

Analysis of Tall Sized Women's Figures Based on sizeusa Data:
An Assessment of Tall Sizing Systems Used in the U.S. Apparel Industry

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Introduction & Objectives: Main apparel companies, such as Lands' End, The Gap, and J.Crew, are providing tall-sized clothing. In addition, new emerging apparel brands as well as existent jean ones have expanded their tall market (Crouch, 2018; Salesforce, 2018; Zinko, 2017). However, tall-sized customers are not generally satisfied with the fit of their clothing. 'Tall' size is typically defined as women with a taller height, 5'8" and over, with torso and limb lengths increased accordingly. However, these definitions have not been confirmed by the recent population data. PS 42-70 only presented sizing standards for Missy tall-sized women, but these were based on out-of-date data collected in 1941. Studies regarding the analysis of tall figures are also scarce: although Yoo (1996) and Jones and Giddings (2010) did study related to tall sized women's satisfaction with apparel products, its specific topic was not dealt with the actual tall body figures compared with industrial ones. The **objectives** of this current study then are (1) to analyze body size and shape characteristics of tall sized women by exploring the differences between tall size and regular size based on SizeUSA data, and (2) to assess tall sizing systems currently used in the U.S. apparel industry predicated on SizeUSA data.

Methodology: From the SizeUSA data, 1,362 females aged 18 to 35 were selected and divided into two groups: 'Tall' (n=267) and 'Regular' (n=1,095) by height 5'8" (93th percentile). A t-test was performed to compare mean values between the two groups, using 28 body measurements: eight heights, five lengths, twelve girths, and three widths. Through online research, we obtained sizing charts of 10 apparel companies that are providing both Tall and Regular sizes, and the differences between the two sizes were then compared to the results of the t-test. To categorize tall women's body shapes, we conducted K-means cluster analysis using the statistical package SPSS 17.0. For this, we utilized 15 body measurements by stature ratios for independent variables for a PC analysis (varimax rotation method). The PC scores were used for independent variables of cluster analysis.

Findings: From the t-test, the circumference and width indicated no significant difference between the 'Tall' and 'Regular' groups. However, the height and length measurements were shown to be significantly different between the 'Tall' and 'Regular' groups. Differences at primary locations were as follows: Cervical height: 4.4"; waist height: 1.9"; crotch height: 1.5"; thigh height: 1.5"; knee height: 0.9"; center back length (center back neck point to wrist point): 1.0"; arm length: 0.9".

All 10 companies corresponded to the results of the t-test at the bust, waist, and hip girths. However, for height and length measurements, their sizing charts presented differently from the results of the t-test. First of all, for crotch height (*inseam length*), none of the 10 companies corresponds to the results from the t-test: although the difference from the t-test was 1.6, six companies only included this measurement in their charts and set 2-4 differences. Only

four companies included the center back length in the chart: solely two companies used 1-1.2" differences which was close to the t-test result (1.1"), while the other two brands used 2" wrongly.

From the *stature* distribution analysis, 5'8" was at the 93th percentile of the total sample. They specified stature for the 'Tall' size category: four companies defined Tall as 5'8" and taller; the other four defined as 5'9" and taller; the rest of two defined as 5'10" or 5'11" and taller.

In the three-group body model, the data distributed (Group 1: 24.3 percent, Group 2 was 58.1 percent, Group 3 was 17.5 percent). The overall *F* for the one-way ANOVA was statistically different ($p < 0.05$). The main body shape characteristics of each body shape group were: Group 1 (Top tall) had the longest torso, and relatively average limbs and body volume; Group 2 (regular tall) had a relatively average torso and long limbs; Group 3 (Bottom tall) had the shortest torso length, longer limbs, and larger body volume.

Conclusions and Implications: This study provides an investigation of tall-sized women's figures based on the SizeUSA data, and an analysis of current Tall size charts in comparison to the population data. When the size charts of major companies producing tall sizes were compared to the results of this statistical analysis, it was found that their charts of height and length measurements were not reflected the population of tall-sized customers, while presenting relatively correct measurements at bust, waist, and hip girths. Also, according to the consequence on body figure classification, tall-sized women have different torso and limb length proportions even if their body circumferences does not present significant difference from ones of regular-sized women: for example, tall-sized women's upper body is fairly long whereas their lower body is regular size, and vice versa. Therefore, tall-sized clothing cannot be well-fitted if the company produces tall-sized clothing by simply extending regular sized clothing: they need to consider the length proportion of the upper and lower body when making tall-sized dress. For future studies, the results of this study can be utilized to devise a standard sizing system for tall-sized women, so fashion businesses will be able to afford a better fit of clothing to tall-sized customers. Further research is necessary to analyze older women's tall sizes and tall women of different ethnic groups. This study can be regarded as the first step in revising the tall sizing for all those in need of that kind of apparel.

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