precise laboratory set. The SAS was used to determine which means amongst a set of means differ from the fifteen points of measurement locations (POML). When appropriate, the data of the one-way analysis of variance (ANOVA) revealed two findings: First was that there were different or inconsistencies among the three samples of the same brand measured. Secondly, the four brands differ in some ways.

Sample. There are inconsistences among the three samples from the same brand. Most of the inconsistencies run through the locations measured. None of the three samples for each brand measured the same at the key point's locations. Even if they were in the same range, they measured slightly different and were not exact in centimeters or inches, and that is was the source of the inconsistency. This means that the brands do not follow the same measurement for any single pair of jeans manufactured. If the measurement is outside the range in one or more inches, then the inconsistency is way

above the published standard. It is established the fact that the product could measure ¾, 3/8, ½, 1inch, or ¼, more and still meet the specification due to standard tolerance.

The three samples from the same brands (Children's Place) differ slightly but not very much in this case. However, there is a significant difference between *waist circumferences* of the samples. The measurement collected from Gap shows clearly that the sample jeans differ in some ways. These increments are so small that it is difficult for the consumer to notice these variations. For the gap, the only point of location, which measured the same, was the overall length on the right side of the jeans for G1, G2, and G3. Levi's Sample #2 measured 29.25, which is excessively larger than CP, G, and ON. This also means that there is a big variance in the waist circumference in the 'Sample' jeans, which is approximately 3 inches increment than the other brands in this study. This indicates that the sample does not measure the same with brands. The variables from the Old Navy revealed that there are little similarities between the three samples from the same brands. The inconsistencies are within the three sample brands and between the four brands. These major differences create minimal confusion as well as a misunderstanding among the four major brands.

Differences. The SAS was used to determine which means amongst a set of means differ from the eleven points of the measurement locations (POML). When appropriate, the data of the one-way analysis of variance (ANOVA) revealed two findings: significant or not significant.

The difference seen in this research is quite simple in that some of the significant differences were in the waist and the length. From the three samples measured from the various brands, it was clear that no two garments of the same size could be guaranteed to be the exact size. This is why the three "jeans sample" of the same brand may have a slightly different fit, but both jeans may still fall within an acceptable range. The result revealed that the waist circumference of the brands mean square for significantly different shows that Levi and Children's Place are not significantly different. The same applies to Old Navy and Gap brands.

The Tukey Comparison Lines for Least Squares Means of the brand depicts that Children's Place, Old Navy, and Gap are not significantly different. However, there is a significant difference with Levi's brand between the front crotch depth areas. The Least

Squares Means of brands back crotch depth portrays that Old Navy was significantly different from the other three brands. Gap and Children's Place estimated not significantly different. Levi's was significantly different from Gap and Children's Place brands. The front hip measurement for Children's Place, Old Navy, Levi's, and Gap were not significantly different from each other. The back hips analysis obtained from the means of the four brands showed Levi's, Children's Place, Old Navy, and Gap was the same and are not significantly different.

Tukey's investigation of the four brands from the right inseam for Old Navy, Levi's, Gap, and Children's Place was not significantly different. However, Old Navy and Children's' Place were significantly different from each other as well as Levi's and Gap, respectively. The left inseam revealed that Old Navy was significantly different from Levi's, Gap, and Children's Place. Children's' Place also is significantly different from Old Navy, Levi's, and Gap. However, Levi's and Gap are not significantly different.

The Tukey analysis revealed Old Navy was significantly different from the other three brands, Gap, Levi's, and Children's Place since there are not significantly different from each other. The brand's right overall length from the ANOVA analysis revealed that Old Navy was significantly different from the other three brands, Gap, Levi's, and Children's Place since there are not significantly different from each other.

Laboratory Evaluation Differences. The lab measurement indicates that Levi's average waist circumference measurement was 28.42 inches and was above the other three brands, which ranged between 26.67 to 26.83. Levi's front crotch depth was 7.38 inches, Children's Place (CP), Gap (G), Old Navy (ON), is in the scale between 8.71-8.33 inches with an SD of 0.07. Crotch depth back accounted for 12.21 for both CP and ON, G (11.54), and L (11-04) in the average range. Front hips and back hips are in the same range of 16.13-16.58 for three brands except for Gap (15.92). The right inseam and left shows between 29.54-29-92 in the CP and ON, Gap in the 27.79 -27.96. However, Levi's right inseam has a huge difference of 28.58. There was not much difference in the right and left outseam. Overall length on the right and left CP and ON has a significant difference of three inches between the other two brands.

After the measurement, the SAS model was used to analyze a one-way ANOVA to determine if variables (points of measurement locations) means are or not significantly

different. In the analysis, the p-value of 0.0073 indicated that Levi's is significantly different from Children's Place, Old Navy, and Gap in the waist circumference. The front crotch depth had a p-value of 0.0004, which is not significantly different from Children's Place, Old Navy, and Gap. However, it was significantly different from Levi's. Left crotch depth had a p-value of 0.0002, which is not significantly different from Gap and Children's Place but significantly different from Old Navy and Levi's, respectively.

The front hip p-value was 0.2693, which is not significantly different from all brands. A P-value of 0.0999, which is also not significantly different from all brands, was found on the back hip. The right inseam p-value 0.0001 was not significantly different from Levi's and Gap, but significantly different from Old Navy and Children's Place. In the left inseam, p-value <.0001 was calculated, which was not significantly different from Levi's and Gap, hence, significantly different from children's Place and Old Navy.

Results from the ANOVA analysis also revealed that on the right outseam, the p-value was 0.0021which was not significantly different for Levi's, Gap, and Children's Place. Conversely, it was significantly different from Old Navy. Left out seam was 0.0003 for Levi's, Gap, Children's Place and that was not significantly different, but significantly different from Old Navy. The last variable obtained was the right and left the overall length of the jeans. The p-value <.0001 was obtained, which was not significantly different from Gap, Levi's, and Children's Place. However, it was significantly different from Old Navy in length right. On the left length, the p-value <.0001 was not significantly different from Levi's, Children's Place, and Gap but significantly different from Old Navy.

Chapter Five

Conclusion

The purpose of this research study was to understand the sizing and fit problems of girls ages 7-12 and to evaluate how these brands utilize the current sizing standards. The research categorizes four jeans brands and compares sizing and fit to ascertain if it conforms to the ASTM standard. ASTM guide and the sizing charts of the brands were used to compare and contrast differences in sizing. The four major selected brands of girl's jeans categories were Children's Place, Gap, Levi's, and Old Navy. A survey was created and made accessible to a sample population of consumers (N=156) to examine, evaluate, and determine the sizing variations among brands and parents' opinions. Areas of fit and sizing issues that repeatedly appear in the online review of jeans were structured and developed into a questionnaire based on customer reviews, complaints, comments, and feedback.

The second purpose is to compare and ascertain if the brands sizing categories conformed to the ASTM standard. In addition, to see if there are differences, consistencies, inconsistencies, or variances in the sizing of the four brands in size 12 girls' jeans. The survey was distributed by Qualtrics online software off campus to help gain a better understanding of sizing and fit problems for girls age 7-12 when shopping for jeans. The final sample population was 156 parents who have girls who wear jeans. The survey provides the demographic information of the parents in this age range and about parent experiences when shopping for jeans for their children. To make the process easier, regular size 12 boot-cut jeans were selected from four brand categories; the selection was based on the fit, style, and popularity of the brand. Another criterion of the selection is whether the selected brand carries the fit and style in the same age category and the quantity needed to complete the research. Three sample girls' jeans were ordered online from the brand website directly except for Levi's, which was purchased on the Walmart online store.

Girls, Jeans, Boot-cut, Regular, and Size 12 were categories selected for this research because girls' clothing sizes are a bit more complicated than boys. It is often the case that a girl will develop hips and a chest suddenly, without any corresponding growth

in height. Another reason for selecting girls for this study is that in general, girls' sizes assume an hourglass figure, which means that chest and hip measurements become larger than the waist measurements. This also means girls who do not fit this body type may have difficulty finding well-fitting clothing. The selection of jeans was based on the notion that jeans are an iconic American-style garment. Denim jeans have always been a tried-and-true staple item in the U.S. and around the world. Jeans are the most popular for running errands (50 percent), work (32 percent), and dinner (31 percent). The research selected jeans due to its popularity, comfortability, affordability, durability, and functionality. Customers look for mobility, comfort, abrasion resistance, and longevity in their products, and denim is no exception. Customers live a very active life and have to work for a long time. Consumers hike, climb, bike, and play in jeans (Lincoln, 2016). Jeans are a popular item for parents of school-age kids (Berardelli, 2016). The research study narrowed down to the Boot-cut Jeans style. The boot-cut style of jeans is the most classic and the fit is suitable for all girls' body types because they take body shape and fit well. Similarly, the Regular style was selected because the study needed Jeans that will sit straight on the hip to satisfy the fit style of interest and is worn and preferred by girls who are neither skinny nor thick.

Research Objectives for this study were to:

RO1. *To assess parent satisfaction/dissatisfaction with children's wear.*

To assess parent satisfaction/dissatisfaction with children's wear, multiple product reviews, feedback, and comments were collected and examined to help understand parent's complaints and frustrations with sizing, particularly with online and in-store experience of children's clothing websites. Problems and complications frequently identified in consumer written literature such as product review, comments, and posts were noted and grouped into categories based on similarities. Kinley states that body size is likely a determining factor in satisfaction with body image, which affects self-esteem (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).

The survey frequency responses revealed that 84% would be satisfied to purchase their girl's jeans instore oppose to online. At the end of the analysis of the fit issues, it was apparent that parents were satisfied in the waist, overall length, and the inseam of the jeans they potentially purchase for their girls. This is so only if these locations fit within their required expectations. They specified that they were satisfied around the waist locations, overall length, and in the inseam area of the jeans, which turned out to be extremely important. They also considered the hip, crotch depth, outseam, and bottom leg as very important. They pointed out that if they encountered any issues in these locations then that led to dissatisfaction

. Fit dissatisfaction is a commonly stated problem associated with apparel purchases (Alexander et al., 2005; Kinley, 2009; Newcomb & Istook, 2004). Additionally, the mood the wearer wishes to communicate with apparel will affect her behavior, whether this trait is consistent with the wearer's personality or she is experimenting with a desired or ideal personality (Moody, Kinderman, & Sinha, 2010). The parent indicates that if there are fit issues in the waist, overall length, and the hip, they will be dissatisfied and would not purchase the brand. To scale the dissatisfaction of size and fit, parents answered fit issues by indicating the level of agreeability when trying on jeans on their children. The responses revealed that they "strongly agree" that waist, overall length, hip, crotch depth, opening leg, inseam, and outseam are locations fit issues they stumbled upon. Dissatisfaction is attained if jeans do not fit right. When this happens, they are dissatisfied, frustrated, and seek to order custom made, or alter the Jeans to fit. To the extreme, some parents would have the jeans altered or adjust and sew them to fit.

RO2. *To evaluate the published ASTM (American Society for Testing and Materials) standard of the body dimensions of girls wearing the size 12 and compare the measurement to the online size charts for girls of four major brands of jeans.*

Size 12 was singled out per ASTM (American Society for Testing and Materials), D6192 / D6192M – 19 Standard Table of Body Measurement 1.2, which states that the maximum age for a girl's chart is 12 ½ years old to the size 20. Therefore, since the age group in this study was between 7-12, it is prudent to single out the maximum, which was size 12 for the sample size for the evaluation. Another reason for selecting this age group

(7-12) was that after age 6, girls' clothing follows the same sizing parameters from ages 4 to 6, then split, after age 6, as the sizes no longer coordinate with age. Around this age, girls are mature enough to form their own opinions about many things, including clothing sizing and fit. At the same time, many girls also develop a preference for a certain kind of jeans style.

The evaluation of the four brands (12 pairs in total) included laboratory analysis of the sizing charts, size, age, height, weight, waist, hip, and inseam. Additionally, the evaluation of the laboratory product sample analysis the measurement of the circumference of the waist, crotch depth, hips, inseam, knee, leg-opening circumference, outseam, and overall length. Standard Tables of body measurements for girls, size 2 to 20 (Regular & Slim) and girls plus1, from the American Society for Testing Material (ASTM), ASTM D6192 / D6192M – 19 to define the evaluation and measurement locations and procedure for the examination.

The body measurements can be used as a baseline in designing apparel for girls in this size range when considering factors such as fit and style. It is interesting to note that even though Gap and Old Navy were similar companies, Gap jeans size 12 was labeled XL, and Old Navy was labeled as L. Based on the ASTM standard, the height responses were 30-49 range below the ASTM standard, and 62-79 was above the ASTM standard. The height for the ASTM standard was 58 inches. Three brands, Children's Place, Gap, and Levi's, recorded the height in ranges. The ranges of the heights differed as 55-58, 57-60, and 58-61, respectively. Old Navy did not list the height in this brand category.

To evaluate the weight, there was a pattern of ranges except for Old Navy, which did not report any weight in the brand category. ASTM standard shows a range of weight varied from 85-95, Children's Place fails to adhere to the standard, Gap and Levi's passes the standard in this category.

The waist requirement was satisfied for each of the brands. The four brands were within the ASTM Standard as recommended for brands. As a voluntary standard, this may imply that most girls have a waist size that conforms to the recommended ASTM standard in the size 12 jeans. The ASTM hip standard was met by all brands; however, there were slight variations for Children's Place and Gap, but Levi's and Old Navy both met the recommendation. This implies that across all the brands, the hip sizes for girls of

this age are very standard for body dimensions of girls wearing the size 12 and as compare among the four major brands of jeans.

RO3. *To evaluate the measurement of jeans from four major brands of girls jeans and compare the measurements from brands to brands.*

There are inconsistences among the three samples from the same brand. Most of the inconsistencies run through the locations measured. None of the three "Samples" brands measured the same at the key point's locations. Even if they are in the same range, they measured slightly differently. This suggests that the brands do not follow the same measurement for any single pair of jeans manufactured. If the measurement is outside the range by one or more inches, then the inconsistency is much larger than the published standard.

The three samples from the same brands (Children's Place) differ slightly but not very much in this case. However, there is a significant difference between waist circumferences of the samples compared to the online chart size guide. The measurement collected from Gap clearly shows that the sample jeans differ in some ways. These increments are small that it is difficult for the consumer to notice these variations. For the Gap, the only point of location, which measured the same, was the Overall length on the right side of the jeans for G1, G2, and G3.

Levi's Sample #2 measured 29.25 in the waist, which is excessively larger than the guide indicates. This suggests that Sample L2 does not meet the online size guide standard. This also means that there is a big variance in the waist circumference in the 'Sample' jeans, which is about 4 inches increment than what the jeans should measure, based on the brand size guide sta. This indicates that the sample does not meet the brand standard measurement. The variables from the Old Navy revealed that there are little similarities among the three samples from the same brands.

The inconsistencies or fit were detected in the three sample brands and between the four brands in this research study. These major differences create confusion as well as a misunderstanding among the four major brands. Levi's average waist circumference measurement does not correspond to the other three brands. Levi's right inseam has also had a large difference in measurements. Levi's also was significantly different from Children's Place, Old Navy, and Gap in the waist circumference. The left crotch depth is

not significantly different from Gap and Children's Place but significantly different from Old Navy and also Levi's, respectively. The front hip was not significantly different from all brands. Back hip, which is also not significantly different from all brands. The right inseam was not significantly different from Levi's and Gap, but significantly different from Old Navy and Children's Place. The left inseam was not significantly different from Levi's and Gap, hence, significantly different from children's Place and Old Navy. The p-value was not significantly different for all four brands in the right knee width. P-value was not significantly different for all four brands in the left knee width. The leg-opening circumference on the left was not significantly different from Levi's and Gap and not significantly different from Children's Place and Old Navy. The right outseam p-value was not significantly different for Levi's, Gap, and Children's Place, conversely, significantly different from Old Navy. Left outseam for Levi's, Gap, Children's Place was not significantly different, but significantly different from Old Navy. The last variable obtained was the right and left the overall length of the jeans. The p-value was not significantly different Gap, Levi's, Children's Place. However, significantly different from Old Navy in length right. On the left length, the p-value was not significantly different from Levi's, Children's Place, and Gap. Hence, significantly different from Old Navy.

In conclusion, the survey results indicated that there were 100% participation responses to the questionnaire, and the highest age category was 12 years. From this research, the majority of the participants reported their ethnicity as White/European. The parents prefer to shop instore rather than online. Parents may shop instore so that their children can try on jeans before purchasing. This could suggest that in-store experience fulfills the fit satisfaction and the utilization in jeans selection. This shows that girls would have the ability to try on for size and fit. The instore experience would provide clarity and assurance, knowing that the jeans will fit. The top three-brand preference was Old Navy, Children's Place, and Levi's. The top three styles purchased was skinny, boot cut, and straight jeans. The parent will usually pay $16-25, $5-15, or $26-35 for a pair of jeans. Their size affiliations were based on regular, slim, and plus category.

In the design features category, parents revealed that they would prefer fabric with stretch, adjustable waistband, and pocket. For the brand purchase reasons, the

parents rated fit as their first choice, followed by price and quality. For the importance of fit, parents overwhelmingly considered fit in the waist, overall length, and inseam as extremely important. In the fit issue section, parents strongly agreed that waits, hip, and overall length are the places they find issues with their jeans. Due to fit issues, the majority of the parents indicate that their girls try on jeans in store 55 percent of the time. Parents gave a variety of reasons if they do not find jeans that fit their children. Some may not purchase the jeans, look for somewhere else or, in extreme cases, alter the jean, sew it themselves, or ask the child to wear the parent jeans if they are of the same size. The lab evaluation for Children's Place indicates that the three samples from the same brands differ slightly but not very much in this case. However, there is a significant difference between waist circumferences of the samples compared to the other brands.

It is evident that the sample jeans differ in some ways for Gap. These increments are small that it is difficult for the consumer to notice the variations. For the Gap, the only point of location, which measured the same, was the 'Overall Length' on the right-hand side of the jeans for G1, G2, and G3. It was found out that all four brands labeled as boot-cut jeans; however, the style of Levi's has drastically looked like a flare type of style rather than a boot-cut. This is misleading to consumers since a cut style change can also affect, imparts, and influences the size and fit of the jeans.

The variables obtained from Old Navy revealed that there are tiny similarities among the three samples from the same brands. The research study revealed that there are differences, consistencies, inconsistencies, or variances in the sizing of the four brands in the size 12 girl's jeans.

Many times the importance of fit depends on both appearance and comfort for girls age 7-12. Brands usually promote products by their functional attributes or comfort level of specific products; however, they fail to promote their good fit and accuracy of the size of the brand. In this research study, a focus on key measurement locations that appeared in this study would help both the consumer and the brand to navigate through fitting and sizing issues in girl's jeans merchandise selection. Brands need to find ways to evolve the meaning of size and fit in jeans for parents and their girls. When seeking jeans for girls, most parents consider important factors such as fit, size comfortability, functional, style, durability, and high quality.

Implications

The results of this research have implications for jeans brands, manufacturers, academia, and sizing standards. Brands focus on marketing effort and profit yet fail to provide jeans that have the right size and fit. Since jeans continue to be the most popular bottom for girls in apparel retailing it is a crucial factor in brand profitability and growth. Therefore, brands cannot ignore the parent's opinions, found in this research. To maximize profits, jeans brands and retailers will need to address the needs and desires of sizing and fit issues to remain competitive. This implies that jeans brands and retailers need to reevaluate the sizing and fit they are offering or face a possible loss of profits, satisfaction, and loyalty by not meeting the needs of the parents and their daughter's.

The research revealed that there are differences, consistencies, inconsistencies, or variances in the sizing of the four brands in the size 12 girl's jeans. Therefore, brands need to find ways to evolve the meaning of size and fit in jeans for parents and their daughters. When seeking jeans for girls, most parents consider important factors such as fit, size comfortability, functional, style, durability, and high quality. Likewise, jeans brands need to examine their sizing in light of the parent's opinions, which could be essential to maintaining brand satisfaction.

For academia, little academic research could be found which investigated apparel sizing and fit issues particularly, on girls aged 7-12. The implication for academia is to focus on research, furthering the understanding of sizing and fits for future research of the key locations parents find problems in jeans by creating the awareness of want to accept when shopping for jeans. Academia could expand research of girl's jeans and by maintaining a realistic approach to sizing and fit for jeans brands.

Based on the sizing standard, the result in this research indicates that height and weight deviated from the ASTM standard sizes. Also, some measurement locations in the brand's size charts did not correspond to the ASTM standard. This indicates that the current ASTM standardized categories and sizes, as well as brand sizes, have not addressed the size and shape of girls aged 7-12 in this research. Therefore, updating standard size chart data reflecting the size and fit of today's girl is necessary for jeans manufactures to improve jeans sizing and fit. Modifying a girl's size chart to reflect today's girl's size body can be an effective way to address the sizing and fit issues.

Limitations

The questionnaire was conducted with a large sample of parents (N=156) who have girls aged 7-12 in the USA. The study selected four popular brands in the USA based on online review literature. The findings are not generalized to all girls, parents, and brands in the United States. Therefore, the results obtained will not be a representative to all brands and may not be applicable across similar brands, age group, or population.

Recommendations for Future Research

Most of the issues of jeans fit were found in locations such as the waist, hips, inseam, length, crotch, and the hips. Size guidelines vary from brand to brand, but the waist, hips, inseam, length, and the crotch are generally good measurement locations to track. The U.S. children's clothing sizing standards, for example, use an age-based size labeling system; however, this research study shows that some girls in this age category (upper age group, for example, 11-14) may even fit into their parent's jeans. Consumers need to use the preferred brand size charts to not only find the best size in a brand but to find brands that are geared towards the girl's body type. The key is to make sure the jeans will fit the girl comfortably, not to rely on the sizing on the labels per se.

Nevertheless, it is worth noting that all four selected brands in the study have a fiber content of spandex. Children's Place and Gap have 1percent spandex each, Levi's 1.5 spandex, and Old Navy 2 percent. What the spandex does in the fiber content is that it allows for a stretching capacity. Yet, parents noted that they would not be satisfied if the jeans will not fit the locations under investigation. This suggests that even though the jeans could recover and stretches easily due to elasticity, it does not cover imperfections in fit and sizing. Although the girl's jeans market faces some challenges due to inconsistencies, the market remains steady. Hence, size and fits issues remain unresolved.

On the other hand, the design features in the brands included inner or conceal adjustable waistband. The population of 51 percent noted that they would prefer fabric with stretch in their jeans. Furthermore, this merits further investigation concerning size and fit in girls' jeans. Due to the complexity of the sizing and fit brands put their design feature to aid the fitting issue. Therefore, it is difficult to assess if girls' jeans are following the required standard or not.

For brands, consumer satisfaction and dissatisfaction in this research suggest the parents and their girls are satisfied if key jeans locations such as the waist, hips, inseam, length, and the crotch fit well. For this reason, girl's jeans brands (manufacturers) need to be more realistic in such key locations to drive sales. Paying close attention to these key locations will provide a better-fit and sizing for girl's jeans around this age range. The brand would have to address the concern of fitting issues in these locations to attaining a satisfactory fit and size to reach and maximize sales potential. From the results, the 'waist factor' and the 'length factor' clearly indicate that jeans brands and manufacturers tend to make jeans based on their version of standard sizing and fit.

To get the full picture of the sizing and fit in girl's jeans, it is recommended that the study should be repeated with more brands. Much remains to be learned about sizing and fit between this age range to provides brands with better insights into profitability, providing jeans to meets the needs and wants of girls aged 7-12 and their parents. The most important thing for girls with this age range is that they feel comfortable and confident in the jeans they wear. A well-fitted jean means that the girl (consumer) could rely on it for a long time and will feel comfortable all day long.

As jean's popularity continues to grow, it has become harder brands to set their jeans apart and remain memorable to the young child. While there are multiple contributing factors to this sizing and fitting dilemma, the biggest one is for brands to pay attention to the waist and the length to meet parent's satisfaction around what they are offering. Retailers need to find ways to evolve the meaning of size and fit in jeans for parents and their girls. Brands need to consider parents' and children's size and fit preferences, especially as girls aged 7-12 play a big role in purchase decisions. A brand that captures and satisfies the attention of parents and their girls have a chance to boost further purchases.

The findings in this research revealed that jeans brands should offer acceptable size and fit, provide a sense of comfort, and yet challenges a customer to feel good about themselves. This will inspire and challenge both parents and girls aged 7-12 (customer) on a level that is not solely about the brand but about the size and fits as well. Girl' between the ages of 7-12 has every opportunity to look and feel their best in jeans.

APPENDIX A

Definition of Terms

Apparel: Any type of clothing worn by men, women, and children. (Fairchild's Dictionary of Fashion, 2014, p.9).

Band: An edge treatment consisting of fabrics in a double-ply cylindrical construction, sewn to the raw edge of a garment to extend and finish the edge. A band can be used as a collar, at the hem edge of a skirt, pant or sleeve, or the waist of a skirt or pant. (Fairchild's Technical Sourcebook for designers, 2014, p.446).

Body Measurement: A standardized distance between two specified points on the human anatomy. *Body measurements generally are based on standardized values from statistical studies of large populations. (ASTM, 2019).

Boot-Cut: Refers to the width at the hem of pants – cut wide enough so that pant leg can be pulled over the outside of a pair of western boots. (Fairchild's Dictionary of Fashion, 2014, p.311).

Balance: A symmetrical quality to a garment that occurs when it is cut on the grain, and the right and left sides match. (Fairchild's Technical Sourcebook for designers, 2014, p.446).

Blue Jeans: Ankle-length pants traditionally made in faded blue or indigo denim. Originally worn by farmers and workers, pants were styled with toping-stitching, two hip pockets, two side pockets, a V-shaped yoke in the back, and rivets reinforcing points of strain. In the late 1960s, adapted for the public as fashionable casualwear with flared legs in the same cut but made of many fabrics, including denim, bleached denim, printed fabrics, suede, stripes, corduroy, and even velvet. (Fairchild's Dictionary of Fashion, 2014, p.311).

Comfort: Possessing those qualities that promote a feeling of well-being, ease, and freedom from pain (Fairchild's Dictionary of Textiles, 2014).

Crotch: The lowest point of the torso where the legs separate or the area of a garment where the legs meet. (ASTM, 2019).

Crotch Length: The distance from the waist level at the center front, through the crotch and to the waist level at the center back, avoiding constriction at the crotch. (ASTM, 2019).

Ease: Factor taken into consideration when drafting a pattern-allowing extra measure at burst, waist, and hips so that the garment will fit comfortably, not skintight. (Fairchild's Dictionary of Fashion, 2014, p.123).

Ease: The amount of difference between the body measurements of the intended wearer and the corresponding measurements of the finished garments" (Keiser & Garner, 2017, p. 458).

Fit Ease: Areas of a garment that are just enough larger than the body to allow for comfort and movement. (Fairchild's Technical Sourcebook for designers, 2014, p. 449).

Hem: the lower edge of an item of clothing, such as a skirt or a blouse, or sleeve. That edge is turned under and secured, usually by sewing. A finish at the edge of a garment, the most common of which is the turned-back hem. (Fairchild's Technical Sourcebook for designers, 2014, p. 450).

Hip: the laterally projecting region formed by the lateral parts of the pelvis and the upper part of the femur together with the flesh covering them. (ASTM, 2019)

Knee: the joint between the lower and the upper leg. (ASTM, 2019).

Length: Point at which the lower edge of an item of apparel ends. (Fairchild's Dictionary of Fashion, 2014, p.273).

Levi's: Trademark for the type of DUNGAREES or BLUE JEANS. Distinguishing characteristics are a label stitched to the outside on one hip pocket, also the placing of rivets at places of most strain, and patch pockets placed at hips. First made out cloth used for sails- later, DENIM was used-by Levi Strauss in California for miners prospecting for gold in the 1840s. A distinctly American fashion, it developed into a multimillion-dollar industry, with many pairs exported yearly. The Costume Institute of the Metropolitan Museum in New Yoke and the Smithsonian Institution in Washington, D.C., have included Levi's in their American collections. The trademark is also used for a wide variety of casual apparel. (Fairchild's Dictionary of Fashion, 2014, p.313).

Numeric Sizing: Size range designated with numbers, such as 4, 6, 10, 12, and so on. (Fairchild's Technical Sourcebook for Designers, 2014, p. 452)

Pant: Clothing for the lower torso made to fit around each leg may be any length and width; some have cuffs, and some do not. (Fairchild's Dictionary of Fashion, 2014, p.310). Pant (Trouser): A bifurcated garment covering the body from waist to ankle, in two parts, one for each leg. (Fairchild's Technical Sourcebook for designers, 2014).

Points of Measure (POM): Points on a garment where each spec is defined, and where measurements are taken, such as across at 1" below armhole. (Fairchild's Technical Sourcebook for designers, 2014, p. 453)

Set: A smooth fit of the garment without draglines or wrinkles. (Fairchild's Technical Sourcebook for designers, 2014, p. 454)

Self-Image: How one sees herself or how she would like to be viewed by others (Schiffman & Kanuk, 2004).

Size Charts: Containing apparel sizes and their associated body measurements. Apparel manufacturers develop size charts to reflect their target market (Lee & Steen, 2010).

Sizing System: A method of designating garment sizes. (ASTM, 2019)

Target Customer: An imaginary customer who embodies the demographic, lifestyles, and physical characteristics of the customers for which apparel is designed and marketed (Lee & Steen, 2010).

Target Market: "a well-defined customer group to which a business wants to sell" (Keiser & Garner, 2008, p. 67).

Waist: The part of the torso as identified as the waist by the wearer as applicable to bottom garments (preferred waist). The part of the torso at the location between the lowest hip and hip identified by bending the torso to the side. (ASTM, 2019)

APPENDIX B

Survey/Questionnaire

University of Kentucky
College of Agriculture,
Food, and Environment
Retailing & Tourism Management
318 Erikson Hall
Lexington, KY 40506

P: 859-257-4917 F: 859-257-1275
www.uky.edu

September 18, 2019

Dear Participant,

You are invited to participate in a web-based research study investigating Apparel Sizing and Fit for girls between 7 and 12 years of age. The study is a part of my thesis requirement to complete a master's degree in the Department of Retailing and Tourism Management at the University of Kentucky.

The purpose of the study is to understand the problems related to size and fit for girls in this age group. Although you will not get personal benefits from taking part in this research study, your responses will help to understand the problems of size and fit of jeans for girls between 7 and 12 years of age. If you choose to participate in this study, you will be asked to complete an online questionnaire. To qualify for participation in this research, you should be the parent/guardian of a girl between 7 and 12 years old. The girl should wear jeans and you either shop for her or with her to purchase jeans.

Our goal is to receive 300 completed questionnaires. The questionnaire will take approximately 15 minutes to complete. The study is strictly voluntary, and you may opt-out of participation with no consequence, and there is minimal to no risk involved. By completing the questionnaire, you consent to participate in the study. Please be aware, that we will make every effort to safeguard your data, once received from the online survey/data gathering company, given the nature of online surveys, as with anything involving the internet, we can never guarantee the confidentiality of the data while still on the survey/data gathering company's servers, or while in route to either them or us. It is possible that the data collected for research purposes may be used for marketing or reporting purposes by the survey/data gathering company after my research is concluded, depending on the company's Terms of Service and Privacy policies. The data I receive from the company will be held on a secure computer in my professor's office with password protection.

If you have any questions concerning this study, please contact Dr. Elizabeth P. Easter, Professor and Directory of my thesis research at the University of Kentucky, 318 Erikson Hall Lexington, KY 40506 (859) 257-7777 or e-mail – eeaster@uky.edu. If you have complaints, suggestions, or questions about your rights as a research volunteer, contact the staff at the University of Kentucky Office of Research Integrity at 859 257-9428 or toll-free at 1-866-400-9428.

Thank you in advance for your participation in this study. Your response is very important to my research and will enable me to complete the master's degree.

Sincerely,

Peggy Sowah, Ashia, Graduate Student,
Retailing & Tourism Management Department;
318 Erikson Hall, University of Kentucky, Lexington, KY 40506;

RESEARCH ON APPAREL SIZING AND FIT FOR GIRLS AGE 7-12

DEMOGRAPHIC INFORMATION

Directions: The following questions will help us gain a better understanding of size and fitting problems for girls age 7-12 when shopping for jeans. The following questions will provide demographic information of the parents of girls within this age range.

1. Do you shop for a girl between the ages of 7-12?
   - ○ Yes
   - ○ No

2. Are you the:

   ___ Mother

   ___ Father

   ___ Grandmother

   ___ Other: (Please specify) _____

3. How old is your child?

   - ○ 7
   - ○ 8
   - ○ 9
   - ○ 10
   - ○ 11
   - ○ 12

4. What ethnic group(s) do you consider yourself a member of?

   Please check all that apply.

   _____ White/European American

   _____ African American/Black

   _____ Hispanic American or Latina

   _____ Asian

   _____ Other? (Please specify)_____

5. Does your child wear jeans? If no, please discontinue survey.

   ○ Yes

   ○ No

QUESTIONNAIRE

RESEARCH ON APPAREL SIZING AND FIT FOR GIRLS AGE 7-12

Please think about your experiences when shopping for jeans for your child.

6. Where do you usually shop for jeans for your child?

- ○ In-store
- ○ Online
- ○ Catalog
- ○ Other (Please Specify) _____

7. What brand(s) of jeans do you usually purchase for your child?
   Select all that apply.

- ○ Children's Place
- ○ Gap
- ○ Old Navy
- ○ Arizona
- ○ Levi's
- ○ Lee
- ○ Guess
- ○ Lucky
- ○ Designer Brand
- ○ Other (Please Specify) _____

8. What style jeans do you usually purchase for your child?

- ○ Straight
- ○ Boot-cut
- ○ Skinny
- ○ Jegging
- ○ Other (Please Specify)_____

9. How much do you typically pay for one pair of jeans for your child?

- ○ $5-15
- ○ $16-25
- ○ $26-35
- ○ $36-45
- ○ Other (Please Specify) _____

10. What size jeans does your child wear?

_____ Regular ☐ 7 ☐ 8 ☐ 10 ☐ 12 ☐ 14

_____ Slim ☐ 7 ☐ 8 ☐ 10 ☐ 12 ☐ 14

_____ Plus ☐ 7 ☐ 8 ☐ 10 ☐ 12 ☐ 14

_____ Other (Please Specify) _____

11. What is your child's height in feet and inches? _____feet _____inch

12. What is your child's weight in pounds? _____

13. What design features does your child prefer in jeans?

- ○ Fabric with Stretch
- ○ Elastic waist band
- ○ Adjustable waist band
- ○ Cuffs
- ○ Pockets
- ○ Other (Please Specify)_____

14. Which of the following best describes why you purchase the brand (s) of jeans selected in question 7?

- ○ Fit
- ○ Price
- ○ Quality
- ○ Popularity of the brand name (Many of my child's friends wear this brand).
- ○ Other (Please Specify)_____

15. How important is ‘fit’ in the following locations when selecting jeans for your child?

    Select all that apply

	Very Unimportant	Unimportant	Neutral	Important	Very Important
	1	2	3	4	5
Inseam	O	O	O	O	O
Out seam	O	O	O	O	O
Crotch Depth	O	O	O	O	O
Waist	O	O	O	O	O
Bottom Leg Opening	O	O	O	O	O
Hips	O	O	O	O	O
Overall Length	O	O	O	O	O

16. When trying jeans on your child, which of the following are 'fit' issues?

Select all that apply.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	1	2	3	4	5
Inseam	O	O	O	O	O
Outseam	O	O	O	O	O
Crotch Depth	O	O	O	O	O
Waist	O	O	O	O	O
Bottom Leg Opening	O	O	O	O	O
Hips	O	O	O	O	O
Overall Length	O	O	O	O	O

17. Does your child try on garments in the store, or do you purchase according to size?

- ○ Yes, try on jeans in the store
- ○ No, do not try on jeans in the store
- ○ Yes, purchase jeans according to size
- ○ No, do not purchase according to size
- ○ Sometimes, try on garments in the store or purchase according to size
- ○ Other (Please Specify)_____

18. What do you do when you cannot find jeans that fit your child?

Please Specify _____

APPENDIX C

IRB Approval

University of Kentucky | Office of Research Integrity
IRB, RDRC

XP Initial Review

Approval Ends:	IRB Number:
11/21/2020	54028

TO: Peggy Sowah, Master's Graduate Student
Bachelor of Business Administration Retailing & Tourism Management
PI phone #: 6062595205

PI email: pdso222@uky.edu

FROM: Chairperson/Vice Chairperson
Nonmedical Institutional Review Board

(IRB) SUBJECT: Approval of Protocol

DATE: 11/29/2019

On 11/22/2019, the Nonmedical Institutional Review Board approved your protocol entitled:

APPAREL SIZING AND FIT FOR GIRLS: VARIATION OF SELECT COMPANIES, AND PARENT OPINIONS

Approval is effective from 11/22/2019 until 11/21/2020 and extends to any consent/assent form, cover letter, and/or phone script. If applicable, the IRB approved consent/assent document(s) to be used when enrolling subjects can be found in the "All Attachments" menu item of your E-IRB application. [Note, subjects can only be enrolled using consent/assent forms which have a valid "IRB Approval" stamp unless special waiver has been obtained from the IRB.] Prior to the end of this period, you will be sent a Continuation Review (CR)/Administrative Annual Review (AAR) request which must be completed and submitted to the Office of Research Integrity so that the protocol can be reviewed and approved for the next period.

In implementing the research activities, you are responsible for complying with IRB decisions, conditions and requirements. The research procedures should be implemented as approved in the IRB protocol. It is the principal investigator's responsibility to ensure any changes planned for the research are submitted for review and approval by the IRB prior to implementation. Protocol changes made without prior IRB approval to eliminate apparent hazards to the subject(s) should be reported in writing immediately to the IRB. Furthermore, discontinuing a study or completion of a study is considered a change in the protocol's status and therefore the IRB should be promptly notified in writing.

For information describing investigator responsibilities after obtaining IRB approval, download and read the document "PI Guidance to Responsibilities, Qualifications, Records and Documentation of Human Subjects Research" available in the online Office of Research Integrity's IRB Survival Handbook. Additional information regarding IRB review, federal regulations, and institutional policies may be found through ORI's web site. If you have questions, need additional information, or would like a paper copy of the above mentioned document, contact the Office of Research Integrity at 859-257-9428.

APPENDIX D

Table D1

Children's Place Jeans Eleven Measurement Locations

Measurement Location	Children's Place Jeans Size Number: 12				
	Sample Product CP 1	Sample Product CP 2	Sample Product CP 3	Average	SD
	Inches	Inches	Inches	Inches	Inches
Circumference of Waist	27.63	28.25	27.25	27.71	0.51
Crotch Depth Front	8.75	9.00	8.63	8.79	0.19
Crotch Depth Back	11.25	11.63	11.38	11.42	0.19
Hips Front	16.38	16.75	16.50	16.54	0.26
Hips Back	16.38	16.75	16.25	16.46	0.66
Inseam Right	27.75	26.75	26.50	27.00	0.14
Inseam Left	26.38	27.50	26.50	26.79	0.25
Out Seam Right	33.50	33.50	33.25	33.42	0.13
Out Seam Left	33.50	33 38	32.88	33.24	0.38
Overall Length Right	34.75	34.50	34.63	34.63	0.51
Overall Length Left	34.76	35.13	34.38	34.75	0.19

Table D2

Gap Jeans Eleven Measurement Locations

Points Measurement Location	Gap Jeans Size Number: 12				
	Sample Product G 1	Sample Product G 2	Sample Product G 3	Average	SD
	Inches	Inches	Inches	Inches	Inches
Circumference of Waist	26.75	26.50	26 .75	26.67	0.14
Crotch Depth Front	8.38	8.38	8.25	8.33	0.07
Crotch Depth Back	11.63	11.50	11.50	11.54	0.07
Hips Front	16.13	15.63	16.00	15.92	0.26
Hips Back	16.00	15 88	15.88	15.92	0.07
Inseam Right	27.63	28.00	28.00	27.88	0.26
Inseam Left	27.50	28.00	27.88	27.79	1.09
Out Seam Right	33.63	33.50	33.63	33.58	0.19
Out Seam Left	33.13	33.50	33.38	33.33	0.00
Overall Length Right	35.00	35.00	35.00	35.00	0.25
Overall Length Left	34.50	34.75	35.00	34.75	0.26

Table D3

Levi's *Jeans Eleven Measurement Locations*

Points of Measurement Location	Levi's Jeans Size Number: 12				
	Sample Product L 1	Sample Product L 2	Sample Product L 3	Average	SD
	Inches	Inches	Inches	Inches	Inches
Circumference of Waist	28.00	29.25	28.00	28.42	0.72
Crotch Depth Front	7.25	7.00	7.88	7.38	0.45
Crotch Depth Back	11.13	11.25	10.75	11.04	0.26
Hips Front	15.50	16.75	16.13	16.13	0.63
Hips Back	16.00	16.88	16.88	16.58	0.51
Inseam Right	28.63	28.63	28.50	28.58	0.07
Inseam Left	27.88	28.00	28.00	27.96	0.07
Out Seam Right	33.63	34.63	33.25	33.83	0.71
Out Seam Left	33.38	34.13	33.13	33.54	0.52
Overall Length Right	35.00	35.00	34.60	35.20	0.35
Overall Length Left	35.00	35.75	35.38	35.04	0.31

Table D4

Old Navy Jeans Eleven Measurement Locations

Points of Measurement Location	Old Navy Jeans Size Number: 12				
	Sample Product ON 1	Sample Product ON 2	Sample Product ON 3	Average (Inches)	SD
	Inches	Inches	Inches	Inches	Inches
Circumference of Waist	26.75	26.50	27.25	26.83	0.38
Crotch Depth Front	8.75	8.63	8.75	8.71	0.07
Crotch Depth Back	12.13	12.25	12.25	12.21	0.07
Hips Front	16.25	16.13	16.50	16.29	0.19
Hips Back	16.25	16.38	16.50	16.38	0.13
Inseam Right	29.75	29.63	30.38	29.92	0.40
Inseam Left	29.50	29.38	29.75	29.54	0.19
Out Seam Right	35.25	35.00	36.00	35.42	0.52
Out Seam Left	35.38	35.13	36.00	35.50	0.45
Overall Length Right	36.75	36.38	37.38	36.50	0.82
Overall Length Left	37.00	37.00	37.25	37.08	0.14

Table E.1

Children's Place Sizing Guide Chart

SIZE		AGE	HEIGHT	WEIGHT	WAIST	HIP	INSEAM
4	XS	3 - 4	38 - 41"	35 - 39 lbs	21.5 - 22"	22 - 23"	15.5 - 17"
5	S	4 - 5	41 - 44"	39 - 45 lbs	22 - 22.5"	23 - 24"	17 - 18.75"
6	S	5 - 6	44 - 46.5"	45 - 50 lbs	22.5 - 23"	24 - 25"	18.75 - 20.25"
6X / 7	M	6 - 7	46.5 - 50.5"	50 - 57 lbs	23 - 23.5"	25 - 27.5"	20.25 - 23"
8	M	7 - 8	50.5 - 52.5"	57 - 65 lbs	23.5 - 24.25"	27.5 - 28.5"	23 - 24.25"
10	L	8 - 9	52.5 - 55"	65 - 75 lbs	24.25 - 25"	28.5 - 30"	24.25 - 26"
12	L	9 - 10	55 - 58"	75 - 86 lbs	25 - 26"	30 - 32"	26 - 27.5"
14	XL	10 - 11	58 - 61"	86 - 100 lbs	26 - 28"	32 - 34"	27.5 - 29"
16	XXL	11 - 12	61 - 62.5"	100 - 108 lbs	28 - 30"	34 - 36"	29 - 29.5"
18	XXXL	12 - 13	62.5 - 64"	108 - 115 lbs	30 - 32"	36 - 38"	29.5 - 30"

https://www.childrensplace.com/us/p/Girls-Basic-Bootcut-Jeans---Medium-Worn-Stone-Wash-2024535-93?cid=email-_-190926-_-trig-_-ordconf-_-main

Table E.2

Gap Sizing Guide Chart

Size	US Size	Weight	Height	Waist	Hip
XS	4	33-38	39-42	21	24
	5	39-44	42-45	22	25 ½
S	6	45-55	45-49	22 ½	26 ½
	7	56-64	49-52	23	27 ½
M	8	64-72	52-54	23 ½	28 ½
L	10	71-81	54-57	24 ¼	30
XL	12	82-93	57-60	25 ¼	31 ½
XXL	14	94-106	60- 62	26	33
	16	106-116	62-63	27	35
XXXL	18	116-126	64-66	28	37

https://www.gap.com/browse/product.do?pid=494994002&pcid=999

Table E.3

Levi's Sizing Guide Chart

Manufacturer Size	US Size	Height (in inches)	Weight (in pounds)	Bust (in inches)	Waist (in inches)	Hips (in inches)
Regular	7	50.5-52.5	52-58	26	22.5	27.5
Regular	8	52.5-55	61-68	27	23	28.5
Regular	10	55-58	71-87	28.5	24	30
Regular	12	58-61	85-95	30	25	32
Regular	14	61-64	99-110	31.5	26	34
Regular	16	62.5-67	109-120	33.5	27	36

Https://www.walmart.com/ip/Levi-s-Thick-Stitch-Boot-Cut-Jeans-Big-Girls/774947031, Copyright 2019 by Levi's Brand INC.

Table E.4

Old Navy Guide Chart

Manufacturer Size Regular Size Chart	Size	Waist (In Inches)	Hips (In Inches)
XS	5	22 ½	24
	6	22 3/4	25 ½
S	7	23 1/8	27
M	8	23 1/2	28 1/2
	10	24 1/2	30 1/4
L	12	25 ½	32
XL	14	26 ½	33 3/4
XXL	16	27 ½	35 1/2

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