A Study on the Fit of Ready-to-Wear Garment for Girls at the Age of Puberty

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Abstract

The purpose of this study is to investigate the fit of ready-to-wear garment for girls at the age of puberty and to find out the respective differences by age and locality. For this study, a questionnaire survey was conducted to 347 girls in Seoul and Gyeonggi-do.

As a whole, the largest parts of complaints for unfitness were height, waist circumference and, next hip circumference. According to the result of comparing the fit of ready-to-wear garment by items, the fit of clothing for girls at the age of puberty gets relatively worse with the increase of age in all items except one-piece. As for the fit by parts of ready-to-wear garment, significant differences were observed according to age in the length of sleeve, crotch and the length of upper garments. That is, girls at the age of 10~11 were found to think that their clothes are long in the three measures.

Key words : girls at the age of puberty, unfitness, the fit by parts of ready-to-wear garment, crotch.

I. Introduction

The construction of clothing for a good fitness must be preceded the exact antropometric measurement and the study of somatotype. Somatotype is human body shape and physique type which can be classified not only by the size, but also by the shape or posture of the body[1]. The somatotype was changed as age, sex, nation, race and shaped from mixed state of various conditions like nutritive conditions, way of life. Therefore an understanding of body pro-

portions and the posture resulting from age induced anatomical and physiological changes are necessary for designing clothes[2]. In general, consumers have been dissatisfied with fit associated with the fact that the current sizing system for the manufacturing of garments is only based on body measurements. To solve these problem, it's essential to classify somatotype based on the body shape and posture according to the age group.

In human development phase, puberty is the period that boys and girls have a increasing interest in their clothes and appearance[3], and

physical appearance assumes a new kind of importance in the lives of both them. Puberty is derived from Latin, Pubertas that means an adult. The relatively brief time between the end of childhood and the beginning of adolescence, during which an individual becomes sexually mature, is known as puberty[4]. During puberty, while an adolescent is gaining height and weight dramatically, other equally important changes occur that signal the beginning of sexual maturation. In general, the growth spurt for girls occurs almost two years earlier than for boys. Girls, who on the average are shorter than boys during childhood, begin their growth spurt first and at this point are generally taller and heavier. This spurt usually occurs between the ages of ten and eleven[5]. Physical growth at puberty is accompanied by a number of changes in the reproductive system and by the emergence of secondary sex characteristics. In girls, all of secondary sex characteristics continue to develop well past the beginning of menarche. Menarche almost always after the peak rate of growth in height has occurred and related quite closely to body weight. Girls at puberty show horizontal growth with menarche, having voluminous body shape[6]. The onset of menarche varied from 10 to 15 years and the age at menarche has been occurring earlier as part of this secure trend toward more rapid maturation[7]. In Korea, the average age at menarche was 14.8 in 1962[8] and 13.9 in 1987[9]. And a research in 2005 reported that the average age of menarche was 11.1[10]. Most researchers feel that improved nutrition, sanitation and health care are responsible for the trend and today's children are growing up faster physically than children in past generations due to environmental factors. At this period of rapid physical change, boys and girls at puberty are often highly critical of their own and other's physical appearance and clothes. In particular, Girls are far more likely than boys to suffer from unattractiveness. Therefore it's important for girls at puberty to provide well-fitting dress based on their physical characteristics.

Meanwhile, Recently in the apparel industry, pubescent boys and girls are emerging as a new consumer group defining of a "tween" market. "Tween generation" refers to people aged between 8 ~ 14 in western countries but in Korea considering differences in physical and emotional development, it corresponds to those aged between 10 ~ 16[11]. Tweens are more brand aware, fashion conscious and nearly always consider style when shopping[12]. In response to this, companies are developing clothes, underwear, cos-

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[3] Jung-Soon Lee, Jeng-Hae Yun, and Youn-Choo Cho, "A study on the developmental trend of body for the establishment of the sizing system of the junior high school students uniforms," *Journal of Costume Culture* 5, no. 3 (1997) : 460.

[4] Young-Shik Rim, and Sang-Cheol Han, *Understanding of adolescent psychology* (Seoul: Hakmoon Sa, 2000). 68.

[5] Yun-Mi Choi et al., *Adolescent psychology in modern* (Seoul : Hakmoon Sa, 2000), 46.

[6] Hwa-Yeon Jeong, "A study on classification and characteristics of early adolescent girl's somatotype for the apparel sizing system" (Ph. D. diss., Hanyang University, 2004), 114.

[7] A-Chung Park, *Understanding of puberty* (Seoul: Kyoyook Sa, 2000), 72.

[8] Joo-Sung Kim, "A survey on woman's menarchal in Korea," *Research of Asian Women*, (1962) : 115-139.

[9] Jin-ho Kim, "A survey on school girl's menarche and menstruation in Korea," *Journal of Student Guidance* 14, no. 1 (1987) : 141-155.

[10] Hwa-Yeon Jeong, and Mi-A Suh, "The physical characteristics of early adolescent girls," *Journal of Costume Culture* 13, no. 2 (2005) :267.

[11] Report Service Team, "Consumer group in the future : Tween generation," *CEO Report*, December 2003, 10.

[12] http://www.marketresearch.com/researchindex/235652.html

metics etc. In spite of increasing in clothing products for girls at puberty, it's not easy to find well-fitting dress for them. One of the most frequent reasons is that their body shape is diversified due to having not only vertical growth but also horizontal growth.

The purpose of this study is, therefore, to investigate the fit of ready-to-wear garment and to provide a basic data for pubescent girl's apparel manufacturers to develop more functional and more adaptable clothes.

According to the previous study[13 - 16] of examining the period of the rapid growth of height, the time of menarche and ages targeted by companies for girls at puberty, this study defined the period between 10~14 corresponding to puberty when there is a rapid physical change.

II. Survey Method

1. Subjects and Investigation Period

By stratified cluster sampling, girls aged between 10 to 14 were surveyed in capital area -Gangnam. Gangbuk. Gyeonggi-Do. After a pretest, the main survey was conducted from March 4 to April 3, 2004. The questionnaire was distributed to 570 girls attending at one elementary school and one middle school located at different district. The completed 547 data out of 570 data were used for the statistical analysis. Subjects' demographic information included age, locality are as ⟨Table 1⟩.

2. Questionnaire

A questionnaire used in the present study was composed of 24 questions adapted from the previous study[~ 20]. Those questions were modified through a pre-test. Questions were asked about frequency of clothing purchase, shopping places. preferred brands, preferred fit. parts unfit

⟨**Table 1**⟩ Subjects' Demographic Information $n(\%)$

Age	Locality			Total
	Gangnam	Gangbuk	Gyeonggi-Do	
10 years	34(6.2)	40(7.3)	39(7.1)	113(20.7)
11 years	34(6.2)	37(6.8)	39(7.1)	110(20.1)
12 years	36(6.6)	35(6.4)	41(7.5)	112(20.5)
13 years	49(9.0)	27(4.9)	42(7.7)	118(21.6)
14 years	30(5.5)	26(4.8)	38(6.9)	94(17.2)
Total	183(33.5)	165(30.2)	199(36.4)	547(100)

[13] Hee-Sook Roh, "A study on somatotype change and classification of female in the growth period" (Ph. D. diss., Seoul National University, 1997), 102-103.

[12] Sun-Young Choi, "A study of elementary school children's somatotype for clothing construction" (Master's Thesis. Keimyung University, 1998), 79-82.

[15] Hwee-Sook Jang, *Human development*, (Seoul: Parkyoung Sa. 2000), 224.

[16] Ministry of Culture and Tourism, "A government report on youth," (Seoul : Youth Committee in Ministry of Culture and Tourism, 2000), 31.

[17] Jee-Yeon Kim, and Hee Soon Shon, "A Study on fitness and awareness of sizing system of infants' wear," *Journal of Costume Culture* 8, no. 2 (2000) : 272-281.

[18] Giyoung-Nam Lee, and Ock-Sang Hahm, "A study about fitting of children's ready-to-wear clothing." *Journal of the Korean Society for Clothing Industry* 2. no. 2 (2000) : 138-145.

[19] Yang-Weon Kim, "Fitness and problems of ready-to-wear garment in collegians," *Journal of Living Science Research* 10. no. 1 (2001) : 93-100.

for the body, the fit by items and parts of ready-to-wear. Each of questions about preferred fit, the fit by items and parts of ready-to-wear was measured on 5-point Likert type scale.

3. Data Analysis

SPSS for window (Ver.12 program) was used for statistical analysis including means, standard deviations, Duncan test, χ^2-test, ANOVA and frequency analysis. The $p<.05$ level significance was set for all analysis of variables.

III. Results and Discussion

1. The Actual Condition of Clothing Purchase

1) Frequency of Clothing Purchase

As for frequency of clothing purchase, "purchasing clothing at the change of seasons" was 40.0%, "purchasing clothing whenever I need" was 44.3%, "purchasing clothing once a year" was 3.8%, "purchasing clothing every six months" was 9.1% and others were 2.6%. The re-

sults indicated that in case of girls at the age of puberty, over 80% appeared to purchase clothing relatively frequently whenever they feel necessary or at the change of seasons.

According to the result of surveying the frequency of clothing purchase in previous research[21] with school-aged children, 68.4% replied to purchase at the change of seasons and only 13.8% replied to purchase clothing whenever they need. Thus, girls at the age of puberty, who tend to purchase whenever they need, appeared to purchase clothing more frequently than school aged children. It is believed that because girls at the age of puberty are in the middle of active physical growth during a short period they purchase clothing more frequently than children.

2) Shopping Places

⟨Table 2⟩ showed shopping places according to age. The result indicated that among the respondents, "purchasing clothing at department stores" was 32.7 %, 26.0% replied that they buy clothes at nearby shopping centers or markets,

⟨**Table 2**⟩ Shopping Places according to Age $n(\%)$

		Shopping Places						
		Department Stores	Nearby Shopping Centers or Markets	Large-size Marts or Discount Stores	Dong-Daemun Fashion Mall	Brand Stores	Total	χ^2
Age	10 years	31(27.4)	32(28.3)	5(4.4)	28(24.8)	17(15.0)	113(20.7)	
	11 years	36(32.7)	28(25.5)	5(4.5)	24(21.8)	17(15.5)	110(20.1)	
	12 years	40(35.7)	29(25.9)	10(8.9)	18(16.1)	15(13.4)	112(20.5)	83.59**, df=32
	13 years	43(36.4)	28(23.7)	24(20.3)	14(11.9)	9(7.6)	118(21.6)	
	14 years	29(30.9)	25(26.6)	16(17.0)	19(20.2)	5(5.3)	94(17.2)	
Total		179(32.7)	142(26.0)	60(11.0)	103(18.8)	63(11.5)	547(100.0)	

** $p<.01$.

[20] In-Suk Kim et al., "A study on fitness and awareness of sizing system of kid's clothes," *Journal of the Korean Home Economics Association* 40, no. 12 (2002) : 119-129.

[21] Giyoung-Nam Lee, and Ock-Sang Hahm, *Op. cit.*, 140.

and other places commonly used for clothing purchases include the Dongdaemun fashion mall. brand stores, large-size marts and discount stores in their order.

Significant differences ($\chi^2 = 83.59$, $p < .01$) were observed in shopping places according to age. For girls at the age of 10 - 12, brand stores were used more frequently than large-size marts or discount stores, but for those at the age of 13 - 14, large-size marts were preferred to brand stores.
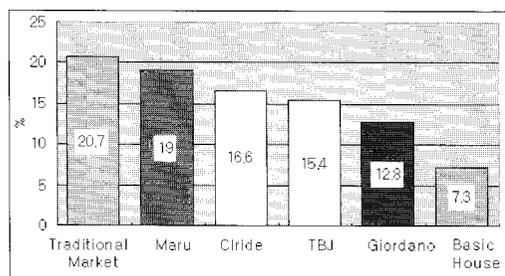
In previous research[22] with boys aged from 12 to 14, department stores were the most favorite places for dress shopping and, next, brand stores. Thus, boys showed a difference from girls who tend to buy clothing at department stores or nearby shopping centers.

3) Preferred Brands

⟨Fig. 1⟩, ⟨Fig. 2⟩ showed brands preferred
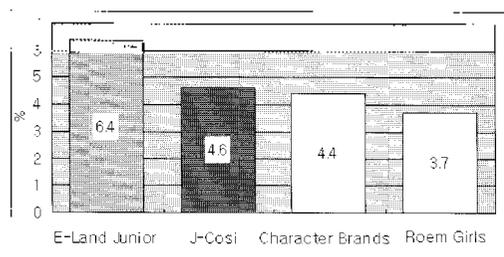
⟨**Fig. 1**⟩ Preferred Brands in Children's Wear.

⟨**Fig. 2**⟩ Preferred Brands in Casual Wear.

by girls at the age of puberty . In the survey on preferred brands, each respondent was allowed to mention up to three brands. The most preferred brand in children's wear was "E-Land Junior" (6.4%) and "J.cosi" (4.6%). "Roem Girls" (3.7%) followed it in their order.

Also, the most preferred casual brand was "Maru" (19.0%) and, next, "Clride" (16.6%), "TBJ" (15.4%), "Giordano" (12.8%) and "Basic House" (7.3%) in their order. In addition, 20.7% replied that they purchase market clothing regardless of brand. This shows that not only brand clothing but also market clothing is purchased a lot. In a previous survey[23] of students from 4th grade in elementary school to 2nd year in middle school on their preferred fashion brands, the fashion brand preferred most by their mothers was "J-cosi" and, next, "Nike", "Adidas", "traditional market products", "Maru", "Polo", and "E-Land junior" in their order. Also, the brand preferred most by the students was "Nike" and, next, "J-cosi", "Maru", "Adidas", "Giordano", and "Guess" in their order. In the present research, the most preferred brands of children's wear were "E-Land Junior" and "J-cosi," which are identical with the brands preferred most by mothers for their children. As for casual brands, the results of the present survey did not include sports casual brands, differently from the results of the previous research. This is probably because while the previous research surveyed both boys and girls the present study surveyed only girls.

2. The Fit of Clothing

1) Preferred fit

The preferred fit of ready-to-wear garment was measured on 5-point scale, which ranged from 1 (very fitted) to 5 (very loose). The result are as seen in ⟨Table 3⟩.

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[22] Kyung-A Kim, "Actual wearing conditions and fitting problems of ready-to-wear garment for tween generation boys aged from 12 to 14," *Journal of the Korean Society for Fashion Business* 8, no. 5 (2004) : 89.

[23] Sumyu Journal, "Blooming in junior market," *Fashionbiz*, May 2003, 138-139.

⟨**Table 3**⟩ Preferred Fit

Age	Mean		S.D.	F	Locality	Mean		S.D.	F
10 years	3.79	A	0.95		Gangnam	3.67	A	0.95	
11 years	3.98	A	0.64						
12 years	3.46	B	1.04	17.45***	Gangbuk	3.47	AB	1.06	5.71**
13 years	3.17	C	1.14						
14 years	3.01	C	1.11		Gyeonggi-Do	3.30	B	1.13	
Total	3.47		1.06			3.47		1.06	

** $p<.01$. *** $p<.001$. Only statistically significant results were listed.
A>B>C : grouping by Duncan's multiple range test.

The preferred fit of ready-to-wear garment according to age was significantly different ($F =$ 17.45, $p<.01$). For girls at the age of 10 and 11, the average scores of preferred fit were 3.79 and 3.98, respectively, but it was 3.01 for those at the age of 14. This suggested that girls at the age of 10 preferred ample size compared to those at the age of 14. In addition, significant differences ($F =5.71$, $p<.01$) were observed according to locality as well. The result indicated that girls in the Gangnam area preferred ample size compared to those in the Gyeonggi-do area.

2) Parts Unfit for the Body

⟨Table 4⟩ showed that parts unfit for the body. As a whole, the largest parts of complaints for unfitness were about height (30.2%), waist circumference (30.2%) and, next hip circumference (14.3%).

Meanwhile, significant differences were not observed according to locality but parts unfit for the body according to age was significantly different ($\chi^2=77.26$, df=28, $p<.01$). Among girls at the age of 10 and 11, complaints about height and waist circumference were remarkable and among those of older age, complaints about these parts decreased gradually but complaints about hip circumference increased from 8.5%

⟨**Table 4**⟩ Parts Unfit for the Body n(%)

Age	Parts Unfit					None
	Height(length of dress)	Waist C.	Hip C.	Bust C.	Others	
10 years	41(34.7)	38(32.2)	10(8.5)	5(4.2)	16(13.6)	8(6.8)
11 years	32(37.2)	40(42.6)	2(2.1)	5(2.1)	8(8.5)	7(7.4)
12 years	32(28.3)	34(30.1)	14(12.4)	10(8.8)	11(9.7)	12(10.7)
13 years	29(26.4)	28(25.2)	27(24.5)	5(4.5)	16(15.5)	5(3.6)
14 years	28(25.0)	25(22.3)	25(22.3)	12(10.7)	21(18.7)	1(0.9)
Total	165(30.2)	165(30.2)	78(14.3)	34(6.2)	72(13.3)	33(5.9)

** $p<.01$.

among 10-year-old girls to 22.3% among 14-year-old ones. Furthermore, complaints about bust circumference also increased with the increase of age. This result was agreed with the study of Jung[24] that girls at puberty showed remarkable growth of height at the age of 10 – 11 and then showed horizontal growth at the age of around 12. That is, girls at the age of 10 – 11 tended to complain about the length of dress because of their fast growing height, but as their measures in circumference grew their complaints about circumference-related sizes also increased

gradually. In case of waist circumference, if clothing is purchased in accordance with the growth of height, a large waist circumference is selected naturally. However, waist circumference does not grow together with height but it expands after the vertical growth, and this is considered the reason for frequent complaints about waist circumference.

3) The Fit of Ready-to-Wear Garment by Items

The fit of ready-to-wear garment by items

⟨Table 5⟩ The Fit of Jacket

Age	Mean		S.D.	F	Locality	Mean		S.D.	F
10 years	1.91	C	0.84		Gangnam	1.93	B	0.83	
11 years	2.06	AB	0.75						
12 years	2.03	BC	0.88	3.40**	Gangbuk	2.05	A	0.77	9.21***
13 years	2.28	A	0.74		Gyeonggi-Do	2.28	A	0.83	
14 years	2.14	B	0.89						
Total	2.08		0.82			2.08		0.82	

** $p<.01$. *** $p<.001$. Only statistically significant results were listed.
A>B>C : grouping by Duncan's multiple range test.

⟨Table 6⟩ The Fit of Shirts

Age	Mean		S.D.	F	Locality	Mean	S.D.	F
10 years	2.09	AB	0.91		Gangnam	2.02	0.96	
11 years	2.01	AB	0.81					
12 years	1.96	B	0.89	2.58*	Gangbuk	2.18	0.88	-
13 years	2.15	AB	0.87					
14 years	2.33	A	0.97		Gyeonggi-Do	2.23	0.84	
Total	2.10		0.90			2.10	0.90	

* $p<.05$. Only statistically significant results were listed.
A>B : grouping by Duncan's multiple range test.

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[24] Hwa-Yeon Jung and Mi-A Suh. *Op. cit.*, 267.

was measured on 5-point scale, which ranged from 1 (very fitted) to 5 (very loose). The result are as seen in 〈Table 5〉 ~ 〈Table 11〉.

In all items except one-pieces, significant differences were observed in fit according to age. First, in case of jacket among upper garments, the average score increased from 1.91 in 10-year-old children to 2.14 in 14-year-old ones. This suggests that older girls evaluate the fit of jacket low. Second, in case of shirts, the average score was 1.96 in 12-year-old girls, evaluating the fit of clothing high, but it was 2.33 in girls at the age of 14. As in jacket, this shows that older girls evaluate the fit of shirt low. Third, in case of t-shirt and coat, older girls evaluate the

fit of t-shirt and coat low as well. This is consistent with the result mentioned earlier on preferred fit by age that as girls grow old they prefer relatively less ample fit, suggesting that, compared to 14-year-old ones, 10-year-old girls who prefer ample dress tend to think that their upper garment fits their body. On the other hand, in comparison of the fit of four upper garment items, T-shirt was evaluated to fit best(1.94) and, next, jacket(2.09), shirts(2.14) and coat(2.16) in their order. Among lower garment items, the fit score of pants was 2.27 on the average in 10-year-old children but, with the increase of age, the average score went up, which means that the fit of pants got worse.

〈**Table 7**〉 The Fit of T-Shirt

Age	Mean		S.D.	F	Locality	Mean		S.D.	F
10 years	1.75	AB	0.78		Gangnam	1.81	B	0.91	
11 years	1.92	AB	0.76						
12 years	1.87	B	0.91	4.18***	Gangbuk	1.96	AB	0.81	3.54*
13 years	1.97	AB	0.77						
14 years	2.18	A	0.90		Gyeonggi-Do	2.04	A	0.79	
Total	1.94		0.84			1.94		0.84	

* *p*<.05. *** *p*<.001. Only statistically significant results were listed.
A>B : grouping by Duncan's multiple range test.

〈**Table 8**〉 The Fit of Coat

Age	Mean		S.D.	F	Locality	Mean		S.D.	F
10 years	1.91	C	0.93		Gangnam	1.99	B	0.96	
11 years	2.18	BC	0.88						
12 years	2.04	BC	0.98	5.03**	Gangbuk	2.07	B	0.94	8.45***
13 years	2.22	AB	0.95						
14 years	2.45	A	1.07		Gyeonggi-Do	2.38	A	0.99	
Total	2.16		0.98			2.16		0.98	

** *p*<.01. *** *p*<.001. Only statistically significant results were listed.
A>B>C : grouping by Duncan's multiple range test.

⟨**Table 9**⟩ The Fit of Pants

Age	Mean		S.D.	F	Locality	Mean		S.D.	F
10 years	2.27	B	1.09		Gangnam	2.29	B	1.10	
11 years	2.31	B	0.79						
12 years	2.33	B	1.13	5.35***	Gangbuk	2.52	A	0.93	3.31*
13 years	2.51	B	0.96						
14 years	2.82	A	1.05		Gyeonggi-Do	2.54	A	1.03	
Total	2.45		1.03			2.45		1.03	

* $p<.05$. *** $p<.001$. Only statistically significant results were listed.
A>B : grouping by Duncan's multiple range test.

⟨**Table 10**⟩ The Fit of Skirt

Age	Mean		S.D.	F	Locality	Mean		S.D.	F
10 years	2.65	AB	1.17		Gangnam	2.34	B	1.10	
11 years	2.69	AB	1.00						
12 years	2.38	B	1.24	2.55*	Gangbuk	2.65	A	1.11	8.78***
13 years	2.48	B	0.96						
14 years	2.81	A	1.15		Gyeonggi-Do	2.80	A	1.10	
Total	2.60		1.12			2.60		1.12	

* $p<.05$. *** $p<.001$. Only statistically significant results were listed.
A>B : grouping by Duncan's multiple range test.

⟨**Table 11**⟩ The Fit of One-Piece Dress

Age	Mean	S.D.	F	Locality	Mean		S.D.	F
10 years	2.55	1.15		Gangnam	2.43	B	1.08	
11 years	2.58	0.98						
12 years	2.50	1.24	-	Gangbuk	2.64	AB	1.10	3.58*
13 years	2.65	0.97						
14 years	2.74	1.15		Gyeonggi-Do	2.73	A	1.12	
Total	2.61	1.10			2.61		1.10	

* $p<.05$. Only statistically significant results were listed.
A>B : grouping by Duncan's multiple range test.

Between pants and skirt, the fit of skirt was perceived to be relatively lower than that of pants, and between upper and lower garments, the fit of lower garments was evaluated to be lower. For upper garments a slightly large width may not be a big matter for fit, but for lower garments unfit waist circumference and hip circumference may lead to complaints about fit, and this is a possible reason for the low evaluation of the fit of lower garments. Besides, one-piece showed the lowest fit among all items.

Summing up, the fit of clothing for girls at the age of puberty gets relatively worse with the increase of age in all items except one-piece. This may be because those at the age of puberty experience physical growth not only vertically but also horizontally and, as a consequence, the age group has various body shapes and, additionally, because with the increase of age they prefer less ample clothing and this causes more complaints about the fit of garments.

On the other hand, in all items except shirts, significant differences were observed in fit according to locality. Girls in the Gangnam area evaluated the fit of their clothing higher than those in the other two areas. This is consistent with the result mentioned earlier that girls in the Gangnam area prefer ampler clothes than those in the other two areas. That is, because girls in the Gangnam area prefer ample-size dress, their evaluation of fit appears to be higher than that of girls in the other two areas.

4) The Fit by Parts of Ready-to-Wear Garment

The fit by parts of ready-to-wear garment was measured on 5-point scale, which ranged from 1 (too short or very small) to 5 (too long or very large). The result are as seen in ⟨Table 12⟩ ~ ⟨Table 15⟩.

Measures for which apparel size was considered "shorter" or "smaller" than the body were bust circumference (2.90), neck circumference (2.93), crotch (2.94), skirt length (2.97) in their order, and those for which apparel size was considered "longer" or "larger" than the

body were the length of upper garment (3.02), shoulder length (3.06), waist circumference (3.06), sleeve length (3.06), and trouser length (3.42) in their order. That is, bust circumference was considered "smallest" among the body parts, and trouser length was considered "longest" compared to other parts.

Significant differences were not observed acc-

⟨Table 12⟩ The Fit by Parts of Ready-to-Wear Garment

Parts	Mean	S.D.
Bust C.	2.90	0.65
Shoulder L.	3.06	1.45
Waist C	3.06	0.82
Hip C.	2.98	0.71
Sleeve L	3.06	0.81
Neck C.	2.93	0.60
Upper Garments L.	3.02	0.66
Skirt L	2.97	0.74
Trouser L.	3.42	0.81
Crotch	2.94	0.67

* $p<.05$.
Only statistically significant results were listed.
A>B>C : grouping by Duncan's multiple range test.

⟨Table 13⟩ The Fit of Sleeve Length

Age	Mean		S.D.	F
10 years	3.19	AB	0.76	
11 years	3.23	A	0.73	
12 years	2.97	BC	0.95	3.35*
13 years	3.02	BC	0.81	
14 years	2.90	C	0.75	
Total	3.06		0.81	

* $p<.05$.
Only statistically significant results were listed.
A>B : grouping by Duncan's multiple range test.

⟨Table 14⟩ The Fit of Upper Garments

Age	Mean		S.D.	F
10 years	3.13	A	0.63	
11 years	3.11	A	0.53	
12 years	2.86	B	0.87	3.04*
13 years	2.99	AB	0.67	
14 years	2.98	AB	0.54	
Total	3.02		0.66	

* $p<.05$.
Only statistically significant results were listed.
A>B : grouping by Duncan's multiple range test.

⟨Table 15⟩ The Fit of Crotch

Age	Mean		S.D.	F
10 years	3.01	AB	0.59	
11 years	3.12	A	0.57	
12 years	2.82	B	0.87	3.36*
13 years	2.85	B	0.70	
14 years	2.91	B	0.56	
Total	2.94		0.67	

* $p<.05$.
Only statistically significant results were listed.
A>B : grouping by Duncan's multiple range test.

ording to locality but the fit by parts of ready-to-wear garment according to age was significantly different (Sleeve length : F =3.35, $p<.$ 05. The length of upper garments : F =3.04, $p<.05$. Crotch : F =3.36, $p<.05$) in sleeve length, crotch and the length of upper garments. As for sleeve length, 11-year-old girls tended to consider long compared to other age groups and 14-year-old ones tended to consider short. As for the length of upper garments, 10-year-old girls thought more frequently that it is long than 13-year-old ones did. As for crotch length as well, 10- year-old girls appeared to think it long compared to other age groups. In this ways,

younger girls were found to think that their clothes are long in the three measures. Thus, it is considered necessary to set the grading deviation of the three measures in designing dress patterns for them.

IV. Summary and Conclusions

The purpose of this study was to investigate the fit of ready-to-wear garment for girls at puberty that show growth spurt and to provide the useful data for apparel manufacturers to produce well-fitting dress.

Girls aged from 10 to 14 were surveyed in capital area from March, 4 to April, 3, 2004. The questionnaire was distributed to 570 girls and the completed 547 data out of 570 data were used for the statistical analysis.

The results were as follows :

1. As for frequency of clothing purchase, over 80% appeared to purchase clothing relatively frequently whenever they feel necessary or at the change of seasons. This result indicated that girls at puberty bought clothes oftener than school children.

   Regarding shopping places, among the respondents, 32.7% replied that they buy clothes at department stores and 26.0% replied that they buy clothes at nearby shopping centers or markets, and, next, Dongdaemun fashion mall. For girls at the age of 10~12, brand stores were used more frequently than large-size marts or discount stores, but for those at the age of 13~14, large-size marts were preferred to brand stores.

2. The most preferred brand in children's wear was "E-land Junior", "J.cosi" and "Roem Girls" followed it in their order. Also, the most preferred casual brand was "Maru" and, next, "Clride", "TBJ", "Giordano" and "Basic house" in their order. In addition, 20.7% replied that they purchase market clothing regardless of brand.

3. In terms of the preferred fit of ready-to-wear garment, girls at the age of 10 pre-

ferred ample size compared to those at the age of 14. In addition, girls in the Gangnam area preferred ample size compared to those in the Gyeonggi-do area.

4. As a whole, the largest parts of complaints for unfitness were about height, waist circumference and, next hip circumference. Among girls at the age of 10 and 11, complaints about height and waist circumference were remarkable and complaints about hip circumference and bust circumference also increased with the increase of age. This result implied that various body shapes are found in those at the age of puberty because both vertical growth and horizontal growth happen together during the period, and preference for well-fitting dress gets higher with the increase of age.

5. According to the result of comparing the fit of ready-to-wear garment by items, the fit of clothing for girls at the age of puberty gets relatively worse with the increase of age in all items except one-piece. This may be because with the increase of age they prefer less ample clothing and this causes more complaints about the fit of garments. On the other hand, in all items except shirts, girls in the Gangnam area evaluated the fit of their clothing higher than those in the other two areas.

6. Measures for which apparel size was considered "shorter" or "smaller" than the body were bust circumference, neck circumference, crotch, skirt length in their order, and those for which apparel size was considered "longer" or "larger" than the body were the length of upper garment, shoulder length, waist circumference, sleeve length, and trouser length in their order.

The fit by parts of ready-to-wear garment according to age was significantly different in the length of sleeve, crotch and the length of upper garments. That is, girls at the age of 10 ~ 11 were found to think that their clothes are long in the three measures.

In a general view of the results of this study,

significant differences in fit preference are observed among different age groups, it is required to make research on the characteristics of body shape according to age as well as to set clothing size suitable for their body shape. Because growth rate with the increase of age is different among body parts such as bust circumference and waist circumference, these bodily characteristics should be taken into account in setting size and making dress. Furthermore, future research needs to survey the size systems of apparel makers preferred by this consumer group, and to compare a size system based on their body size with the size of apparel makers preferred by girls at the age of puberty in order to propose a more reliable size system.

References

Ashdown, S. P. 1998. An investigation of the structure of sizing systems. *International Journal of Clothing Science and Technology* 10(5).

Choi, Sun-Young. 1998. A study of elementary school children's somatotype for clothing constructio. Master's Thesis, Keimyung University.

Choi, Yun-Mi et al. 2000. *Adolescent psychology in modern.* Seoul : Hakmoon Sa.

Jang, Hwee-Sook. 2000. *Human development.* Seoul: Parkyoung Sa.

Jeong, Hwa-Yeon. 2004. A study on classification and characteristics of early adolescent girl's somatotype for the apparel sizing system. Ph. D. diss., Hanyang University.

Jeong, Hwa-Yeon and Mi-A Suh. 2005. The physical characteristics of early adolescent girls. *Journal of Costume Culture* 13(2).

Kim, Eun-Kyong, Choi, Hei-Sun and Kang, Yeo-Sun. 2002. A study on the suitability of sizing system for children's clothing. *Journal of the Korean Society for Clothing and textiles* 26(5).

Kim, In-Suk et al. 2002. A study on fitness and awareness of sizing system of kid's clothes. *Journal of the Korean Home Economics Ass-*

ociation 40(12).

Kim, Jee-Yeon and Shon Hee Soon. 2000. A study on fitness and awareness of sizing system of infants' wear. *Journal of Costume Culture* 8(2).

Kim, Jin-ho. 1987. A survey on school girl's menarche and menstruation in Korea. *Journal of Student Guidance* 14(1).

Kim, Joo-Sung. 1962. A survey on woman's menarche in Korea. *Research of Asian Women*.

Kim, Kyung-A. 2004. Actual wearing conditions and fitting problems of ready-to-wear garment for tween generation boys aged from 12 to 14. *Journal of the Korean Society for Fashion Business* 8(5).

Kim, So-Ra. 2003. A study for the properties of upper body somatotype of lateral view for middle-aged women. *Korean Home Economics Association* 41(11).

Kim, Yang-Weon. 2001. Fitness and problems of ready-to-wear garment in collegians. *Journal of Living Science Research* 10(1).

Lee, Giyoung-Nam and Hahm, Ock-Sang. 2000.

A study about fitting of children's ready-to-wear clothing. *Journal of the Korean Society for Clothing Industry* 2(2).

Lee, Jung-Soon, Yun, Jeng-Hae and Cho, Youn-Choo. 1997. A study on the developmental trend of body for the establishment of the sizing system of the Junior High school students uniforms. *Journal of Costume Culture* 5(3).

Ministry of Culture and Tourism. 2000. *A government report on youth*. Seoul : Youth committee in Ministry of Culture and Tourism.

Park, A-Chung. 2000. *Understanding of puberty*. Seoul: Kyoyook Sa.

Rim, Young-Shik and Han, Sang-Cheol. 2000. *Understanding of adolescent psychology*. Seoul: Hakmoon Sa.

Roh, Hee-Sook. 1997. A study on somatotype change and classification of female in the growth period. Ph. D. diss., Seoul National University.

Sumyu Journal. 2003. Blooming in junior market. *Fashionbiz*, May.