

Study on Somatotype Characteristics and Differences of Female Youth from Liaoning Province and Guangdong Province in China

Xiaoping Hu^(✉) and Jing Zhou

School of Design, Guangzhou Higher Education Mega Center,
South China University of Technology, Panyu District, Guangzhou 510006,
People's Republic of China
huxp@scut.edu.cn

Abstract. The purpose of this paper is to study the somatotype characteristics and differences of female youth from North and South China. We select the female youth aged 20 to 29 as the research objects, were measured by garment specialty students. The measure covered height, chest circumference, waist circumference, neck circumference, shoulder width, abdominal circumference and hip circumference. The somatotype data was collected from 102 different female youth. Half of them are from Liaoning province in north China and the other half are from Guangdong province in south China. Two area female youth's somatotype characteristic and difference were summarized based on descriptive statistics by SPSS software. The difference between chest circumference and abdominal circumference is the focus of this research. Not only can the study provide data for the costume design of north and south young females, but also provide reference data for subdivision garment size.

Keywords: Somatotype characteristic · Garment size · Female youth

1 Introduction

There are garment size for man, women and children, but there is no specific standard for female youth from different area, which leads to the clothing in the current market can't fit the different area female youth. So it is necessary to study the somatotype characteristic and difference between the north female youth and south female youth for garment design. Due to the acquired factors, such as genetic factors, physical growth, living habits, eating habits and routine work., the somatotype difference is obvious between north and south. Costumes need adapted to the human body, and researching for different periods, different regions and different age of human body is the basic subjects of clothing structure design. Based on this issue, the research of the body of the different area female and garment size is imperative.

2 The Garment Classification About Somatotype in the Domestic and Overseas

2.1 The Garment Size in China

The Garment Size Classification is Simple. In China, the garment size standard about female only have 4 kinds of somatotype. The garment size standard is not in accordance with the age and geographical division. So it leads many consumers can't find suitable clothing in the market. At the same time, the classification of the garment size standard is detailed in many developed countries. For example, in Japan, the garment size standard divide the somatotype of adult into 7 kinds which included Y, YA, A, AB, B, BE, E. They also divided different age stage, for example, they divided female somatotype into 3 kinds which included the young girl somatotype, young women somatotype and women somatotype. The classification of garment size in Japan is very detail.

The Data is Old. In the late 1980s, China has carried out anthropological on a large scale and get the basic data of the garment size standard. The garment size standard GB/T1335-1991 were set out based on the data. Later on, there were appeared the 1997 edition and the 2008 edition. The 2008 edition is used by now. But these two edition were just slightly adjusted based on the 1991 edition, and they did not update the basic somatotype data. With the improvement of living conditions, the Chinese somatotype has changed in 20 years. So the data of the current garment size standard is old, which is lack of reference value to guide the clothing companies produced clothing for the consumer demands.

2.2 The Methods of the Classification About Somatotype in Domestic and Overseas

The partition of people's somatotype is the key to set out the standard of garment size. Many countries have different methods and index to divide the somatotype of the garment size standard. Overall, there are several kinds. Firstly, the partition based on the discrepancy of girth, mainly based on the discrepancy of chest circumference and waistline, the discrepancy of chest circumference and hip circumference and the discrepancy of waist circumference and hip circumference as the partitioning index. Secondly, the partition based on height, weight, age and chest circumference. Thirdly, the partition based on the index of the body, such as the index of stoop, the ratio of body and chest circumference and the ratio of chest circumference and waist circumference. Fourthly, the partition based on the index of the type of chest, waist and hip. The last, the partition based on clustering method, which is divided by selecting the classification of somatotype.

In China, the classification of somatotype is based on the partition of discrepancy of girth, mainly based on the discrepancy of chest circumference and waist circumference. However, with the change of the somatotype characteristics of the female youth,

the discrepancy of chest circumference and waist circumference which as the basis to divide somatotype can't represent all kinds of somatotype characteristics. So, in this study, we measured data of the body of female youth who aged from 20 to 29 from north and south.

3 Experiment

3.1 Experiment Subject

All data collection used the random sampling method. The sample contains 108 female youth aged 20 to 29 years old from Liaoning province and Guangdong province. The experiment time is from January 10th 2016 to January 30th 2016.

3.2 The Measurement Parts

In order to combine purposes of research and requirements, we choose 10 kinds of representative measuring project based on the database require of somatotype in garment production, which include height, chest circumference, waist circumference, abdomen circumference, hip circumference, shoulder width, arm circumference, arm length, the length from neck to waist and neck circumference. These project covers the main control parts of the body and can satisfy all kinds of related analysis of the body type.

3.3 The Measurement Methods and Tools

The measurement method is traditional manual measurement. In order to ensure the data is accurate, we assign one professional person to operate in the whole process. The measured women wearing thin lingerie. They keep stand straight, visual front and arm natural prolapse. Finally, the surveyor use a tape to measure.

4 Data Analysis

4.1 The Data Prepossessing

The experiment measured 108 young women. In order to ensue the data accurately and reliably, we prepossessing the measured data. We removed some invited data after check the measure data. Then we get 102 valid data, the effective rate is 94 %.

4.2 The Analysis Methods

Use the SPSS software to analysis the mean and the standard deviation of the data. Then T test the sample, summary the somatotype characteristics in north and south. Compare the differences between north female youth and south female youth.

4.3 The Analysis of Data

After statistics and classified the data, we can know that the distribution of chest circumference, waist circumference and hip circumference. N stands for north and S stands for south. The figures as follow and the abscissa axis stands for number, the depth axis stands for girth. From the Figs. 1, 2 and 3, we can know that the chest circumference of north female youth mainly distribute in the range of 80–83 cm. The waist circumference of north female youth mainly distribute in the range of 68–71 cm. And the hip circumference of north female youth mainly distribute in the range of 82–101 cm, and the percentage is 88.2 %. From the Figs. 4, 5 and 6, we can know that the chest circumference of south female youth mainly distribute in the range of 82–89 cm, and the percentage is 74.5 %. The waist circumference of south female youth mainly distribute in the range of 63–70 cm, and the percentage is 76.5 %. And the hip circumference of south female youth mainly distribute in the range of 86–95 cm, and the percentage is 80 %. Compared with the chest circumference, waist circumference and hip circumference of south female youth, the waist circumference and hip circumference of north female youth is clearly larger, but the chest circumference is smaller. This prove that north female youth is fatter, their fat accumulated at waist and hip, which is led the waist circumference and hip circumference larger.

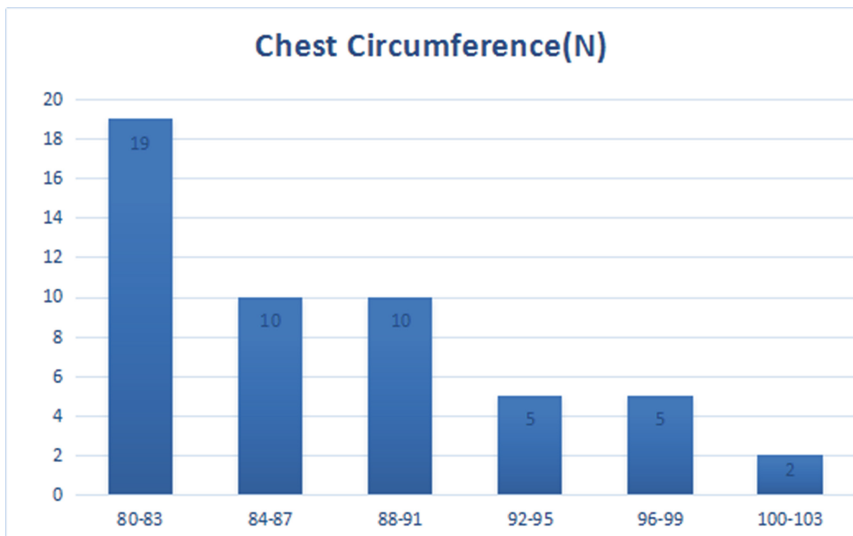


Fig. 1. The distribution of chest circumference (N)

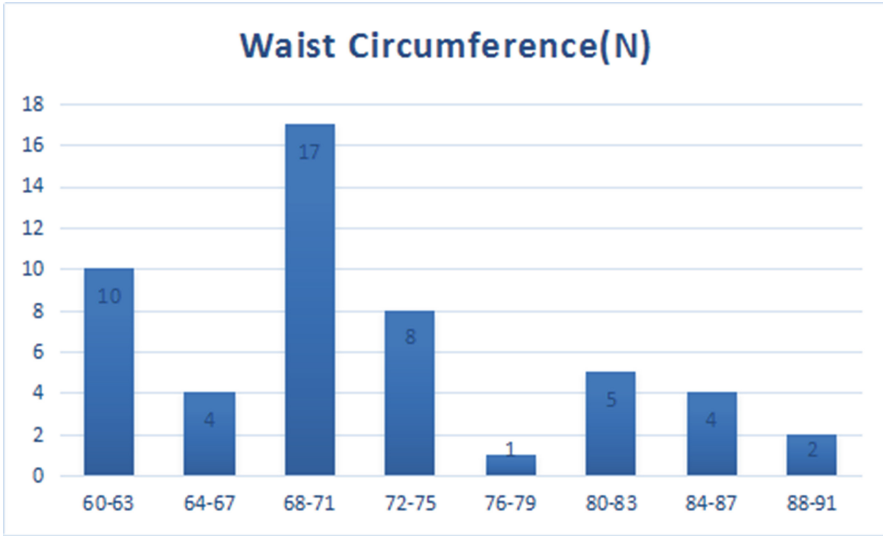


Fig. 2. The distribution of waist circumference (N)

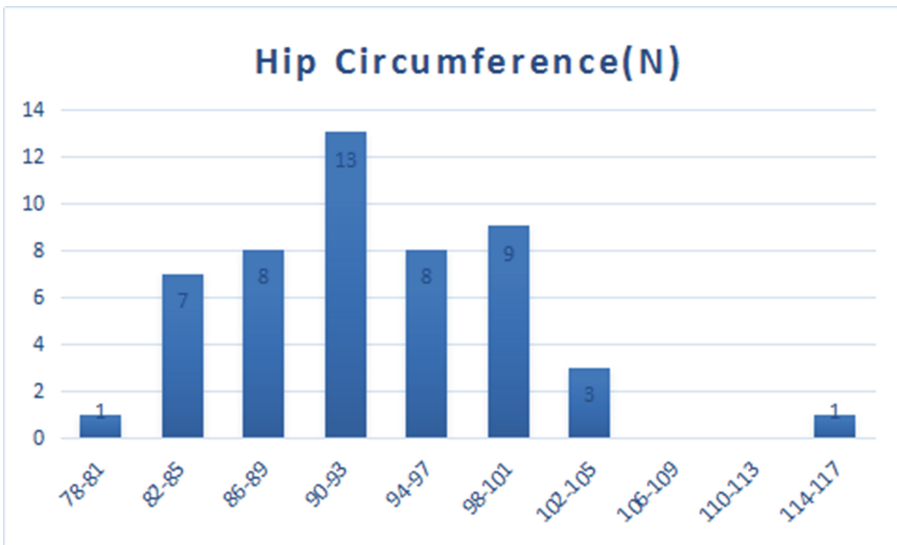


Fig. 3. The distribution of hip circumference (N)

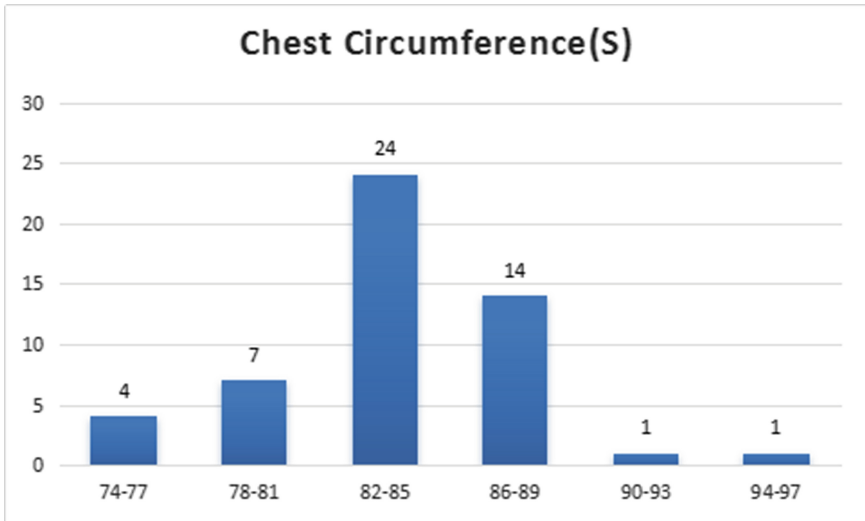


Fig. 4. The distribution of chest circumference (S)

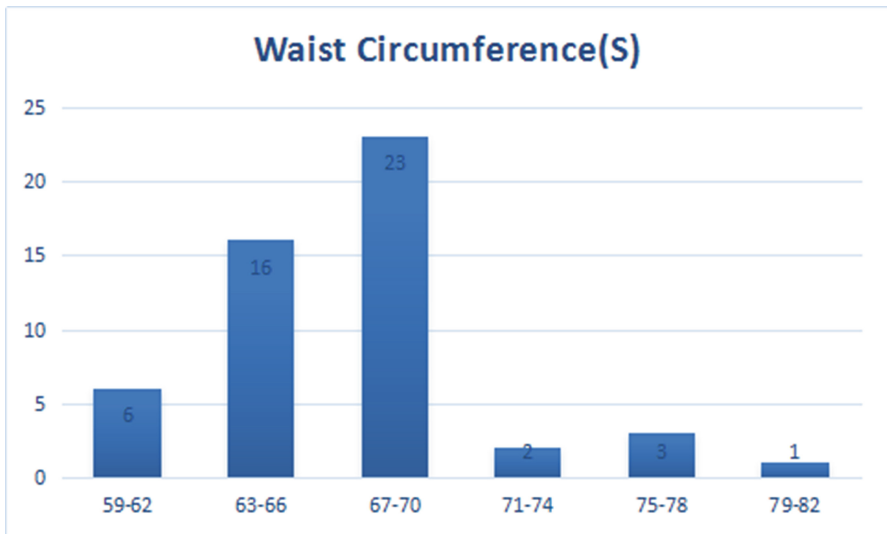


Fig. 5. The distribution of waist circumference (S)

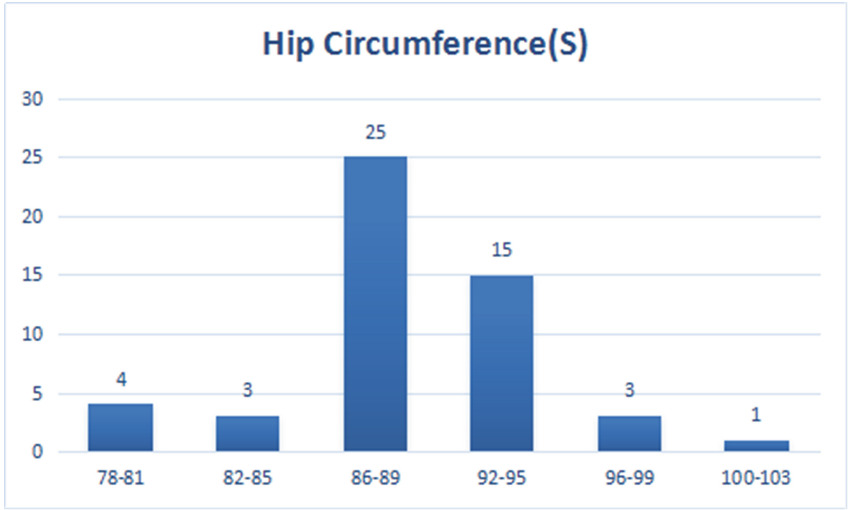


Fig. 6. The distribution of hip circumference (S)

4.4 The Analysis of Data Dispersion

The standard deviation reflects the trend of dispersion. The larger standard deviation, the larger degree of dispersion. On the contrary, the stand deviation is small, the degree of dispersion is concentrated. From the Table 1, the biggest standard deviation have 3 items as follows: the waist circumference of north female youth is 7.522 cm, the abdomen circumference of north female youth is 8.069 and the arm circumference of south female youth is 9.814. These evidence that north female youth have big changes in waist circumference and abdomen circumference, the south female youth have big changes in arm circumference.

Table 1.

	Native place	N	Mean	Std. deviation	Std. error mean
Height (cm)	N	51	165.38	4.560	.632
	S	51	159.92	4.685	.656
Chest circumference (cm)	N	51	87.37	5.726	.794
	S	51	83.88	3.897	.546
Waist circumference (cm)	N	51	71.51	7.522	1.043
	S	51	67.17	4.256	.596
Abdomen circumference (cm)	N	51	77.06	8.069	1.119
	S	51	72.24	5.237	.733
Hip circumference (cm)	N	51	92.83	6.744	.935
	S	51	90.23	3.867	.541
Neck circumference (cm)	N	51	33.09	6.840	.948

(Continued)

Table 1. (Continued)

	Native place	N	Mean	Std. deviation	Std. error mean
	S		32.31	1.005	.141
Arm circumference (cm)	N	51	26.56	4.815	.668
	S	51	25.83	9.814	1.374
Neck to Waist (cm)	N	51	38.19	.595	.083
	S	51	37.65	.744	.104
Arm length (cm)	N	51	52.66	3.255	.451
	S	51	52.47	4.456	.624
Shoulder width (cm)	N	51	38.21	.776	.108
	S	51	37.78	.923	.129

4.5 Independent-Samples T Test

In order to make the classification of somatotype can clearly reflect the study about the overall somatotype characteristics, there need to combine several investigate of index. In this paper, we use the independent-samples T test which is belong the part of SPSS to realize.

Table 2.

		Levene's test for equality of variances		T-test for equality of means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean difference	Std. error difference	95 % confidence interval of the difference	
									Lower	Upper
Height (cm)	Equal variances assumed	.054	.818	5.997	101	.000	5.463	.911	3.656	7.270
	Equal variances not assumed			5.995	100.779	.000	5.463	.911	3.655	7.271
Chest circumference (cm)	Equal variances assumed	10.193	.002	3.602	101	.000	3.483	.967	1.565	5.401
	Equal variances not assumed			3.615	90.058	.000	3.483	.963	1.569	5.397
Waist circumference (cm)	Equal variances assumed	12.827	.001	3.597	101	.001	4.343	1.207	1.948	6.738
	Equal variances not assumed			3.615	80.936	.001	4.343	1.201	1.953	6.733
Abdomen circumference (cm)	Equal variances assumed	13.726	.000	3.590	101	.001	4.822	1.343	2.158	7.487
	Equal variances not assumed			3.605	87.708	.001	4.822	1.338	2.164	7.481
Hip circumference (cm)	Equal variances assumed	10.892	.001	2.395	101	.018	2.601	1.086	.447	4.756
	Equal variances not assumed			2.407	81.575	.018	2.601	1.081	.452	4.751

(Continued)

Table 2. (Continued)

		Levene's test for equality of variances		T-test for equality of means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean difference	Std. error difference	95 % confidence interval of the difference	
									Lower	Upper
Neck circumference (cm)	Equal variances assumed	1.895	.172	.798	101	.426	.773	.968	-1.147	2.693
	Equal variances not assumed			.806	53.243	.424	.773	.959	-1.150	2.696
Arm circumference (cm)	Equal variances assumed	.007	.932	.477	101	.634	.724	1.519	-2.288	3.737
	Equal variances not assumed			.474	72.438	.637	.724	1.528	-2.321	3.770
Neck to waist (cm)	Equal variances assumed	4.543	.035	4.112	101	.000	.545	.133	.282	.808
	Equal variances not assumed			4.103	95.591	.000	.545	.133	.281	.809
Arm length (cm)	Equal variances assumed	.094	.760	.251	101	.802	.193	.768	-1.330	1.716
	Equal variances not assumed			.250	91.470	.803	.193	.770	-1.337	1.722
Shoulder width (cm)	Equal variances assumed	.806	.372	2.545	101	.012	.427	.168	.094	.760
	Equal variances not assumed			2.540	97.408	.013	.427	.168	.093	.761

If the significant level of Sig value of F test is greater than 0.05, it is homogeneous variance. Then chose the first line in equal variances assumed to observe the significant level of T test. If the Sig (2-tailed) is greater than 0.05, then there is no differences. Instead, there is differences. IF Sig value is less than 0.05. Then chose the second line in equal variances not assumed to observe the significant level of T test. If the Sig (2-tailed) is greater than 0.05, then there is no differences. Instead, there is differences.

Based on the independent-samples T test and the Table 2, we can know that:

1. There is significant differences between chest circumference of north female youth and chest circumference of south female youth.
2. There is significant differences between waist circumference of north female youth and waist circumference of south female youth.
3. There is significant differences between abdomen circumference of north female youth and abdomen circumference of south female youth.
4. There is significant differences between hip circumference of north female youth and hip circumference of south female youth.
5. There is no significant differences between neck circumference of north female youth and neck circumference of south female youth.
6. There is no significant differences between arm circumference of north female youth and arm circumference of south female youth.

7. There is significant differences between the length neck to waist of north female youth and the length neck to waist of south female youth.
8. There is no significant differences between arm length of north female youth and arm length of south female youth.
9. There is significant differences between shoulder width of north female youth and shoulder width of south female youth.
10. There is significant differences between height of north female youth and height of south female youth.

5 Conclusion

Based on the analysis of somatotype type about the female youth in north China and south China, we found that there is significant differences between the somatotype of the north female youth and the somatotype of the south female youth. Most of the somatotype data of the north female youth is greater than the south female youth. This study is offer some reference for the fashion designer and clothing enterprise of north female youth and south female youth. This research has a certain practical value, which is benefit for related products development. Some data also need pay much more attention and some related research need to deepen and expand.

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