

## Comparison Research on the Ease of Fitted Dress Shirt Patterns

Lee Eunhae · Park Sanghee\*

Dept. of Fashion Stylist, Yeonsung University

Dept. of Traditional Korean Costume, Baewha Women's University

### Abstract

Shirts which have been a inner-wear in men's suit in the past, are being changed into an item that 20's men utilize to their individuality. Dress shirts have gotten out of its shape, becoming tight and slim with activity and fashion trend. In this study, two patterns of fitted dress shirts in a clothing construction text book were compared with the pattern of an apparel company with regard to the size tolerance and appearance silhouette; this comparison was performed through a fitting test and an appearance evaluation. According to the study, size tolerance of chest girth and waist girth were about 6~8cm and 10~18cm, respectively. Neck girth of the collar was tight in both the fitting test and appearance evaluation. Thus, the measurement value of the neck base girth had to be used for the collar pattern making. Moreover, approximately 35cm is a moderate size for the width on the upper arm in sleeve. Therefore the factors such as size tolerance of waist girth, height of sleeve cap, slim sleeve width and measurement value of neck base girth are being considered for the pattern making of fitted dress shirts.

**Key words** : ease, fitted dress shirt, pattern, 20's men

### I. Introduction

In the case of male adult, the clothes is one of the symbols that represent social status, and it acts as a passport to success to accomplish their goal in their occupations (Park, 2012; Yoo & Lee, 1996). Lately, as awareness that appearance is a competitiveness expands among males, there shows a tendency toward increase

in their interest in their attire, and the word 'mansumer' (Che, 2006) appeared which refers to a male consumer who is enthusiastic in spending while having a definite taste of his own. Shirt, a basic item to wear when dressing up in a suit, has been accepted as inner-wear (Koo, 2006b). Lately, diverse designs of shirts launched, enabling the shirt to express its own distinction of itself, as the shirts becomes more

---

Corresponding author: Park Sanghee, Tel. +82-2-399-0759, Fax. +82-2-6944-8491  
E-mail: coolsanghee@baewha.ac.kr

recognized as an outer (Han & Lee, 2012; Lim & Sohn, 2000).

As the tendency of menswear becomes softer, more casual and sporty, modern dress shirts show their tendency toward silhouette shirt with a fitted waistline and more curved armhole as well as the shirts that accentuating body curvature from box-style dress shirt (Koo, 2006a). Especially, men in their twenties prefer a trendy style of casual shirts with a close-fitting silhouette and modification on details such as stitches and darts (Ki, 2012; "Rising trend of casual shirts like check patterns", 2013). However, In current, the standard size system of men's dress shirt in KS Menswear size suggests 32 types of measurement of neck girth-cervical to wrist length notation, however, this size system is not practical (Jang, 2008). It seems like the most important element in meeting the need of the clothe fitness is to understand the nature of human body and to design a pattern considering both the fitness of the clothes and the designs and special quality of materials

(Jang & Jang, 2008).

Therefore, this study compares the pattern manufacture method and the fitness of each body parts of fitted dress shirts pattern to suggest a fair fitness of fitted pattern and to help in making the pattern manufacture method.

## II. Method and Procedures

### 1. Collection and Analysis of Dress Shirt Pattern

The dress shirts pattern used in this study is a fitted waistline shirt that men in their twenties prefer the most. Among the menswear textbook, Choi's and Kim and Park's fitted shirt patterns with dart on waistline and pattern of S apparel for men were compared and analyzed. The body size used in pattern making is a standard body size of men in their 20's of Size Korea.

Table 1 represents the body size needed in

**Table 1. Body Size and Proportional Method for Pattern Making** (unit: cm)

| Item              | Kim & Park (2004) | Choi (2008)                     |
|-------------------|-------------------|---------------------------------|
| Stature           | ○                 | ○                               |
| Chest girth       | ○                 | ○                               |
| Neck girth        | ○                 | ○                               |
| Back-neck width   | Neck girth/6      | 2/5 Neck girth-0.2              |
| Back length       | Stature/4+2       | Stature/7.5×2-1                 |
| Hip length        |                   | Stature/10                      |
| Armhole depth     | Chest girth/10+12 | Stature/7.5+2.5                 |
| Shirt length      | Stature/2-13~15   | Stature/7.5×3.2                 |
| Chest girth ease  | 10                | 12                              |
| Sleeve breadth    | Armhole/2-0.5~1.5 |                                 |
| Sleeve cap length | Armhole/3-4~6     | Sleeve cap length-chest girth/8 |
| Sleeve hem        | 26                | 31                              |
| Sleeve length     |                   | Stature/7.5×2.8-1               |

shirt's pattern making from menswear construction textbooks and the needed body sizes such as stature, chest girth, neck girth in itemized formula. While Choi used his stature in his formula many times, Kim and Park used body size of different parts of the body such as chest girth, armhole girth, and stature. Thus, the pattern has manufactured base on an average body figure of 20~24 year-old men which are chest girth of 94cm, neck girth of 36.6cm, and stature of 174cm.

## 2. Subject Selection

Subjects are three male college students who have a closest body figure to the standard shape of men in their early twenties which is from Size Korea (2012). Subjective fitting test and objective appearance evaluation were conducted. Table 2 shows the body size of the subjects and the

standard size of men in their early twenties.

## 3. Production of the Basic Bodice Patterns and Wearing Evaluation

A 30 denier musline was used in the production of collected fitted dress shirts bodice patterns and have attached a fusible interlining on collar, collar stand, and cuffs. In subjective wearing evaluation, three different postures were evaluated in its fitness, the straight posture with arms relaxed naturally, arms raised in 90 degree, and arms folded. In objective appearance evaluation, five people who have above master's degree of apparel study evaluated the front, back, and side of one's straight posture with arms relaxed. Each items were evaluated in seven point scale. According to the result, descriptive statistics, ANOVA, Scheffe's ex-post analysis were taken in statistic process.

Table 2. Subjects' Body Measurement

(unit: cm)

| Item            | Subject |      |      | Standard shape of early 20s (Size Korea, 2012) |     |
|-----------------|---------|------|------|--|-----|
|                 | A       | B    | C    | Body measurement                               | S.D |
| Chest girth     | 90.0    | 88.0 | 94.0 | 93.9   | 5.7 |
| Waist girth     | 74.0    | 75.0 | 76.0 | 78.4   | 7.1 |
| Hip girth       | 89.0    | 93.0 | 97.0 | 93.3   | 5.2 |
| Neck girth      | 36.2    | 36.0 | 37.0 | 36.6   | 1.9 |
| Neck base girth | 42.0    | 41.0 | 42.0 | 42.8   | 2.3 |
| Shoulder width  | 47.0    | 47.0 | 45.0 | 43.5   | 2.8 |
| Back length     | 43.0    | 43.0 | 42.5 | 43.3   | 2.4 |
| Sleeve length   | 58.0    | 60.0 | 56.0 | 58.7   | 2.5 |
| Hip length      | 21.0    | 21.0 | 20.3 | 19.5   | 1.8 |
| Stature         | 176     | 177  | 175  | 173.5  | 5.1 |

### III. Results and Discussion

#### 1. Comparison of Research Pattern

Each experiment pattern has been produced using different pattern drafting method and calculus according to the standard body size of men in their twenties, and because of calculus and ease according to the parts of body, actual pattern size shown differently.

There shows a bit of differences in the shape and the size of shirt pattern of each measured parts shown on Figure 1. But based on armhole depth line, we have measured the widest part of

chest and the thinnest part of pattern was measured for the waistline. When measuring a total girth, amount of dart and meeting line were excluded. Straight lines of pattern were measured as lengths, and front and back neck and the highest part of sleeves was measured as baseline.

Each patterns measured size is shown on Table 3. Choi's, different from two other patterns, has used a pattern method that does not make a yoke pattern. Thus, there is no resection part of yoke line and neck girth is smallest of all. On the other hand, the breadth of sleeves and the length of the shirt were measured as the longest of all.

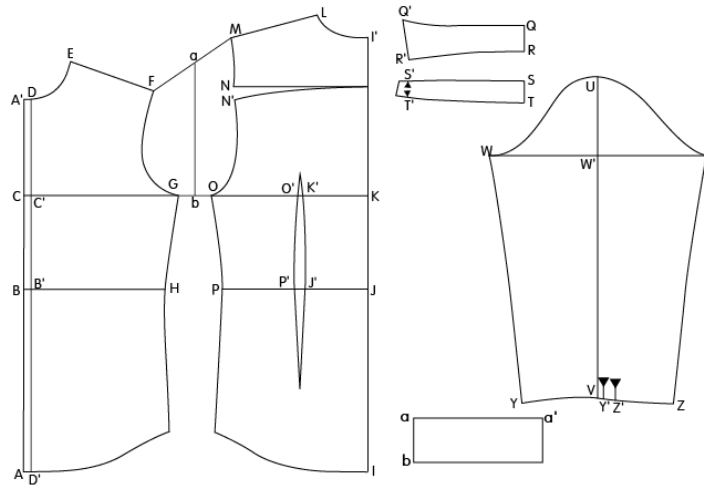


Figure 1. Shirt Pattern of Each Measured Parts

Table 3. Actual Size of Pattern

(unit: cm)

|                   | Kim & Park (2004) | Choi (2008) | S apparel |
|-------------------|-------------------|-------------|-----------|
| 1/2 Chest girth   | 52.0              | 53.0        | 52.7      |
| 1/2 Waist girth   | 44.0              | 50.2        | 48.7      |
| 1/2 Neck girth    | 20.2              | 19.2        | 21.0      |
| Arm-hole girth    | 43.0              | 51.3        | 48.6      |
| Back yoke cutting | 1.5               |             | 2.3       |
| Back length       | 46.5              | 45.5        | 43.7      |

Table 3. Continued

|                          | Kim & Park (2004) | Choi (2008) | S apparel |
|--------------------------|-------------------|-------------|-----------|
| Shirt length(back)       | 72.5              | 75.5        | 73.7      |
| Front length             | 36.7              | 36.4        | 33.0      |
| Shirt length(front)      | 62.7              | 67.6        | 64.7      |
| Armhole depth            | 17.1              | 22.2        | 23.3      |
| Sleeve breadth           | 34.8              | 43.3        | 35.0      |
| Sleeve cap               | 10.2              | 13.2        | 13.6      |
| Sleeve hem width         | 22.0              | 24.2        | 24.2      |
| Sleeve length            | 57.7              | 59.0        | 55.8      |
| Collar stand height(C.B) | 4.5               | 3.5         | 3.8       |
| Collar stand height(C.F) | 4.5               | 2.6         | 2.8       |
| Collar width(front)      | 9.8               | 7.2         | 7.0       |
| Collar width(back)       | 5.5               | 4.2         | 4.5       |
| Cuffs width              | 5.0               | 4.0         | 6.5       |
| Extension                | 2.0               | 2.0         | 1.2       |

Kim and Park's waistline and sleeve was measured the smallest, but the width of the collar and the stand of the collar was wider relatively. A calculation of the depth of armhole based on chest girth size was quite small compared to other two patterns. Thus, the armhole was measured the smallest of all. The depth of the armhole of the apparel was measured the deepest, but it was smaller than Choi's.

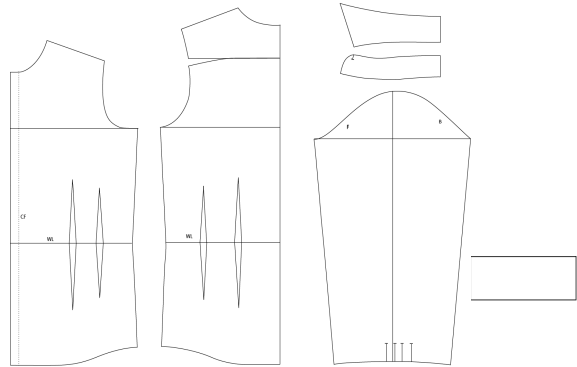
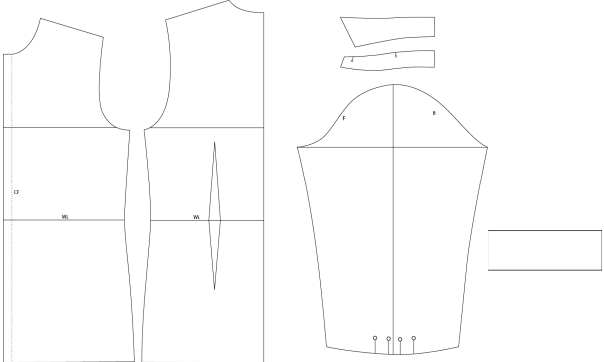
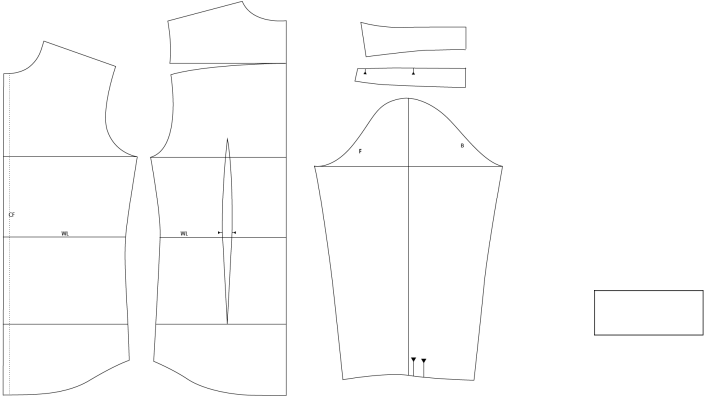
The pattern of the apparels was measured the largest of other patterns. The length of the back and the front was shown in relatively short lines. From the back of armhole line to cut out part of yoke line was measured to be relatively large size. The height of sleeves and the width of cuffs were measured higher compared to other two patterns. width of the extension was small as it measured 1.2cm. However, deviation of chest girth was about 1 cm, being relatively small compared to other body parts. The difference between sleeves is big, but the whole

sleeve length including cuffs shows difference only about 1 cm.

Comparing the actual measurement of pattern and the body size, the ease of chest girth was 6~8cm, showing little difference between the patterns. But the ease of waistline is 9~22cm, showing big difference as well as the armhole, having the difference of 8.3cm. The length of the back and front of the pattern of the apparel was the shortest. Table 4 is research patterns.

Figure 2 is a degree of polymerization of three patterns being arranged on the base of body board, center front and back, and waistline. The sleeves are arranged base of the armhole line and collar, base of the center back of it. If you look at the degree of polymerization, the length of front and back of the pattern from the clothing construction textbook is long, and the width of shoulder is narrow. The length below the waistline of the back and front of the body of Choi and the apparel was 30cm, being longer than Kim and Park's.

Table 4. Research Patterns

|                                  |  |
|----------------------------------|--|
| <p>Kim &amp; Park<br/>(2004)</p> |    |
| <p>Choi<br/>(2008)</p>           |   |
| <p>S apparel</p>                 |  |

The pattern of apparel and Choi's, there is only one dart on the back of the bodice, but there are two darts on Kim and Park's. There is only one pleat on the sleeve of the apparel, but

overall, the Kim and Park's pattern of sleeves, the width and depth of the armhole was smaller. Pattern of apparel has the medium-sized of two other patterns. Having one pleat on the shirt's

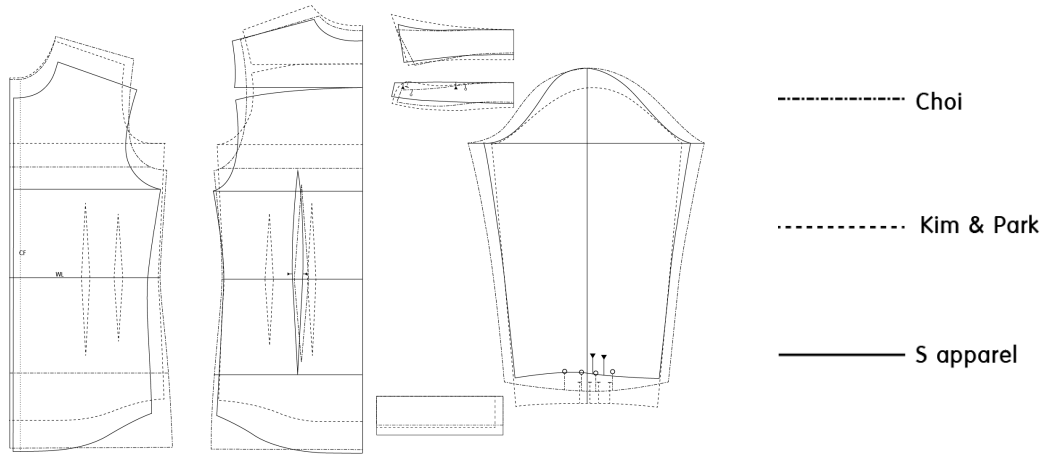


Figure 2. Pattern Polymerization

Table 5. Posture and Part of Fitting Test

| Test part | Standing straight | Arm raised on 90 degree angle | Arms folded |
|-----------|-------------------|-------------------------------|-------------|
|           |                   |                               |             |

cuffs in apparel is explained by the effect of current trends and the relatively high cuffs compared to general dress shirt, resulting the reduction of the overall size of armhole. Kim and Park's cuffs pattern was low and the width of the sleeves was the smallest, but the overall length showed little difference with other patterns. According to the result of the degree

of polymerization, the pattern of the Kim and Park's is the tightest shirts.

## 2. Subject Evaluation of Fit

### 1) Subjects' Fitting Test

There were total of 36 questions: eleven on when standing straight, twelve on arm raised on 90 degree angle, twelve on overall fitness, length, and girths of each shirt parts, and one more regarding arm folded. Each questionnaire

was evaluated in scale of seven, where four stands for most suitable/comfortable fitness, one for too much (loose, too long, or too high), and seven for too small (too tight, too short, or too low) (Table 5).

**Table 6. Subjects' Fitting Test**

|                               | Item            | Shirt A (Kim & Park) |      |        | Shirt B (Choi) |      |        | Shirt C |      |        | F value  |
|-------------------------------|-----------------|----------------------|------|--------|----------------|------|--------|---------|------|--------|----------|
|                               |                 | M                    | S.D  | Sheffe | M              | S.D  | Sheffe | M       | S.D  | Sheffe |          |
| Standing straight             | Overall fitness | 5.33                 | 1.15 | A      | 2.67           | 0.58 | AB     | 4.00    | 0.00 | B      | 9.60*    |
|                               | Neck girth      | 6.33                 | 0.58 | A      | 6.00           | 0.00 | B      | 4.00    | 0.00 | B      | 43.00*** |
|                               | Chest girth     | 5.33                 | 1.15 | A      | 3.67           | 0.58 | A      | 4.67    | 1.15 | A      | 2.11     |
|                               | Waist girth     | 3.67                 | 0.58 | A      | 2.33           | 0.58 | B      | 4.00    | 0.00 | B      | 1.50*    |
|                               | Hip girth       | 4.00                 | 0.00 | A      | 2.67           | 0.58 | AB     | 3.67    | 0.58 | B      | 6.50*    |
|                               | Back length     | 5.33                 | 1.15 | A      | 2.67           | 0.58 | AB     | 4.00    | 4.00 | B      | 9.60*    |
|                               | Sleeve length   | 5.67                 | 1.53 | A      | 4.33           | 0.58 | A      | 4.33    | 0.58 | A      | 1.78     |
|                               | Sleeve breadth  | 5.00                 | 1.00 | A      | 3.33           | 1.15 | A      | 4.00    | 0.00 | A      | 2.71     |
|                               | A.H girth       | 6.00                 | 1.73 | A      | 3.67           | 1.53 | A      | 4.00    | 0.00 | A      | 2.26     |
|                               | Shirt length    | 4.00                 | 0.00 | A      | 2.67           | 0.58 | AB     | 3.67    | 0.58 | A      | 6.50*    |
| Collar stand height           | 4.33            | 1.15                 | A    | 4.00   | 0.00           | A    | 4.00   | 0.71    | A    | 0.60   |          |
| Arm raised on 90 degree angle | Overall fitness | 5.33                 | 1.53 | A      | 2.67           | 0.58 | AB     | 4.33    | 0.58 | B      | 5.44*    |
|                               | Neck girth      | 6.33                 | 5.78 | A      | 5.33           | 0.58 | AB     | 4.67    | 0.58 | B      | 6.33*    |
|                               | Chest girth     | 5.67                 | 0.58 | A      | 3.33           | 1.15 | AB     | 4.00    | 0.00 | B      | 7.80*    |
|                               | Waist girth     | 4.00                 | 0.00 | A      | 2.67           | 0.58 | B      | 4.00    | 0.00 | B      | 16.00**  |
|                               | Hip girth       | 4.00                 | 0.00 | A      | 3.00           | 1.00 | A      | 4.00    | 0.00 | A      | 3.00     |
|                               | Back length     | 5.33                 | 0.58 | A      | 3.00           | 0.00 | A      | 3.67    | 0.58 | B      | 19.50**  |
|                               | Back width      | 6.00                 | 1.00 | A      | 3.67           | 0.58 | AB     | 4.33    | 0.58 | B      | 7.80*    |
|                               | Sleeve length   | 5.67                 | 1.53 | A      | 5.00           | 1.00 | A      | 5.00    | 1.00 | A      | 0.31     |
|                               | Sleeve breadth  | 5.00                 | 1.00 | A      | 3.33           | 1.15 | A      | 4.00    | 0.00 | A      | 2.71     |
|                               | A.H girth       | 6.67                 | 0.58 | A      | 3.67           | 1.53 | A      | 4.67    | 1.15 | A      | 5.25*    |
| Shirt length                  | 4.00            | 0.00                 | A    | 3.00   | 1.00           | A    | 4.00   | 0.00    | A    | 3.00   |          |
| Collar stand height           | 3.67            | 1.15                 | A    | 4.33   | 0.58           | A    | 3.67   | 0.58    | A    | 0.67   |          |
| Arms folded                   | Overall fitness | 6.33                 | 0.58 | A      | 3.67           | 0.58 | A      | 4.00    | 0.00 | B      | 28.50**  |
|                               | Neck girth      | 6.33                 | 0.58 | A      | 5.67           | 0.58 | AB     | 4.33    | 0.58 | A      | 9.33*    |
|                               | Chest girth     | 5.33                 | 1.15 | A      | 3.33           | 1.15 | A      | 4.00    | 0.00 | A      | 3.50     |
|                               | Waist girth     | 4.00                 | 0.00 | A      | 3.00           | 0.00 | A      | 4.00    | 0.00 | A      |          |
|                               | Hip girth       | 3.67                 | 0.58 | A      | 3.33           | 1.15 | A      | 3.67    | 0.58 | A      | 0.17     |
|                               | Back length     | 5.00                 | 1.73 | A      | 3.00           | 1.00 | AB     | 3.67    | 0.58 | B      | 2.15     |
|                               | Back width      | 6.33                 | 1.15 | A      | 3.33           | 1.00 | A      | 4.67    | 0.58 | A      | 6.78*    |
|                               | Sleeve length   | 5.67                 | 1.53 | A      | 4.67           | 1.15 | A      | 4.67    | 1.15 | A      | 0.60     |
|                               | Sleeve breadth  | 5.33                 | 1.15 | A      | 3.67           | 1.53 | A      | 4.33    | 0.58 | A      | 1.58     |
|                               | A.H girth       | 7.00                 | 0.00 | A      | 3.67           | 1.53 | AB     | 4.67    | 1.15 | B      | 7.18*    |
| Shirt length                  | 4.33            | 0.58                 | A    | 2.67   | 0.58           | B    | 4.00   | 0.00    | B    | 10.50* |          |
| Collar stand height           | 3.67            | 1.15                 | A    | 4.00   | 0.00           | A    | 3.67   | 0.58    | A    | 0.20   |          |

\*p<.05 \*\*p<.01 \*\*\*p<.001, A<B (shade: less than 3.0 or more than 5.0)



In subjective opinion of each subject of Table 6, the overall fitness of shirt A was tight while shirt B was loose except for neck area. The subjects were overall satisfied with the shirt except for the sleeve length when the arm is raised in a 90 degree angle. The neck size evaluated to be too tight on both shirt A and B, which corresponds with the fact that the shirt pattern of shirt A, B, and C had 3.6cm and 1.6cm of deviations each.

As for detailed response of shirt A, its overall girth was too tight, and the length was too short. There also was too much pulling of the armhole when raising an arm, and the back ease appeared to be too little as well. The back length was evaluated to be too long, and it seems to be because the side length from armpit point to waist line is long. The sleeve length, on the other hand, was evaluated as short while the actual length, including the cuffs width, is the longest. The reason sleeve length of shirt A felt shorter than that of shirt C, which's actual length is shorter, seems to be because the back width is shorter than that of shirt C. Other than the above factors, waist and hip girths, shirt length, and collar stand was evaluated as suitable.

As for shirt B, the overall fitness was evaluated to be loose. This is because the size of the chest was bigger than that of waist and hip girth. This also shows that the subject does not bother the tightness on small areas such as neck size as long as the overall fit is loose. As for length, the actual length of front center and back center of shirt B is shorter than that of shirt A, yet the subjects said that the overall length of shirt B is longer. This is believed to be associated with the length from armhole depth and waist line to the hem. Lastly, for shirt C, it was evaluated as most suitable except for sleeve length when the arm is raise on a 90 degree angle. The reason shirt C had most complementing evaluation is believed to be because it has loose neck size and back width. Moreover, considering the fact that the difference of chest girth is less than 1cm, the different value of waist girth, armhole size and depth, and the front length had effect on subjective evaluation. Finally, the positive evaluation of the fitness of shirt C corresponds with the fact that shirt C has a medium measurement value of shirt A and shirt B.

For all three types of shirts, the sleeve length was said to be short when the arm is raise on



Figure 3. Pictures of wearing shirts for Appearance Evaluation of Fitness

Table 7. Appearance Evaluation of Fitness

|                       |                 | Shirts              | Shirt A (Kim & Park) |      |        | Shirt B (Choi) |      |        | Shirt C |      |          | F value  |
|-----------------------|-----------------|---------------------|----------------------|------|--------|----------------|------|--------|---------|------|----------|----------|
|                       |                 | Item                | M                    | S.D  | Sheffe | M              | S.D  | Sheffe | M       | S.D  | Sheffe   |          |
| F<br>r<br>o<br>n<br>t | Ease            | Overall             | 4.07                 | 0.96 | A      | 2.73           | 0.70 | B      | 4.07    | 0.46 | B        | 16.37*** |
|                       |                 | Neck girth          | 5.20                 | 1.15 | A      | 4.27           | 0.59 | A      | 4.00    | 0.00 | B        | 10.72*** |
|                       |                 | Chest girth         | 3.80                 | 1.08 | A      | 3.07           | 0.70 | AB     | 4.40    | 0.51 | B        | 10.43*** |
|                       |                 | Waist girth         | 3.20                 | 1.01 | A      | 2.67           | 0.72 | AB     | 3.80    | 0.41 | B        | 8.39**   |
|                       |                 | Hip girth           | 3.13                 | 0.92 | A      | 2.67           | 0.62 | A      | 4.13    | 0.35 | B        | 18.82*** |
|                       |                 | A. H girth          | 4.67                 | 1.23 | A      | 3.20           | 0.77 | B      | 4.20    | 0.41 | B        | 11.00*** |
|                       |                 | Upper arm girth     | 4.53                 | 0.99 | A      | 1.67           | 0.62 | B      | 3.93    | 0.26 | B        | 72.00*** |
|                       | Line            | Bust line           | 2.47                 | 0.64 | A      | 3.80           | 0.41 | B      | 3.80    | 0.41 | B        | 35.44*** |
|                       |                 | Waist line          | 3.33                 | 0.72 | A      | 3.87           | 0.52 | AB     | 2.87    | 0.99 | B        | 6.37**   |
|                       |                 | Hip line            | 3.13                 | 1.06 | A      | 3.47           | 0.83 | A      | 3.80    | 0.41 | A        | 2.51     |
|                       | Length          | Shirt length        | 4.40                 | 0.83 | A      | 3.00           | 0.76 | B      | 4.40    | 0.83 | B        | 15.13*** |
|                       |                 | Sleeve length       | 4.20                 | 0.68 | A      | 3.33           | 0.62 | AB     | 3.67    | 0.62 | B        | 7.06**   |
|                       | Collar          | Collar stand height | 2.87                 | 0.83 | A      | 4.00           | 0.00 | B      | 4.13    | 0.35 | B        | 26.62*** |
|                       |                 | Collar width        | 2.33                 | 1.11 | A      | 3.87           | 0.35 | B      | 3.87    | 0.35 | B        | 23.74*** |
|                       | Sleeve          | Cuffs width         | 3.60                 | 0.91 | A      | 3.67           | 0.49 | A      | 3.67    | 0.62 | A        | 0.05     |
| S<br>i<br>d<br>e      | Length          | Shirt length        | 4.07                 | 1.03 | A      | 3.20           | 0.56 | B      | 4.07    | 0.46 | B        | 7.08**   |
|                       |                 | Sleeve length       | 4.13                 | 0.35 | A      | 3.60           | 0.51 | A      | 3.53    | 0.64 | B        | 6.16**   |
|                       | Sleeve          | Cuffs width         | 3.93                 | 0.26 | A      | 3.67           | 0.49 | A      | 3.80    | 0.41 | A        | 1.68*    |
| Ease                  | Upper arm girth | 4.67                | 1.11                 | A    | 2.13   | 1.13           | B    | 4.13   | 0.62    | B    | 28.96*** |          |
| B<br>a<br>c<br>k      | Ease            | Overall             | 3.73                 | 1.03 | A      | 2.67           | 0.62 | B      | 3.67    | 0.62 | B        | 8.79**   |
|                       |                 | Chest girth         | 3.47                 | 0.83 | A      | 2.47           | 0.64 | B      | 3.40    | 0.91 | B        | 7.27**   |
|                       |                 | Waist girth         | 3.40                 | 0.83 | A      | 3.01           | 0.70 | AB     | 3.80    | 0.41 | B        | 4.48*    |
|                       |                 | Hip girth           | 4.20                 | 0.94 | A      | 3.13           | 0.64 | B      | 4.13    | 0.52 | B        | 10.29*** |
|                       |                 | A.H. girth          | 4.80                 | 1.42 | A      | 3.00           | 0.53 | B      | 3.93    | 0.46 | C        | 14.45*** |
|                       |                 | Upper arm breadth   | 4.67                 | 1.05 | A      | 2.00           | 0.85 | B      | 4.20    | 0.56 | B        | 42.98*** |
|                       |                 | Wrist girth         | 4.20                 | 0.56 | A      | 3.00           | 0.65 | B      | 3.80    | 0.41 | B        | 18.38*** |
|                       | Line            | Chest girth         | 3.20                 | 0.41 | A      | 4.27           | 0.70 | B      | 4.40    | 0.83 | B        | 14.39*** |
|                       |                 | Waist girth         | 3.87                 | 0.64 | A      | 4.07           | 0.46 | AB     | 3.33    | 0.72 | B        | 5.66*    |
|                       |                 | Hip girth           | 3.93                 | 0.26 | A      | 3.40           | 0.91 | B      | 3.93    | 0.26 | B        | 4.44*    |
|                       | Length          | Shirt length        | 4.13                 | 0.92 | A      | 2.87           | 0.74 | B      | 3.67    | 0.49 | B        | 11.34*** |
|                       |                 | Sleeve length       | 4.27                 | 0.70 | A      | 3.33           | 0.72 | A      | 3.60    | 0.63 | B        | 7.33**   |
|                       | Collar          | Collar stand height | 3.07                 | 0.70 | A      | 4.00           | 0.00 | B      | 3.93    | 0.26 | B        | 21.71*** |
|                       |                 | Collar width        | 2.87                 | 0.83 | A      | 3.93           | 0.26 | B      | 3.93    | 0.26 | B        | 20.60*** |
|                       | Sleeve          | Cuffs width         | 3.67                 | 0.72 | A      | 3.67           | 0.49 | A      | 3.67    | 0.49 | A        | 0.00     |

\*p<.05 \*\*p<.01 \*\*\*p<.001, A<B (shade: less than 3.0 or more than 5.0)

a 90 degree angle rather than with crossed arms. There was significant different in six items when standing straight, seven with arm raised

on a 90 degree angle, five with crossed arms. Overall fitness and neck size showed significant difference in all three poses while the back

width and armhole girths showed significant differences in poses with movements. Lastly, there was significant difference of evaluation in hip girth when standing still and in chest girth when arm is raised on a 90 degree angle.

## 2) Appearance Evaluation of Fitness

The subject was evaluated on three views: back, front, and side. The evaluation criteria were girths, length, and position of center line; the side view was evaluated on length. Figure 3 is wear pictures for appearance evaluation of fitness.

The evaluation result of Table 7 showed shirt B as the loosest fitting, and this result seemed to be affected by the waist and hip girth. Contrast to the subjective evaluation above, which said suitable, the sleeve and wrist girths looked loose. As for height of collar stand, shirt A seemed the tallest and the neck size looked the smallest. The actual height of collar stand of shirt B, however, is the tallest, yet the neck base line and small neck girth seemed to have affected the appearance. The armhole of shirt B looked bigger from the back than from the front. The difference seems to be coming from the fact that the chest length of the back side is looser.

For overall ease in fitting, the shirt B, shirt A, and shirt C had tighter appearance in order. Among the three shirts, shirt C had the most positive evaluation in all criteria except for waist girth from front view. Shirt A and shirt B had difference of 12cm in waist girths. However, the difference in appearance evaluation was smaller than that from subjective evaluation. The armhole evaluation had the same result.

As for sizes of parts of shirts, the appearance

looked more fitted when the subject responded to be tight. Nevertheless, the evaluation on overall torso girths had similar answers. Overall, all criteria showed significant differences except for hip girths from front view and cuffs from front and back view.

## IV. Conclusion

The purpose of this research is to compare the ease – fitness – of fitted dress shirt patterns based on two patterns from clothing construction textbook and one from business use. Each pattern was designed to fit the standard somatotype of twenties male, and the result are as followed.

The difference between the actual measurement value of patterns and the body measurements were little in chest girths, for being 6~8cm, while there were big differences in waist girths, which had 9~22cm differences, and armhole, which had 8.3cm differences. The back and front length of the pattern used in business were the shortest, whereas the ones from the textbook showed little differences. However, there was big difference in neck sizes between the ones from textbook.

For evaluation, shirt C had the most complementing evaluation in both subjective and appurtenance evaluation. Shirt B had the loosest fitting in both evaluation, and shirt A had tight fitting on subjective evaluation while nice fit on appearance evaluation. This results show that appearance evaluators preferred tighter fitting than what the subject feels it to be. In conclusion, shirt B had the loosest fit, and shirt C had the most suitable fit in evaluation.

The two patterns from the textbooks appeared to have tight neck size in subjective evaluation, and it seems to be because the measurement location of neck girths and neck base girths are ambiguous. The neck girth measurement location in the textbook is close to the baseline than that used in business pattern. If the business measurement standard is to be used in making a collar stand, the width ends up too tight in many cases. Due to this difference, there is over 2cm of differences in neck girth measurement between textbook and business pattern.

In conclusion, the research shows that the appropriate addition length from the body measurement is 6~8cm in chest girth and 10~18cm for waist girth. As for collar, it is better to use the neck girth closer to neck base line. For sleeve width, 35cm seemed most appropriate. In summary, the most suitable fitted dress shirt should have high sleeve cap line, small sleeve width, and neck girths measured closer to base neckline.

Actually, fitted dress shirts are one of most favorite items of men in early 20s. But the study about fitted dress shirts is rare by comparison with their interest. This study is considered a basic study for fitted dress shirts of men. Also, it will subserve the studies on the application of many different design lines, ease and materials to various body shape and age groups. However, this research was done with cotton which has no stretch, so further studies with cloth material with stretch should be done.

## References

- Che, S. (2006). Formative characteristics in dress shirts design on contemporary men's wear. *Family and Environment Research*, 44(10), 79-90.
- Choi, Y. (2008). *Men's classic patterns*. Seoul: Kyohakyongusa.
- Han, S., & Lee, Y. (2012). Characteristics of gender-bending design in contemporary men's dress shirts. *Journal of The Korea Fashion and Costume Design Association*, 14(2), 157-169.
- Jang, J., & Jang, S. (2008). A study on a men's dress shirt pattern depending on body shape for mass customization system. *Journal of Korean society of Clothing and Textile*, 32(2), 294-306.
- Jang, S. (2008). A study on sizing system and preferable ease in a men's dress shirt for virtual mass customization system. *Journal of Korean society of Clothing and Textile*, 32(1), 99-109.
- Ki, J. (2012, February 19). Suit classing shirt-casual of the spring menswear. *MK Business News*. Retrieved from <http://news.mk.co.kr>.
- Kim, O., & Park, K. (2004). *Men's wear pattern design*. Seoul: Kyeongchunsa.
- Koo, I. (2006a). A study of the shirt style preference and shirt purchase attitude. *Journal of Fashion Business*, 10(2), 40-59.
- Koo, I. (2006b). A study on the image perception and preference of the dress shirt. *Journal of Fashion Business*, 10(4), 1-15.
- Lim, H., & Sohn, H. (2000). A research on the consumer's actual condition for men's dress shirt. *Journal of Fashion Business*, 4(4), 135-151.
- Park, Y. (2012). A study on the preference of

necktie design according to the demographic characteristic of adult man. *Journal of Fashion Business*, 16(4), 152–165.

Standard shape sizing chart of early 20s men. (2012). <http://sizekorea.ats.go.kr>

Rising trend of casual shirts like check patterns. (2013). Retrieved from <http://www.ajunews.com>

Yoo, J., & Lee, S. (1996). A study on the development of men's wear in Korea. *Journal of the Korean Society Costume*, 29, 5–13.

---

Received (June 12, 2014)

Revised (July 1, 2014; July 15, 2014)

Accepted (July 18, 2014)