Demographic Factors for Developing Apparel Sizing Systems in USA

1. INTRODUCTION

In the United States, people who have different ethnic backgrounds often experience poor fit due to their unique body proportions. The fit problems are associated with apparel sizing systems that have been based on old demographic data. The current population is becoming more ethnically diverse in the United States. According to the U.S. Census Bureau (2001), the U.S. immigrant population grew rapidly during the 1990s and the foreign-born population grew by 57% during the decade nationwide.

Purpose of this study:
The purpose of this study was to investigate body shapes according to ethnicity and age as demographic factors for developing apparel sizing systems in the United States.

2. EXPERIMENTAL PROCEDURES

2.1 Data collection
Females* in Missy size ranges were selected from SizeUSA National Sizing Survey that was conducted by [TC]², Cary, NC, USA between 2002 and 2003 in the United States.

*A total 1335 of 6310 females answered that they wear Missy sizes.

2.2 Data analysis procedure
In this study, 6310 females were grouped by their ethnicity and ages by running Simple Query Language (SQL). Prior to investigating demographic factor for the sizing systems, body shape distributions by ethnicity were compared, including:
- Rectangle
- Spoon
- Inverted Triangle
- Hourglass shape
- Top Hourglass
- Bottom Hourglass
- Triangle shapes.

2.3 Statistical analysis
A factor analysis of variance (ANOVA) was used to investigate body dimension differences according to two demographic factors:
(1) Age group
(2) Ethnic group.

A Tukey test was used for multiple comparisons to determine which groups were similar or different with significance level set at α=0.05.

3. RESULTS AND DISCUSSIONS

3.1 Shape Analysis by Ethnicity

3.2 The Body Differences Among Ethnic Groups

Table 1. Multiple comparisons among ethnic groups

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<thead>
<tr>
<th>Ethnicity</th>
<th>18-25</th>
<th>26-35</th>
<th>36-45</th>
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<th>56-66</th>
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3.3 The Body Differences Among Age Groups

Table 2. Multiple comparisons among age groups

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<th>Age Group</th>
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<th>36-45</th>
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4. CONCLUSIONS

In summary, this study revealed several factors that may help define diverse female body shapes in the U.S. population. Half of the females in the study possessed rectangular shapes. They have various body shapes based on demographic factors of age and ethnicity.

- As the age of the subjects increased, body measurements in the waist, hip, bust, neck base, and upper arm were larger until age 66. Subjects over age 66 showed slightly smaller measurements than the age groups below, but with a greater shoulder slope. There were large size variances in the middle age group.
- Asians have smaller hips, waists, and busts with greater shoulder slope. On the other hand, African Americans have larger hips, waists, and busts. Hispanics and Mexicans have similar body sizes. Hispanics had similar body measurements as Caucasians in waist, hip, and bust. However, the degree of the Hispanics’ shoulder slope were smaller compared to the Caucasians’. The shoulder slope differences might have an effect on developing women’s clothing such as dresses, jackets, and blouses.
- The results clearly show that the differences among age groups and ethnicity have an effect on the apparel market. It is important for apparel manufacturers and retailers to understand the idea that people have different shapes and these body shapes vary by the ethnicity and age. Therefore, apparel manufacturers must be aware of the differences in age and ethnicity in order to develop women's apparel market. Further study should be done for defining body shapes with detail shape differences such as shoulder shapes and crotch lengths in order to develop precise sizing systems for mass customization.