Sizing Systems for Children's Wear in the United States

Authors:

****Su -Jeong Hwang Shin, Ph.D. & **Cynthia L. Istook, Ph.D.***

(*Texas Tech University, Lubbock, TX, USA , **NC State University, Raleigh, NC, USA)

Acknowledgement:

CDRC (Child Development Research Center), Texas Tech University

Oakwood United Methodist Church, Lubbock, TX

1. INTRODUCTION

Children's apparel consumers have difficulty finding appropriate sizes of children's clothing. The major sources of published anthropometric data on children are now over two decades old. The most reliable source for the apparel industry, ASTM D5826, was developed from data published by the U.S. Department of Commerce 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. Several studies using children's Body Mass Index (BMI) are available from the fields of health and nutrition.

However, the information is limited only to height and weight. A number of national sizing projects (SizeUK, 2002; CAESAR, 2000; SizeUSA, 2003) have been conducted during the last decade to gather anthropometric data to gain a better understanding of the adult population. However, children were deemed to be too difficult to size with either 3D body scanners or traditional tape measurements in the national sizing projects.

Therefore, the purpose of this study was to understand current children's body dimensions in the ages of 2-5 and to investigate if current standard sizing systems would be valid for developing children's wear patterns.

2. EXPERIMENTAL PROCEDURES

2.1 Data collection

- ❑ A pilot study was conducted to obtain current children's body dimension data between 2006 and 2007 in Texas, the United States. During the period, 47 children aged 2-5 and their parents participated in the pilot study. Only valid data of 40 children was used in this study.
- ❑ The demographics of the children:
  - ❑ Girls (47.5 %) and boys (52.5%)
  - ❑ Caucasian (65 %), Asian (22.5%), and Hispanic (12.5%).

2.2 Data analysis procedure

The survey consisted of two sections:

- ❑ In the first section, parents were asked to fill out the survey form that included questions about their children's clothing sizes and any problem with the fit of children's clothing.
- ❑ In the second section, 34 body dimensions of each child were measured with a traditional measurement tape. *The measurement method was based on *ASTM D 5826-00 (Standard Tables of Body Measurements for Children, Sizes 2 to 6x/7).*
- ❑ In addition, National Center for Health Statistics (NCHS) and ASTM D 5826 (Standard Tables of Body Measurements for Children, Sizes 2 to 6x/7) were investigated.

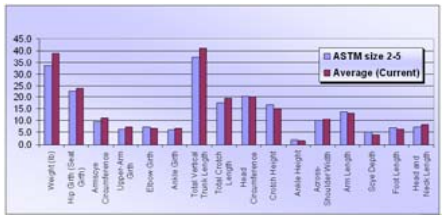
2.3 Statistical analysis

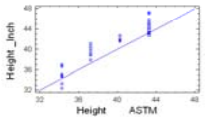
- ❑ A single factor analysis of variance (ANOVA) was used to investigate body dimension differences between boys and girls (p=0.05).
- ❑ T-test was used for two sample comparison ASTM children's body measurements and current children's body measurements from the pilot study (p=0.05).

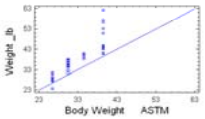
3. RESULTS

- ❑ 69.4% of parents answered that they were frustrated about the current availability of sizes in children's clothing.
- ❑ Parents felt that different brands offered different sizes and they had varying fit problems.
- ❑ When specific clothing items were identified, in the jacket item, 67.5 % wore bigger sizes than their age and 5% wore smaller sizes. In the pants item, 55% wore bigger sizes and 12.5 % wore smaller sizes.
- ❑The 3 and 4 year old groups were discovered to be the age groups that have the biggest issues in fit, while 59.2% of the 5 years old group had no problem with the fit of clothing. In this study, 83% of the 3 year olds and 70% of the 4 year olds wore bigger sizes than their age.
- ❑ Parents of children 3 and 4 years old often mentioned finding toddler sizes of the clothing. For the ages of 3 and 4, 3T or 4T were often found to be too small for the ages. Size 4 and 5 would also not fit for the age of 3 and 4.

3.1 Current Children's Sizes vs. ASTM

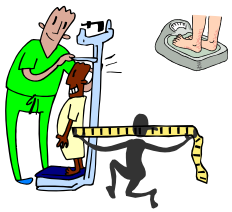






3.2 Children's Sizes Differences from the ASTM D5826

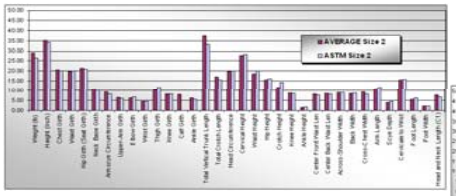
Average vs. ASTM (Unit: Inches)	ASTM size 2-5	Average (Current)	T-test (p=0.05)
Weight (lb)	33.48	38.81	t = -3.30135 P-value = 0.00145304
Hip Girth (Seat Girth)	22.65	23.72	t = -2.55302 P-value = 0.0126307
Armscye Circumference	9.53	11.24	t = -5.6964 P-value = 2.07325E-7
Upper-Arm Girth	6.54	7.20	t = -3.8556 P-value = 0.000235905
Elbow Girth	7.16	6.77	t = 3.61685 P-value = 0.00052707
Ankle Girth	6.12	6.72	t = -4.52782 P-value = 0.0000210928
Total Vertical Trunk Length	37.13	41.01	t = -4.92833 P-value = 0.00000456222
Total Crotch Length	17.48	19.48	t = -3.93444 P-value = 0.000179726
Head Circumference	20.41	20.15	t = 2.07388 P-value = 0.0413909
Crotch Height	16.73	15.09	t = 3.41964 P-value = 0.00100011
Ankle Height	2.08	1.68	t = 7.6295 P-value = 4.89435E-11
Across-Shoulder Width	10.00	10.67	t = -3.33091 P-value = 0.00132457
Arm Length	13.76	13.03	t = 2.07189 P-value = 0.0415804
Scye Depth	4.91	3.99	t = 7.80659 P-value = 2.22684E-11
Foot Length	6.86	6.39	t = 4.14388 P-value = 0.0000859598
Head and Neck Length (C1)	7.16	8.51	t = -9.90683 P-value = 0.0

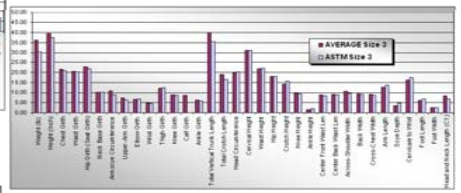


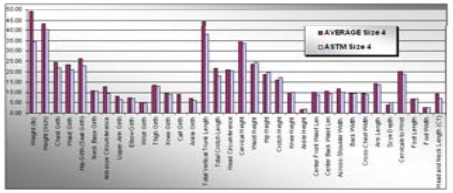
Myth: Boys are bigger and taller than girls?

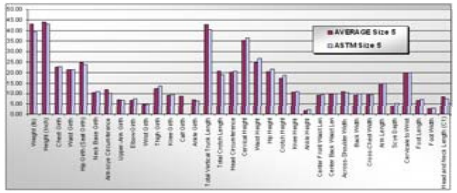
According to ANOVA test results of body dimension differences between Girls and Boys (age 2~5 years old) in this study, There were no significant differences between girls and boys. (p=0.05)
Except, the following body dimensions (p=0.05):
Elbow girth, Back width, and Neck base girth.

3.3 Average Children's Body Dimensions vs. ASTM D5826 in Each Age (Size) Group









4. CONCLUSIONS

- ❑ In summary, there was a significant change in children's growth between ages 2-5.
- ❑ Ages 3 and 4 have significant differences in body dimensions and shapes.
- ❑ Parents reported frustration with finding the right sizes for their children.
- ❑ According to the above test results, current sizing system standards for toddlers and preteen were not valid for current children's wear.
- ❑ Thus, sizing systems should be updated to be able to apply for the current children's wear. Children anthropometric data should be updated to support these standards. Further study should be carried out for defining children's body proportions and shapes. Their garments should be designed accordingly with understanding children's body proportion changes in each age stage.