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

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Introduction & Objectives: The petite clothing market has grown in the past several years, now reaching over $10 billion (Barbaro, 2006). Major apparel companies, such as Lands' End and The Gap, are offering petite-sized clothing, but petite-sized customers are not generally satisfied with the fit of their clothing. 'Petite' size is typically defined as women with a shorter height, 5'4" and under, with pant lengths and jacket proportions cut accordingly. However, these definitions have not been confirmed by the recent population data. PS 42-70 only presented sizing standards for Missy petite-sized women, but these were based on outdated data collected in 1941. Studies regarding the analysis of petite figures are also limited. Kim (1992) and McRoberts (2005) did study this topic, but their sample size was small. The **objectives** of this current study then are (1) to analyze body size and shape characteristics of petite sized women by exploring the differences between petite size and regular size based on SizeUSA data, and (2) to assess petite sizing systems currently used in the U.S. apparel industry based on SizeUSA data.

Methodology: From the SizeUSA data, 2,981 females aged 18 to 35 were selected and divided into two groups: 'Petite' (n=1,618) and 'Regular' (n=1,363) by height 5'4" (50th percentile). A t-test was performed to compare mean values between the two groups, using 42 body measurements , 41 height ratios (measurement/height), and 2 drop (difference) values (bust - waist girth, hip -bust girth). Based on the ratio of center back neck to waist length, to waist to floor length, we divided the sample into 'Top < Bottom', 'Top ≒ Bottom', and 'Top > Bottom' at the 33.3rd percentile (0.421) and the 66.9th percentile (0.457), and these distributions were examined as 'Petite' and 'Regular' groups. Through online research, we obtained sizing charts of 10 apparel companies that are providing both Petite and Regular sizes, and the differences between the two sizes were then compared to the results of the t-test.

Findings: The mean differences in circumference between the 'Petite' and 'Regular' groups were 1" at *bust girth*, 0.8" at *waist girth* and 1.5" at *hip girth*. From the t-test, all measurements were shown to be significantly different between the 'Petite' and 'Regular' groups. Differences at primary locations were as follows: Center back length: 0.9"; across shoulder: 0.5"; cross chest width: 0.2"; cross back width: 0.6"; and shoulder length: 0.2".

      Only one of the 10 companies had a size chart that corresponds to these results from the t-test. One company failed to provide any differences between the 'Petite' and 'Regular' groups. In their 'Petite' size chart, three brands proportionally cut down the bust, waist and hip by 0.5" from the 'Regular' sizing chart. Two companies corresponded to the results of the t-test at the bust girth only, and the rest of the companies did not have any measurements that corresponded to the results of the t-test. Only one company included the thigh girth measurement in the sizing

chart. The thigh difference between 'Petite' and 'Regular' was 0 to 0.75" depending on the sizes, while the t-test results showed a difference of 1". From the *height* distribution analysis, 5'4" was at the 50th percentile of the total sample. Six out of 10 companies specified height for the 'Petite' size category. Among these, five companies defined Petite as 5'4" and shorter and one brand defined 'Petite' as 5'3" and shorter. For the *crotch height (inseam length)*, the difference from the t-test was 2.5". One company only included this measurement in their chart and set 3" differences. Only two companies included the *arm length* (center back neck point to wrist point) in the chart. One company used 2" differences, which was close to the t-test result (1.9"), while the other brand used 1.3-1.5". For *total crotch length* (rise), the t-test result was 1.3" and 0.7" for *waist to hip length*. Only one company included these two measurements in their chart, and this company's measurements corresponded closely to the t-test results at 1-1.3" and 0.5", respectively. Regarding the *proportions* (measurement/height), the 'Petite' group has longer length proportions in the upper body (cervical neck point to waist level) and the pelvic area (waist to crotch level), but shorter length proportions in the lower body and arm length (shoulder point to wrist). The 'Petite' group had thicker girths and wider widths (cross chest, cross back and shoulder width). With respect to *body types*, the 'Petite' group had a straighter body type (Petite < Regular = 0.5" at the H - B girth and 0.2" at the B - W girth drop).

In the 'Petite' group, 'Top > Bottom' consisted of 37.7% and 'Top < Bottom' was 29.6%. To the contrary, in the 'Regular' group, 'Top > Bottom' was 28.1% and 'Top < Bottom' was 37.7%. From a distribution analysis for center back length and waist height measurements, it was found that 20.0% (only the <u>Top Petite</u>) of women in the 'Petite' group belong to the under 50th percentile of center back length, while to the over 50th percentile of waist height, so they should seek pants or skirts from 'Regular sized clothing'. 33.6% (only the <u>Bottom Petite</u>) of the women belonged to the under 50th percentile of waist height, but the over 50th percentile of center back length. This group should therefore seek tops from 'Regular sized clothing'.

<u>Conclusions and Implications:</u> This study provides an investigation of petite sized women's figures based on the SizeUSA data, and an analysis of current Petites size charts in comparison to the population data. When the size charts of major companies producing petite sizes were compared to the results of this statistical analysis, it was found that their charts do not represent the population of petite-sized customers. Also, since petite-sized women have different length, girth and width proportions than regular women, petite sized clothing cannot be well-fitted if the company produces petite-sized clothing by simply cutting down regular sized clothing proportionally. For further studies, the results of this study can be used to design a standard sizing system for petite-sized women, so fashion companies will be able to offer a better fit of clothing to petite-sized customers.

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