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**Clothing for the female crutch user: Case studies of the clothing
worn by the middle class American female crutch user**

Wu, Meng-Hui Margaret, M.S.

The University of Arizona, 1990

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**CLOTHING FOR THE FEMALE CRUTCH USER:
CASE STUDIES OF THE CLOTHING WORN BY
THE MIDDLE CLASS AMERICAN FEMALE CRUTCH USER**

by
Meng-Hui Margaret Wu

A Thesis Submitted to the Faculty of the
SCHOOL OF FAMILY AND CONSUMER RESOURCES
in Partial Fulfillment of the Requirements
For the Degree of
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in the Graduate College
THE UNIVERSITY OF ARIZONA

1990

STATEMENT BY AUTHOR

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APPROVAL BY THESIS DIRECTOR

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ABSTRACT

8

The preferred clothing styles, and consideration factors of selected female underarm crutch users were investigated along with the comparison of body measurements between permanent and temporary crutch users.

An interview schedule questionnaire was administered to five permanent and five temporary crutch users to obtain personal preference and needs. Thirty-eight body measurements were taken on each subject. Garment designs of five items, three designs in each category, were based on the results of the literature review and interview schedule. The five permanent crutch users ranked their preference in each garment category. The prototypes, of most preferred designs, of each subject, were evaluated.

Results indicated permanent crutch users with strong function orientation preferred set-in sleeves, buttoned cuffs, enlarged jewel neckline, shawl collar and bloused silhouette. This was different from the temporary crutch users preference. The measurement difference of the same weight category showed that the proportion of permanent crutch users, with larger upper torso, was different to that of temporary crutch users. Factors for permanent crutch users selection of clothing included function, fit and fabric when evaluating illustrations, and comfort and esthetics were additional factors after trying on the prototypes of their choice. The prototype designs ameliorated the aspect of five subjects.

CHAPTER 1

INTRODUCTION

In the recent decade, the Taiwanese government has paid more attention to the welfare of its people, and has started to implement labor insurance and government employee insurance. The government also passed a bill for handicapped welfare in 1981 which includes medical rehabilitation and special education. Since physically disabled people in Taiwan are more actively involved in the community than ever, clothing is probably one of the most important factors as a first step of socialization. In Taiwan there has been no research done in relation to clothing for the female crutch user. Research done in the United States of America (U.S.A.) noted that clothing was an important factor to the disabled for socialization in communities (O'Bannon, Feather, Vann & Dillard, 1988).

Newton (1984) proposed a taxonomy to classify research of clothing for special needs done in the U.S.A. The taxonomy was classified in three domains: cognitive, affective, and psychomotor. The cognitive domain included clothing preference and needs, clothing and awareness or consumer behavior, learning or educational efforts, designs and size measurements. The affective domain consisted of attitude, body image, and self-concept. The third domain, psychomotor domain, contained developing or testing motor skills. In the cognitived domain, several research studies stated that special functional features of clothing should be sufficiently

inconspicuous so as to avoid a stigmatizing effect when the disabled people interact with the abled (Dallas & Wilson, 1981; Freeman, Kaiser & Wingate, 1985; Kernaleguen, 1978; Schwab & Sindelar, 1973; Turnbull & Ruston, 1985). Furthermore, many researchers noted fashion and fit would help disabled people look their best (Kernaleguen, 1978; Turnbull & Ruston, 1985). Some researchers tried to suggest how to select styles and to adapt clothing for different needs (Broome, 1975; Goldsworthy, 1981; Moore, 1988; Reich & Shannon, 1980). In addition, many studies also dealt with comfort factors and fabric choice for people with different causative factors (Moore, 1988; Reich, 1981; Renbourn, 1971).

Due to the different causative factors of the disabled, the needs of each subject should be met individually. Moreover, Ahrbeck & Friend, 1976, noted that it was of great help when the function of clothing and rehabilitation were combined.

In Taiwan, 0.7% of the population are handicapped and only 11.5% of the disabled have a marketable skill. The next target of the Taiwan rehabilitation program is to help disabled people achieve independence. Clothing will become one of the important factors in the everyday lives of Taiwan's disabled population.

Moreover, understanding body proportions of disabled people will help a designer select suitable styles for customers. Therefore, case studies of female crutch users will be worthwhile to demonstrate to disabled people having similar characteristics, with comparable clothing design needs, whether in the U.S.A. or in Taiwan.

1.1 Statement of Problem

The purpose of this study is to investigate the preferred clothing styles and consideration factors utilized by selected female underarm crutch users, with a variety of causative factors, when selecting clothing. The body proportions of permanent crutch users and temporary crutch users will be determined to allow for better fitting garment designs. The sample will consist of five permanent and five temporary female crutch user volunteers from Tucson, Arizona.

1.2 Objectives

1. Determine the style, fabric, fit and appearance preference of female crutch users in the Ready-To-Wear (R-T-W) market.
2. Determine factors female crutch users consider when they select clothing to fit their physical needs.
3. Determine what other criteria are used when female crutch users evaluated specially designed clothing beyond the base consideration of comfort, fabric, fit , and aesthetics.
4. Determine whether the upper torso of the crutch user is larger than, smaller than or unchanged in proportion with their lower torso.
5. Determine whether there is a difference between the proportion of the upper torso and the lower torso of permanent and temporary crutch users.

1.3 Assumptions

It is assumed that subjects in this study answered all questions truthfully.

1.4 Delimitations

The results of the cases studied can only be generalized to female underarm crutch users with similar conditions. Since the garment items which are designed in this study are dresses, blouses, skirts, pants, and jackets, the results can not be implied to other items.

1.5 Limitations

The sample of ten, including five permanent and five temporary crutch users, were drawn from the population of female crutch users in Tucson.

1.6 Definition of Terms

1. Physically handicapped (Synonymous with physically disabled)(U.S.A.): a person who has the inability to function normally without some kind of help (Hoffman, 1979). For the purpose of this study the meaning includes only physical impairment.

2. Physically handicapped (Taiwan): a person who can not live independently because of damage of brain or neural system, or any body impairments, except visual impairment, hearing impairment, voice impairment, learning retardant, or mental retardant (Office of Social Affairs, Taiwan Provincial Government, 1989).

3. Permanent crutch users: persons who use crutches for a long term period due to their congenital defects or as a result of disease(s) or accident.

They will use crutches and/or other mobility devices through-out their lifetime.

4. Temporary crutch users: persons utilizing crutches for a short time because of medical needs or mobility reasons. They will abandon crutches or change mobility devices after the crutch period.

5. Causative factor: diseases or incidents that cause subjects to utilize crutches as their mobility aids.

6. Ready-To-Wear (R-T-W): Apparel that is mass produced in standard sizes (Calasibetta, 1988).

7. Comfort: a state of mental and physical satisfaction that is free from worry, pain or distress.

8. Function: the functionality of the combination of design features and styles suitable for the subjects' condition.

9. Fit: the silhouette and the ease of garments that can camouflage subjects' unbalance proportion and have adequate freedom of movement and comfort for the wearer.

10. Voluntary product standard, PS 42-70: set of measurements published by the U.S. Department of Commerce, Bureau of Standards for figure types to aid in consistent sizing of women's ready-to-wear apparel (Mancuso, 1982).

CHAPTER 2

REVIEW OF LITERATURE

The context of the review includes Taiwan's handicapped population, clothing psychology and the disabled, clothing preference and the disabled, and body proportion. A review of literature pertinent to case studies of the clothing for female crutch users follows.

2.1 Taiwan's Handicapped Population

According to an announcement of the Department of Social Education in the Taiwan Ministry of the Interior, June 30, 1989, 144,247 handicapped handbooks had been distributed to people with disabilities. This means about 0.7% of the population in Taiwan is handicapped. Moreover, 50.63% (73,033) of the disabled population are physically disabled (Taiwan Department of Social Education, 1989). Another study done in June of 1989, showed that 41.81% of the physically disabled need orthotics, 42.55% are ambulatory, 8.7% are wheelchair users, and 6.76% are immobile (Taiwan Department of Social Education 1989). There is no statistical data showing how many people actually use crutches. Canes and walkers are not as common as underarm crutches in Taiwan, and are commonly used by the physically disabled population.

Statistics from the past five years, supplied by the Taiwan Provincial Health Department, and the Taipei City Health Department & Kaohsiung City Health Department (1988), show that accidents and their adverse effects, diabetes mellitus, and suicide are listed as three of the top ten leading causes of death. For each of the five years, accidents and adverse

effects was the third most common cause of death. Other data also showed that poliomyelitis cases, between 1957 and 1986, were the largest cause of infection in the past three decades (Taiwan Provincial Health Department, Taipei City Health Department and Kaohsiung City Health Department, 1988). As, 42.22% (2,258) of patients died of this disease, there are still at least 3,090 polio patients over twenty-two years old with different levels of disability in Taiwan's society today.

Taiwan's disabled people have great difficulty finding employment, regardless of their disabilities. According to a handicapped population survey, reported by the Ministry of the Interior in 1982, only 30.22% of the disabled over the age of fifteen had a job.

2.2 Clothing Psychology and the Disabled

Clothing is important to individuals for psychological and physical reasons (Stone, 1962). Stone's concept stated that appearance has communicative value, that a person's clothing serves to establish validation of the individual's identity, value, mood, and attitude.

Clothing is a tool that can be used by individuals to express or to conceal and/or enhance their self-concept. Self-concept can be built from personal experience such as social interaction, especially interaction with people who are significant or important to us (Storm, 1987). Clothing might affect self-concept through the interaction with others when someone's appearance is significantly different. Miller (1982) noted that clothing may lessen the impact of physical impairment on some aspects of impression

formation, because evaluations of persons with disabilities are influenced by clothing as well as physical deformities.

The research done by Feather, Martin and Miller (1979), found that the disabled students didn't evaluate appearance as being significantly different to the able-bodied students. According to their attitudes toward the four major clothing variables; fashion, management, comfort, and durability, it showed that the attitudes of physically disabled were significantly lower than those of the able-bodied students. Furthermore, clothing satisfaction scores of the physically disabled were less than, but not significantly different to, the clothing satisfaction scores of the able-bodied. It may be explained that the disabled's expectations may not be as great as those of the able-bodied, and that they had come to accept and cope with the available clothing.

Disabled people do not like to wear adapted or specially designed garments in fear of drawing attention to their disability (Dallas & Wilson, 1981; Macartney, 1985; Schwab & Sindelar, 1973; Wingate, Kaiser & Freeman, 19085). In addition, previous qualitative research noted that special or functional clothing is a relatively complex stimulus that promotes internal stigmatization on the part of a wearer (Freeman, Kaiser & Wingate, 1985). The consideration of designing functional clothing should include the factors of salient feature, which is an internal stigmatization of wearing an eye-catching garment, personal characteristics and other multidimensional features, such as personal preferences or affects, social factors like conspicuousness, and functional factors like comfort and mobility.

Kernaleguen (1978) states that clothing for disabled people should be regular clothing with added inconspicuous features or modifications, designed to maximize the personal satisfaction of the wearer while accommodation his or her individual needs. Furthermore, other researchers indicated that dress may be used, to deflect attention away from a disability, by a person who views that disabilities as a central component of identity (Kaiser, Wingate, Freeman & Chandler, 1987). Ahrbeck and Friend (1976) point out that a feeling of high esteem can raise and individual's rehabilitation potential. Attractive and well-fitting clothing aids in developing a higher self-concept by giving a disabled person confidence in his appearance (Turnbull and Ruston, 1985; Warden & Dedmon, 1975).

Due to the fact that the needs of persons with physical disabilities being very personalized and specific, in addition to the increased awareness of the functional clothing need, this study may be of value in helping persons explore problems related to their personal demands.

2.3 Clothing Preference and the Crutch User

It is important to deliberate design related factors that include fiber/fabric, fashion, styles, and personal demands and limitations, before designing, selecting or modifying clothing for the female crutch user. There are many suggestions relating to the field of fiber/fabric, for disabled people with different causative factors (Jenkins and Lamb, 1987; Moore, 1988; Goldsworthy, 1981).

The prior research noted that factors such as durability, absorbency, flame resistance, static, texture, elasticity, thermal comfort and care properties, are important to brace or crutch users. Propelling wheelchairs or using crutches wears out the inside of sleeves and cuffs or the under arm. The researchers suggest natural fibers mixed with percentages of synthetic fibers to overcome the disadvantages of natural fibers, such as not easy to care for, flammability, crease easily, not very versatile, and more expensive than synthetic fibers. An absorbent and stretch fabric is suitable for the person who wears a body brace, artificial limb, or other surgical appliance, that may cause excessive sweating and needs extra ease. "Comfort stretch", with two to four percent elastic fiber, will wear better. Up to 25% synthetic fiber added to a natural fiber will not change the fabric's absorbency. A blend fabric or a fabric with anti-static finish lessens the risk of static build-up. On the whole, the researchers emphasized that there is no perfect fabric; the final choice of fabric is always personal.

The same concept was submitted by Turnbull and Ruston (1985) and stated that every disabled person's problems are different and the overall dressing problem complicated. They suggested not only fabrics but also style, aids, and adaption need to be considered. In general, some design details such as action pleats for the fullness at the back of garments, reinforcement of underarm or forearm areas, underarm gussets, and elasticized waist belts or hems adjustable to the individual's posture should be considered for the underarm crutch users (Schwab & Sindelar, 1973; Goldsworthy, 1981). Additional research found that other appropriate style

features for crutch users were zipper fasteners and knit fabrics (Schuster & Kelly, 1974).

Kernaleguen (1978) emphasized that long blouses or shirts, and overblouses will be comfortable for underarm crutch users and avoid the tendency of rising blouses. Some reinforcement at appropriate points, with fused-on fabrics or sewn-on patches of durable fabric, reduces abrasion. Low and wide necklines should be avoided, because of the tendency to gape and slip off the shoulders.

Broome (1975) emphasized that before selecting clothing, the disabled person needs to evaluate physical problems, muscle strength, range of motion, and coordination. She also mentioned an invisible detail that a piece of elastic can be stitched to the straps and across the back for holding dropped brassiere straps.

Turnbull and Ruston (1985) also pointed out that careful use of style, color and detail will camouflage or draw attention away from the wearer's disability. Therefore, other than the choice of accessories, the designer can camouflage the wearer's overall proportion by combining the wearer's body proportion with the interests of asymmetrical line, color, motif and/or texture. Other design details like a collar rising up will be uncomfortable. Wheelchair and crutch users have to choose garments carefully. For some people with dressing difficulties need clothes with front or side front opening with accessible and easily seen fastenings.

A few researchers discussed the domain of pattern adjustments for better fitting (Goldsworthy, 1981; Kernaleguen, 1978; Warden & Dedmon, 1975). Adapting the selected ready-to-wear garments and

commercial patterns were discussed to improve their comfort, fit and attractiveness.

Personal needs for special clothing are changed by the symptoms, environment and personal preference of garments. It is necessary to do case studies in order to create examples for a catalogue from which handicapped people themselves or their families could choose suitable clothing (Lamb,1984).

2.4 Body Measurements and Proportion

Problems with fit are the most prevalent of clothing problems, and measurement is the first step in obtaining suitable clothing fit. Robinault (1973) suggested a standard technique that includes six items for women's measurements, nine items for men's measurements and eight items for children's measurements to determine the wearer's proportion. Measurements should be taken over the foundation garments.

Lamb (1984) noted that bodies that were exceptionally slim, chubby, or disproportionate made ready-to-wear purchasing difficult. Purchase of coordinated sets in the same size was frequently not possible.

The United States Department of Commerce (1970) has provided standard body measurements for the sizing of women's patterns and apparel to ready-to-wear and pattern manufacturers. Measurements were taken to the nearest 1/8 inch when subjects were wearing foundation garments when standing. Spread girth measurements were taken when subjects were sitting in a natural position.

There is no comparable body measurement or proportion documentation for disabled people. Salusso-Deonier (1982) examined a method for classifying adult female body variation and comparison with the PCSS and PS 42-70. The PCSS was a standard constructed from the research data. Salusso-Deonier found that the PCSS is better than the current apparel standard, PS42-70. Since the PS42-70 has prevailed in the R-T-W market, the researcher adopted the PS42-70 as the standard measurement for comparison, even though the sizes of the PCSS was more representative.

CHAPTER 3

METHOD AND PROCEDURE OF INVESTIGATION

This chapter contains a description of subjects, data collection and instrumentation, design of garments, and analysis of data. The study was approved by the University of Arizona's Human Subjects Committee.

3.1 Description of Subjects

This study focused on a sample of female crutch users in Tucson, Arizona. In total ten subjects were included in the study. Five permanent crutch users were introduced by Dr. Reich and Dr. Kloeping. Five temporary users participated voluntarily. They were randomly picked from University Medical Center patients who recently used crutches. The researcher asked subjects' willingness to participate in this study via telephone or through face-to-face explanation.

3.2 Data Collection and Instrumentation

There were two phases in this study. In phase I, a personal interview and a priority designed questionnaire were used to collect information for designing certain items of clothing for the permanent crutch user participants. Body measurements needed were listed in the last part of questionnaire I. In phase II(A), garments were designed for each case and evaluated by the subject for preference. In phase II(B), the researcher designed and constructed the most preferred design for each subject, then this prototype was tried on and evaluated by each case.

3.2-1 Description of Phase I

The description of phase I is addressed under the following headings:

(1) Development of questionnaire I: The questionnaire and measurement chart were designed based on related research (Reich & Goldsberry, 1989; Reich & Otten, 1980; United States Department of Commerce, 1970) (Appendix C).

Section 1 of questionnaire I consisted of information related to personal physical disability, data of the subject's causative factor, devices, body changes and movement limitation. In section 2, questions were developed to elicit personal clothing preference. In addition, thirty-eight critical body measurements, identified from the PS42-70, along with personal information, was listed at the end of the questionnaire.

(2) Measurement of subjects: A new plastic tape and a goniometer (for shoulder slope measurement) were used as measurement instruments. The same person (the researcher) measured each subject according to the measurement chart. Subjects using underarm crutches were asked to be in their own foundation garments, and to stand in a natural stance for measuring.

Thirty-eight body measurements were obtained from each of the subjects. Due to the asymmetric figure of the permanent crutch user, some measurements were taken on both right and left side of the subject's bodies. Measurements taken were listed in Appendix F (United States Department of Commerce, 1970).

3.2-2 Description of Phase II

Questionnaire II(A) and II(B) were depicted as following:

(1) Development of questionnaire II(A): Based on the results of reviewing the literature and personal interviews along with questionnaire I, fashion sketches for three different designs for each of five items were developed. The next step involved discussion of the garment designs. The researcher explained design details in the sketch. Five open-ended questions dealt with personal choice and opinions regarding each item (Appendix D).

(2) Development of questionnaire II(B): After completion of the preferred prototype garment for each subject, an open-end questionnaire was devised to obtain the subject's evaluation (Appendix E).

3.3 Design of Garments

Design features of five items; dress, blouse, skirt, pant, and jacket, were drawn from the results of related literature and questionnaire I. The related research emphasized that underarm gussets, back active pleats, elasticized waistlines, and zipper fasteners were suitable design details to underarm crutch users. The results from personal needs of every permanent subject showed false pockets on jackets, reinforcement on certain areas, and avoidance of large front side openings were important features for mobility. Therefore, the design of garments were incorporated the following:

(1) Dress: An adjustable waistline, underarm gussets, a front zipper opening and active back pleats were common features in three designs (Fig. 1). Various sleeve styles like enlarged armhole sleeves, set-in sleeves and

raglan sleeves, suggested in results of questionnaire I, were incorporated in each dress design. The center front zipper was camouflaged in the princess line or by pin tucks.

(2) Blouse: Three designs featured different front openings, such as buttons, zipper, and side openings (Fig. 2). Elasticized waistline, underarm gussets, and back side pleats were featured in the blouse designs. Set-in sleeves, enlarged armhole sleeves and kimono sleeves were the three varieties of sleeve styles incorporated in the blouse designs.

(3) Skirt: Basically, the skirts were gathered skirts (Fig. 3). The only difference between the skirt designs was the waistband treatment and the position of fasteners. The skirt length remained lower than knees for camouflage leg braces.

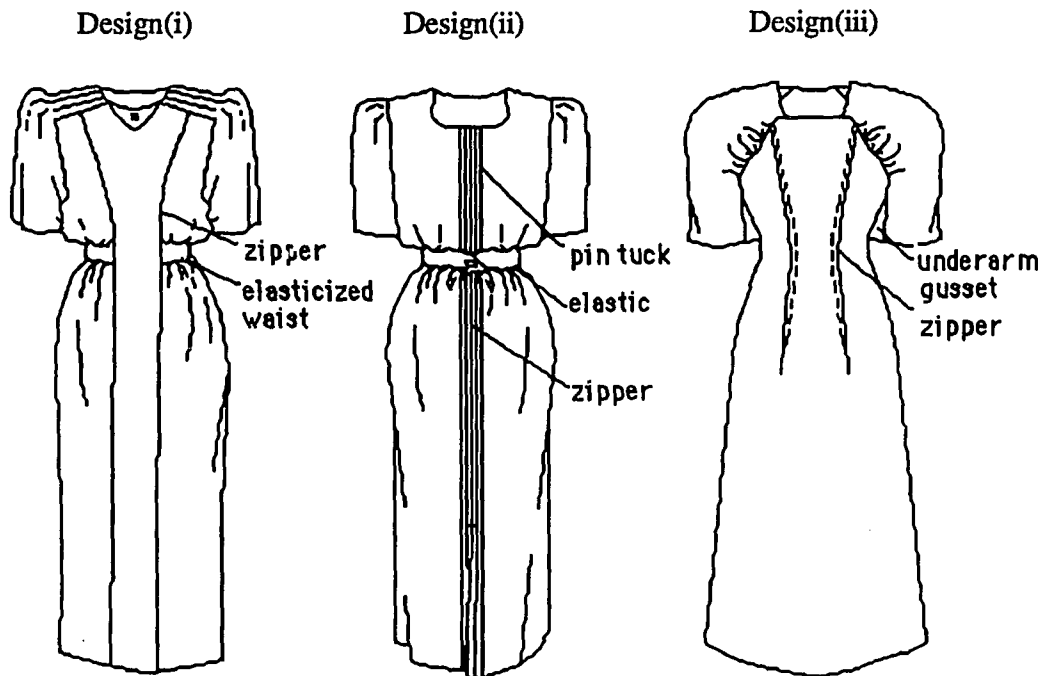
(4) Pant: In design 1, non-waistband was adopted for a shorter front crotch length, and the side panel decoration was for reinforcement. Zipper openings were through the hems of design 1 and 2 for easy dressing. Regardless of pant style, part or all of the waistlines were elasticized (Fig. 4).

(5) Jacket: Similar features of the three jackets were buttons, underarm gussets and false pockets. The difference between jackets were the neckline, hem and center front. The back of all three jackets still retained side pleats and vents (Fig. 5). The application of false pockets is to prevent catching crutches.

For construction of designed clothing: The researcher utilized the Japanese pattern making method along with body measurements for each of the five permanent crutch users to construct the garment patterns. The

FIGURE 1: DRESS DESIGNS AND DETAILS EXPLANATION

(1) FRONT:



(2) BACK:

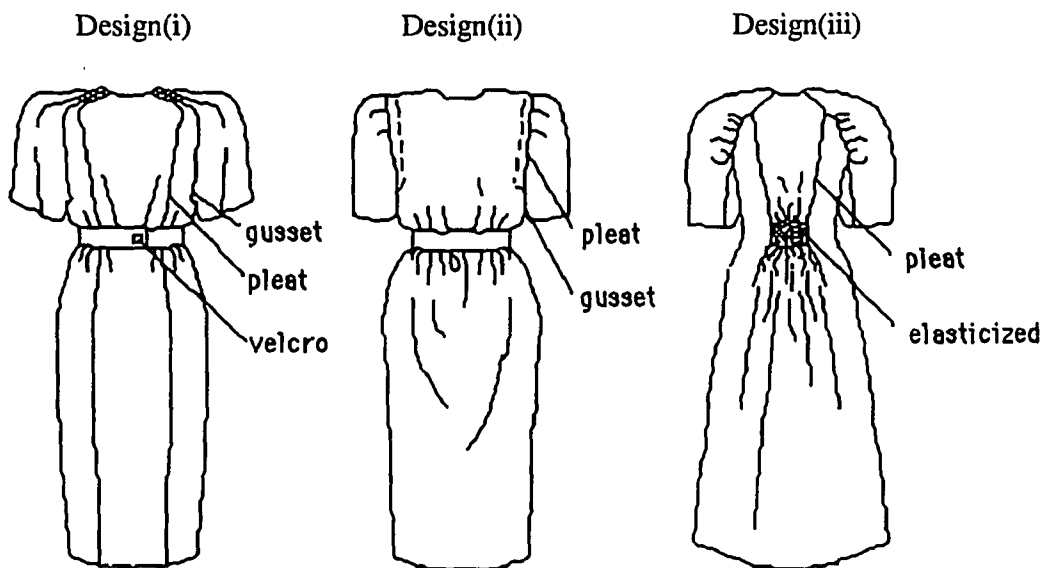
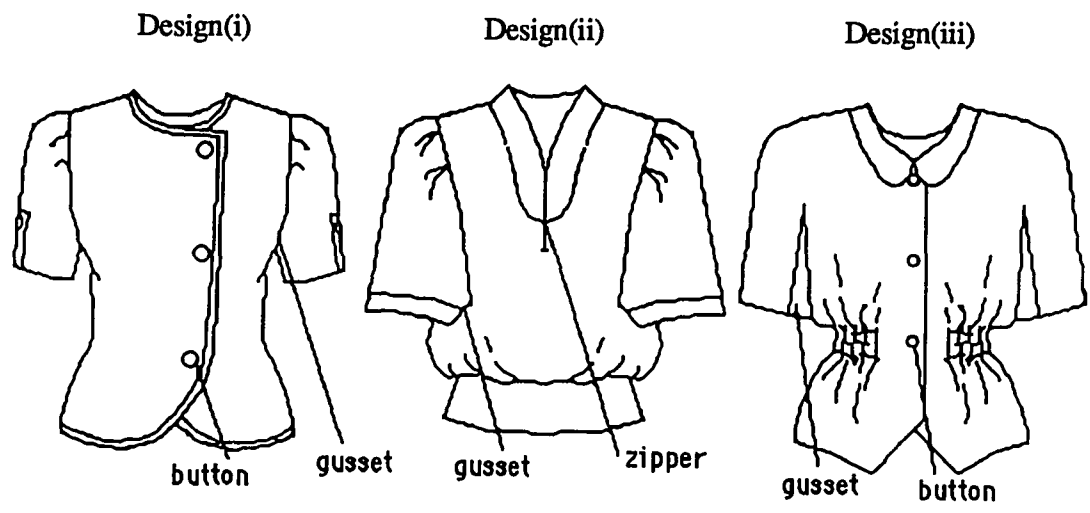


FIGURE 2: BLOUSE DESIGNS AND DETAILS EXPLANATION

(1)FRONT:



(2)BACK:

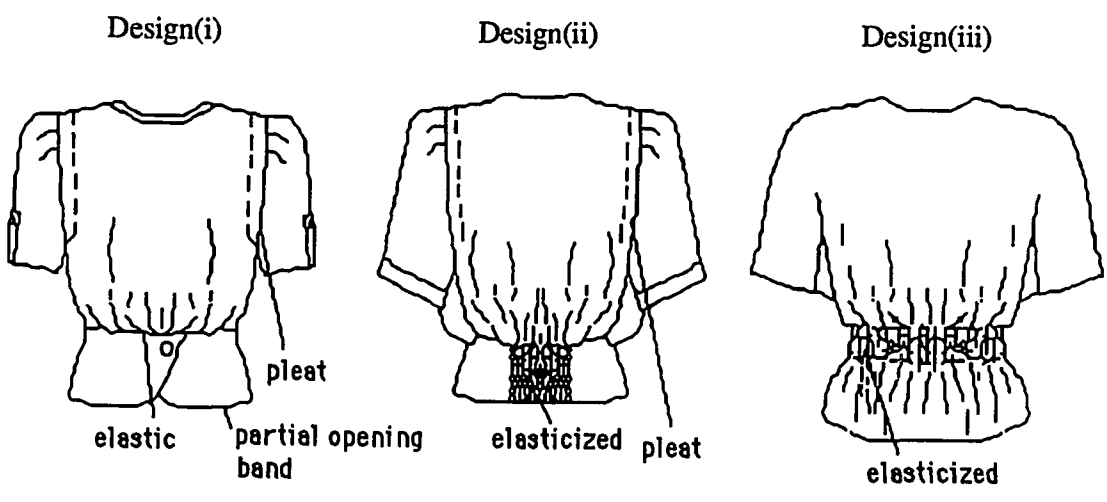
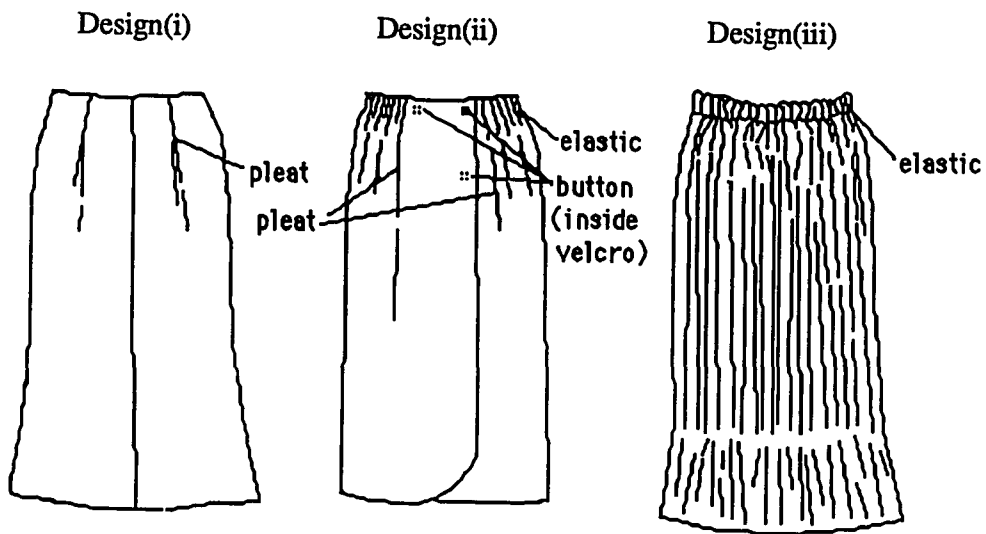


FIGURE 3: SKIRT DESIGNS AND DETAILS EXPLANATION

(1)FRONT:



(2)BACK:

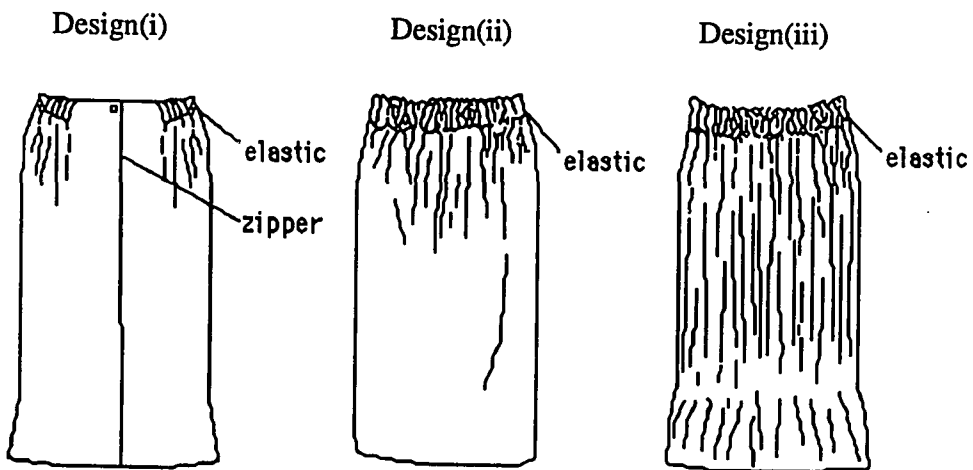
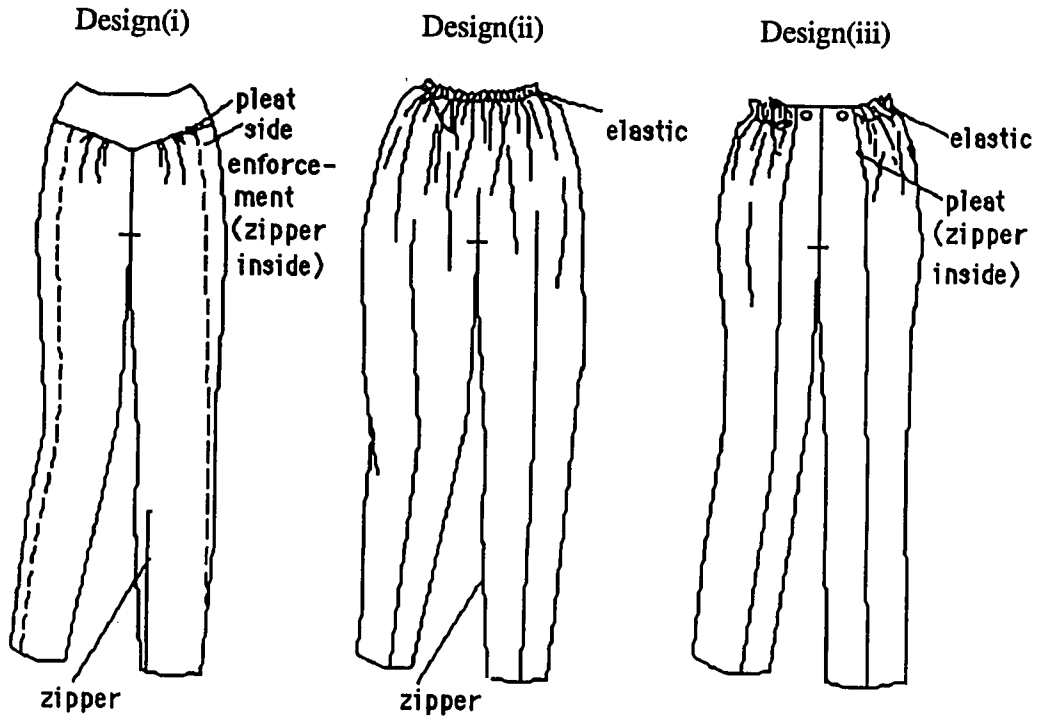
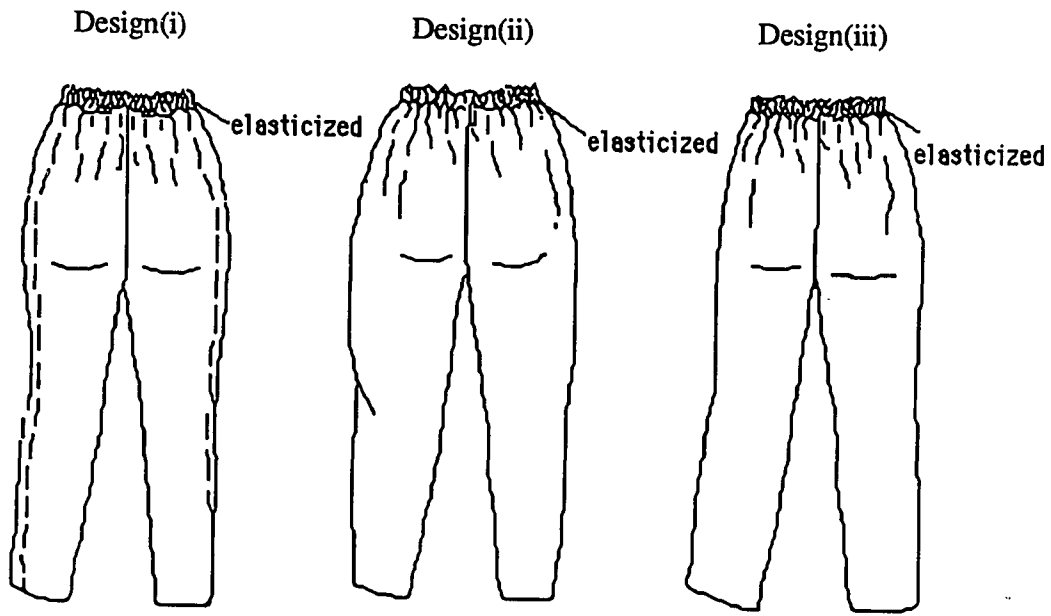


FIGURE 4: PANT DESIGNS AND DETAILS EXPLANATION

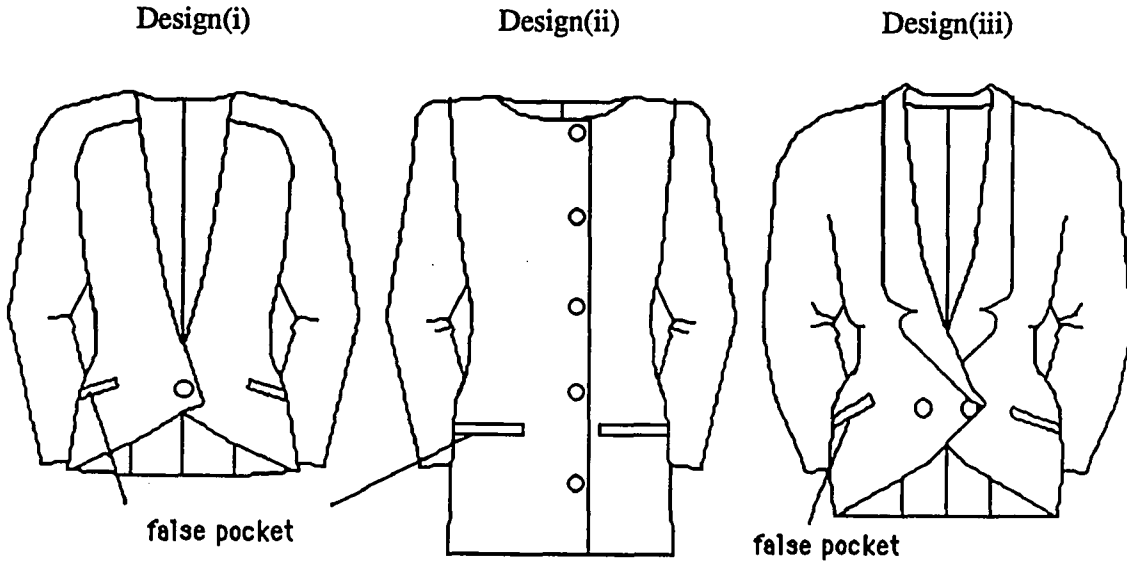
(1)FRONT:



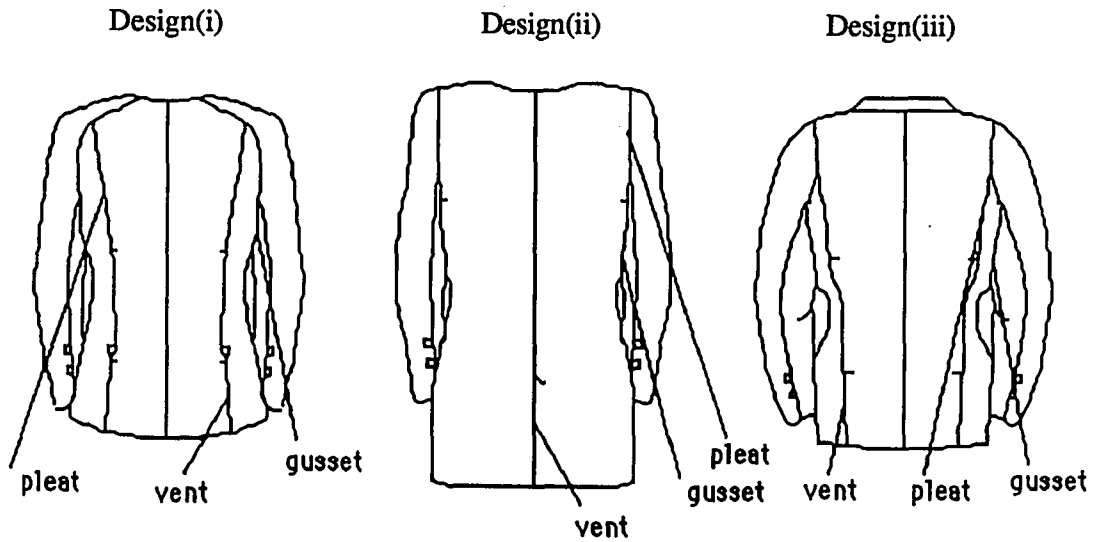
(2)BACK:



(1)FRONT:



(2)BACK:



general rules for camouflaging side to side measurement differences were keeping shoulder slope the same, by utilizing shoulder pads, retaining the horizontal hem, and maintaining the waistline and armholes on their positions without restraint.

3.4 Analysis of Data

3.4-1 Phase I

The data obtained from questionnaire I, were presented by a matrix of the raw-data, which contained all the original information collected about each subject. Other information of personal experience about clothing problems were recorded in the form of notes. The body measurements comparing figures of permanent crutch users and temporary crutch users were based on the PS42-70. The difference between measurements of subjects and PS42-70 were listed in the same weight category. If one item contained more than one number, the average would represent this measurement.

3.4-2 Phase II(A)

The data of questionnaire II(A) were organized in a raw-data matrix. Descriptive statistics were utilized to for clothing evaluations and the opinions of each subject.

3.4-3 Phase II(B)

Descriptive statements were used to describe each subject's satisfaction and evaluation of preferred garment prototype.

CHAPTER 4

RESULTS AND DISCUSSION

The results and discussion of this investigation are presented under different headings. Tables or descriptive analysis were utilized for best demonstrating the outcomes. The five permanent crutch users were labeled number one to number five, and number six to number ten identified temporary users.

4.1 Questionnaire I

During the personal interview of phase I, utilizing questionnaire I, the researcher found only one permanent crutch user, subject number four, who bought or wore specially designed clothing. She owned some custom made clothing and few R-T-W garments. Therefore, there was only one permanent crutch user who wore specially designed clothing.

In Table 4.1, the preferred price range is listed under the five items; dress, blouse, skirt, pant, and jacket. The preferred dress price for six subjects was \$60 or below. Fifty percent of the subjects preferred the price of blouse, skirt, and pant not to be higher than \$40. Besides that, \$80 was the upper price for a jacket for all but one subject. Subject 2 never wore skirts. Another interesting phenomenon was the preferred price range of subject 4, they were always on the upper end. According to the subject, price did not matter as she had most of her garments custom made to fit.

Cotton and blend fabrics were favored by eight of the ten subjects (Table 4.2). The permanent users all liked blends more than cotton while the temporary users preferred cotton. During the interview process, the

TABLE 4.1
PREFERRED PRICE RANGE (Questionnaire I)

	PERMANENT USERS					TEMPORARY USERS				
	1	2	3	4	5	6	7	8	9	10
DRESS										
below \$40	X	X				X				
\$40-\$60		X	X		X		X	X		X
\$60-\$80										
\$80-\$100									X	
above \$100				X						
BLOUSE										
below \$20		X	X		X	X				
\$20-\$40	X	X					X	X	X	
\$40-\$60										X
\$60-\$80				X						
\$80-\$100				X						
above \$100				X						
SKIRT										
below \$20	X	-				X				
\$20-\$40			X		X		X	X	X	
\$40-\$60										X
\$60-\$80				X						
\$80-\$100				X						
above \$100				X						
PANT										
below \$20		X			X	X				
\$20-\$40	X		X				X	X	X	
\$40-\$60										X
\$60-\$80				X						
\$80-\$100				X						
above \$100				X						
JACKET										
below \$40	X		X		X	X				
\$40-\$60		X						X		
\$60-\$80							X		X	X
\$80-\$100										
\$100-\$120										
\$120-\$140										
above \$140				X						

TABLE 4.2
PREFERRED FABRIC CHARACTERISTICS (Questionnaire I)

	PERMANENT USERS					TEMPORARY USERS				
	1	2	3	4	5	6	7	8	9	10
CONTENT										
Cotton	X		X		X	X	X	X	X	X
Wool	X			X	X					
Acrylic		X	X							
Polyester		X		X						
Linen							X	X		X
Mohair										
Modacrylic										
Nylon										
Blends	X	X	X	X	X			X	X	X
TEXTURE										
soft or fuzzy						X	X		X	
smooth or slippery	X					X	X	X	X	
coarse and rough										
firm and stable	X	X						X		
stretch and recover	X	X		X	X		X	X		
all			X							X

permanent crutch users revealed many reasons for choosing specific fabrics, while the temporary users always directly showed their preference. The permanent users valued function highly. This may be the reason for there being a different approach to decision making.

Six users, four of them permanent crutch users, liked stretch and recover fabrics. In Table 4.2 , results showed that most of the temporary crutch users preferred soft and smooth fabrics, which only one permanent user chose. The permanent crutch users do care about the safety and mobility function of fabrics. Their choice automatically avoids slippery fabrics for safety, coarse and rough fabrics for avoiding pressure on their bodies, and stretch and recovery fabric for more freedom. Only subject 3 chose all fabrics, the researcher assumes this might be because of her personal characteristics, not caring much about clothing. On the whole , five permanent crutch users liked smooth, stable, or stretch and recover fabrics.

The personal preferred styles of permanent crutch users showed a difference with that of temporary users. Set-in sleeve, buttoned cuff, jewel neckline, shawl collar, and bloused silhouette were preferred styles of permanent crutch users. This is why, questionnaire II(A) was based on the results presented in Table 4.3 to determine the favorite garment designs. Set-in sleeves, enlarged armhole sleeves, and raglan sleeves were adopted as sleeve details. Due to most of the permanent crutch users mentioning that a lower jewel neckline was their preference, enlarged jewel neckline and a V-neck neckline became neckline details. The convertible and shawl

TABLE 4.3
PREFERRED STYLES (Questionnaire I)

	PERMANENT USERS					TEMPORARY USERS				
	1	2	3	4	5	6	7	8	9	10
<u>SLEEVE</u>										
set-in	X	2		X	X					
raglan		X	2			X				
kimono								X		
enlarged armhole	2		X	2	2		X		X	X
dropped										
<u>CUFF</u>										
buttoned	X			X	2					
ribbed		X	2	2					X	
elastic		2	X							X
none	2				X	X	X	X		
<u>NECKLINE</u>										
jewel	2	X	X	X	2		X	X		X
V-neck	X	2			X				X	
U-neck				2		X				
bateau			2							
<u>COLLAR</u>										
turtle neck			X			X				X
convertible		X		X	2	X		X	X	
shawl	X	2	2	2	X					
frill	2									
<u>SILHOUETTE</u>										
A-line					X					X
boxy		2								
princess	X	X				X				
tapered							X			
bloused	2		2	X	2			X	X	
X-line			X	2						
empire										
low-waist										
x	best preferred									
2	second preferred									

collar were collar details. Bloused silhouette and princess silhouette were used for garment design shapes.

Other personal information gleaned from the interviewing activity found that the subjects mostly did their laundry themselves and dry cleaned if necessary. Some of them thought side pockets and sometimes long side openings would restrict their mobility. All permanent crutch users did not like back openings, especially blouse designs with back buttons opening all the way to the waist. Five permanent subjects found extra fabric always lays on the front waist/abdomen area when they sat down, because of their shorter front crotch length.

4.1-1 Choice of Comparison with Standard Garment Sizing (PS42-70) (APPENDIX G)

The subject's measurements were compared with the standard in the same weight category. If the weight deviated from the standard, back waist length, and stature were used as other reference points to choose compatible sizes.

(1) Case 1: Size juniors 11, size misses petite 12 and half-sizes 12 1/2 are three possible sizes for comparable fit with the subject's measurements. Due to the fact that the stature and back waist length weight of misses petite 12 is similar to that of the subject, misses petite 12 becomes the best comparable standard size of subject #1.

(2) Case 2: Misses petite 12 is the only suitable standard size for the measurements of the subject #2.

(3) Case 3: Half-size 16 1/2, with matching stature and waist length, is a good fit.

(4) Case 4: Based on finding a standard size with similar weight, bust and back waist length, women's 38 is the closest fit.

(5) Case 5: Half-size 12 1/2 is the best standard size when compared with the measurements of subject #5.

(6) Case 6: Although the difference of stature and back waist length are bigger than one inch, misses 8 is still the closest standard size for the subject.

(7) Case 7: Misses tall size 12 is the closest standard size for subject #7.

(8) Case 8: Size junior 11 provides the best measurement match to subject #8.

(9) Case 9: Misses tall size 14 is the most suitable standard size when compared with the measurements of subject #9.

(10) Case 10: It was difficult to determine the best standard size for this subject. Misses 20 and misses tall 20 have almost the same weight range. The researcher, therefore, picked the closest stature for the comparable standard size, that is size misses 20.

4.1-2 Comparison with Permanent and Temporary Crutch Uses

The measurement differences with the standard size of each subject are listed separately by upper torso and lower torso in Table 4.4. Some measurements were taken over braces; brackets were used to mark these measurement items. Bust (full), upper arm, bust (front arc), cross-back width, and cross-chest width were chosen to represent the upper torso

TABLE 4.4
SUBJECTS' MEASUREMENTS COMPARED WITH STANDARD
(Questionnaire I)

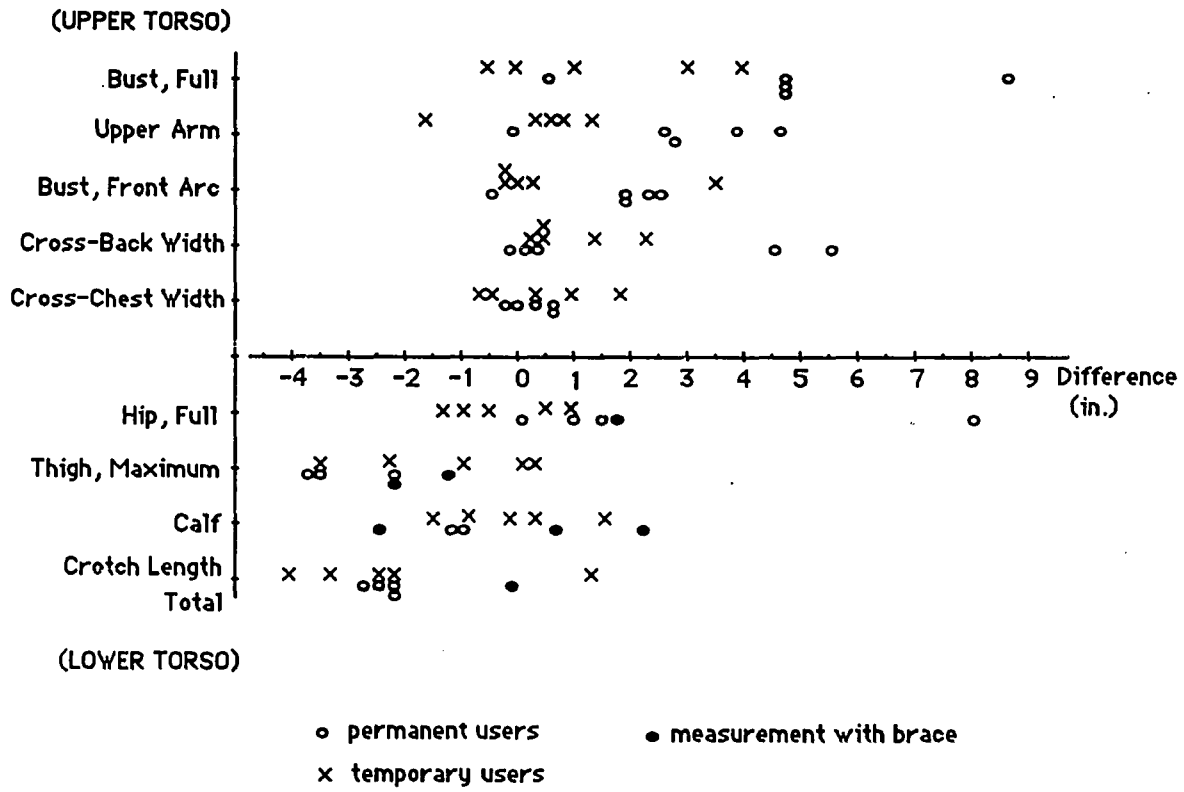
MEASUREMENT DIFFERENCE	PERMANENT USERS					TEMPORARY USERS				
	1	2	3	4	5	6	7	8	9	10
UPPER TORSO										
Bust, Full	+4 3/4	+4 3/4	+8 3/4	+4 3/4	+1/2	0	+1	+1/2	+4	+3
Upper Arm	+2 1/2	+2 9/16	+3 3/4	+4 1/2	-1/4	+5/16	+15/16	+5/8	+1 1/4	-1 5/8
Bust, Front Arc	+2 3/4	+2	+2	+2 3/8	-1/4	+1/2	+1/4	0	+3 3/4	0
Cross-Back Width	+3/8	-1/8	+4 1/2	+5 1/2	+1/4	+1/4	+3/8	+3/8	+2 1/4	+1 3/8
Cross-Chest Width	+5/8	0	+5/8	-1/4	+3/8	+1	-5/8	-1/2	+1 7/8	+3/8
LOWER TORSO										
Hip, Full	+1	0	+8	(+1 3/4)+1 1/2	+1/2	-1 1/4	-1/2	-1	+1	
Thigh, Maximum	(-2 1/4)	(-1 1/8)	-3 3/4	-3 1/2	-2 1/4	-2 3/16	+1/4	-1	0	-3 1/2
Calf	(-2 1/2)	(+5/8)	-1	-1 1/8	(+2 1/8)	-7/8	+1 1/2	-1/8	+5/16	-1 1/2
Crotch Length, Total	-2 5/8	-2 3/8	-2 3/8	(-1/8)	-2 7/8	-2 5/8	-3 3/8	+1 1/4	-4 1/8	-2 3/8
()	with brace									
+	larger									
-	smaller									

measurements. Hip (full), thigh (maximum), calf, and crotch length (total) were the major measurements of the lower torso.

Figure 6 is the diagram of measurement differences and the deviation of upper torso and lower torso between permanent and temporary crutch users. In this study, the measurement differences of bust, upper arm, and cross-back width of permanent users were distributed to the right of the zero column. This means the measurements were bigger than the standard. Moreover, some lower torso measurements of permanent crutch users were measured over braces, so in fact the true difference might be smaller than the one in brackets. This means measurements of thigh, calf, and total crotch length of permanent crutch users were smaller than the standard. For this reason, therefore, the upper torso of five permanent crutch users was generally larger than their lower torso. The measurement data of the five temporary crutch users did not show the upper torso obviously larger than their lower torso.

The distribution of upper torso measurement differences of permanent crutch users were skewed more to the right than that of temporary crutch users, and, the lower torso difference was distributed more to the left of zero. On the other hand, the difference of measurements of the temporary crutch users were more to the center of the 0 column. There seems to be a difference in the proportion of permanent crutch users to that of temporary crutch users.

FIG 6.
COMPARISON WITH PERMANENT AND TEMPORARY USERS
VS UPPER TORSO AND LOWER TORSO



4.2 Questionnaire II(A)

The five permanent crutch users were asked to participate in phase two, questionnaire II(A) of the study. During the garment design process many factors resulting from questionnaire I, discussed in a prior section, were taken into consideration. In questionnaire II(A), the results gleaned from the five open-end questions, suggested that all design considerations were useful and reactions to the designs were positive. Most of them thought at least one design of each item was suitable for their condition. Some of them replied that their preferred designs were attractive to them because of having had a similar favorite design.

4.2-1 Preferred Styles of Each Subject

In questionnaire II(A), subjects were asked to rank three designs from each garment category. Table 4.5 shows the five permanent crutch user's ranking (1 being high) of each style and item. The total numbers of ranking were shown on the right side of table. Taking a look at the right "total" column, dress design (i) was the best preferred design for the five permanent crutch user participants. The best blouse was design (ii). Skirt design (ii) and pant design (ii) were ranked as number one. Jacket design (ii) was ranked as best. The center front long V-shape opening of the jacket was criticized as not suitable for one case, because of catching crutches.

Subjects were asked to select a pair of best preferred designs for their trial of a prototype and evaluation in questionnaire II(B). All the preceding number one ranked designs had been chosen after questionnaire II(A). Development and evaluation of the prototype was the next phase.

TABLE 4.5
PREFERRED DESIGNS (Questionnaire IIA)

	PERMANENT USERS					total
	1	2	3	4	5	
<u>DRESS</u>						
(i)	1	2	2	2	1	8
(ii)	2	1	3	1	3	10
(iii)	3	3	1	3	2	12
<u>BLOUSE</u>						
(i)	1	3	2	3	2	11
(ii)	3	1	1	1	1	7
(iii)	2	2	3	2	3	12
<u>SKIRT</u>						
(i)	3	3	3	3	1	13
(ii)	1	2	1	1	2	7
(iii)	2	1	2	2	3	10
<u>PANTS</u>						
(i)	3	2	3	3	1	12
(ii)	2	1	2	1	2	8
(iii)	1	3	1	2	3	10
<u>JACKET</u>						
(i)	3	2	2	3	1	11
(ii)	1	1	3	1	3	9
(iii)	2	3	1	2	2	10

1-- best preferred
2-- second preferred
3-- third preferred

4.2-2 Factors in Selecting Styles

Fit was the most important factor in selecting styles for these subjects (TABLE 4.6). Other factors like function, fabric and esthetics changed with different design items. Occasion was the factor least considered. Other factors not represented in the questionnaire II(A) mentioned by subject #5, were cost and color. All factors were examined in various situations; one was presented by interview/questionnaire and the other was the prototype trial by the real subjects.

4.3 Questionnaire II(B)

In the end of questionnaire II(A), subjects were asked to choose one complete pair of the most preferred designs from the five garment items, and to select three favorite color cards from 70 colors. Questionnaire II(B) was submitted to the subjects for evaluation after trying on the prototype(s) of their choice. Every subject had a different disabling condition. However, fabric use strategies were the same, such as blend fabrics, knitted fabric as gussets, and knitted fabrics as part or as the complete waist band.

The prototype design to meet the personal needs and evaluation of each participant will be discussed by case individually.

4.3-1 Case 1

This subject is a business woman. She had poliomyelitis thirty-six years ago. Now she's having slight symptoms of osteoarthritis, but it doesn't effect her mobility or everyday life. She wears a brace on her right

TABLE 4.6
FACTORS IN SELECTING STYLES (Questionnaire IIA)

	PERMANENT SUBJECTS				
	1	2	3	4	5
<u>DRESS</u>					
Function	X	X		X	
Fabric	X	X		X	X
Fit	X	X	X	X	X
Esthetic		X	X	X	X
Occasion		X			
<u>BLOUSE</u>					
Function	X	X	X	X	
Fabric	X	X		X	X
Fit	X	X	X	X	X
Esthetic		X	X		X
Occasion	X				
<u>SKIRT</u>					
Function	X	X	X	X	
Fabric	X			X	X
Fit	X	X	X	X	X
Esthetic			X		X
Occasion			X		
<u>PANT</u>					
Function		X	X	X	X
Fabric	X	X		X	X
Fit	X	X	X	X	X
Esthetic			X		X
Occasion					
<u>JACKET</u>					
Function	X	X	X	X	X
Fabric	X	X		X	X
Fit	X	X	X	X	X
Esthetic		X	X	X	X
Occasion					

leg but there is no movement limitation of her extremities. She does not use dressing devices.

The subject selected jacket design (ii) and skirt (ii) as her prototypes. These designs were more suitable for her working wardrobe. The researcher selected a peach basket weave fabric with 45%/55% polyester/cotton blend as the suiting fabric, and 100% polyester plain weave for the lining. The materials including fabrics and notions cost approximately \$25.

The length of the original jacket design was shortened since the subject is also a wheel chair user. Figure 7.1 shows the subject in her own clothing, and Figure 7.2 presents the subject wearing the prototype design garments. A few visible improvements were introduced in the underarm area, and the skirt hem area. Underarm gussets ameliorate the function of sleeves. The different locations of waist height measurement, front, back, left and right, was used to adjust patterns for improved proportion and better perspective.

The subject approved this prototype very much; she would like to stay with this style. She liked the fit and the fabric choice for its breathability as she perspires easily. In conclusion, she liked the garments.

4.3-2 Case 2

Spina bifida is the cause of subject two's disability. She has had this birth defect for 41 years, and it requires her to wear long leg braces on both legs and restricts her left leg's movement. Lifting her left leg to a right

FIGURE 7.1

Subject #1 in Her Own Garments

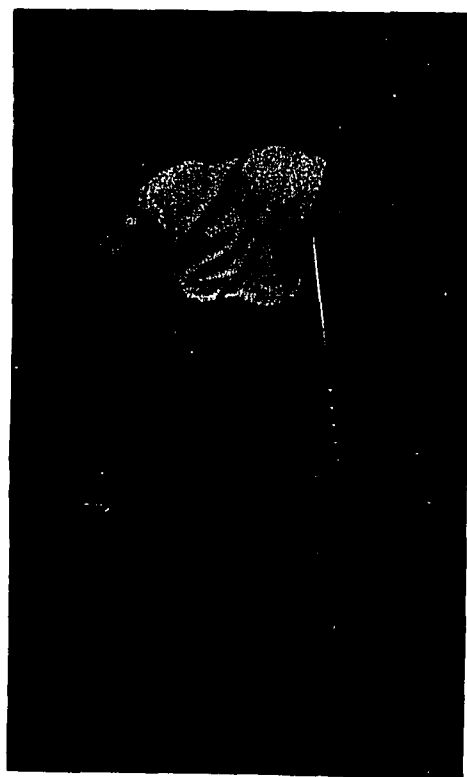
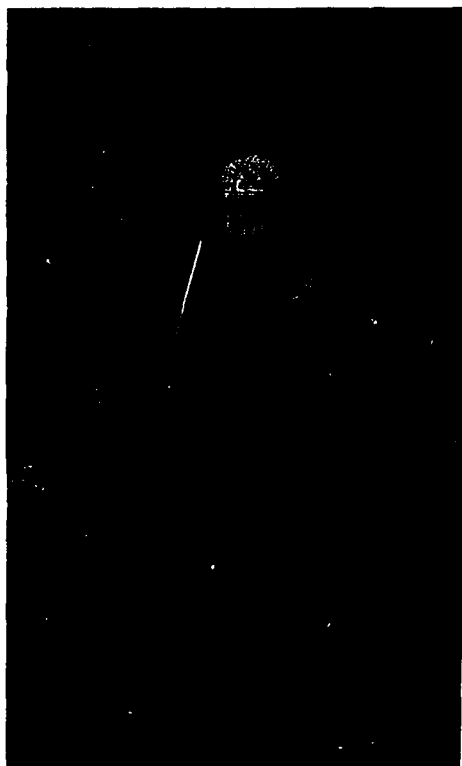
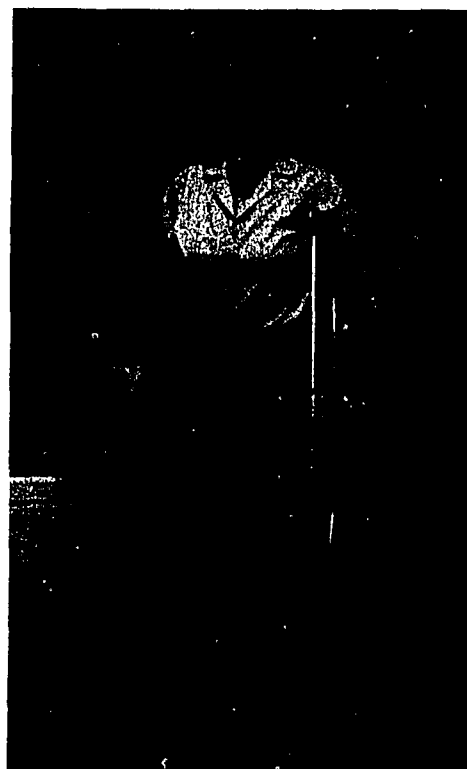


FIGURE 7.2

Subject #1 in the Prototype Designs



angle is impossible. She never wears a skirt, and only sometimes wears dresses. Dress design (ii) was her prototype selection.

A dark blue and white floral print was selected for subject two. This plain fabric with little slub yarns, imitating linen fabrics, contained 50%/50% polyester and rayon. The ideal belt fabric should have been a knit, but the researcher was unable to match the color. Similar dark blue fabric was chosen for the waist band with elastic added inside the center back. The total price of fabric and notions was about ten dollars.

Figure 8.1 and Figure 8.2 present the different sets of dressing results. When subject two wore her personal wardrobe, the total figure didn't appear symmetric, especially the lower torso proportion. The largest improvement of the designed garment appeared in the area of the waist, underarm, and skirt hem. It is this researcher's opinion that subject two should always wear a skirt, because a skirt camouflages her disproportion and is more suitable to her condition.

Dress design (ii) still was her best choice after trying the garment provided plenty of arm room, was easy to move around in and the center front zipper fastener were characteristics she preferred in this garment.

4.3-3 Case 3

Subject number three had spina bifida, a birth defect, for 25 years. As a working woman, she uses both wheelchair and crutches. Spina bifida along with an ostomy affects almost all parts of her body, except neck, upper back, and hands. She doesn't wear any braces. She can't bend

FIGURE 8.1

Subject #2 in Her Own Garments

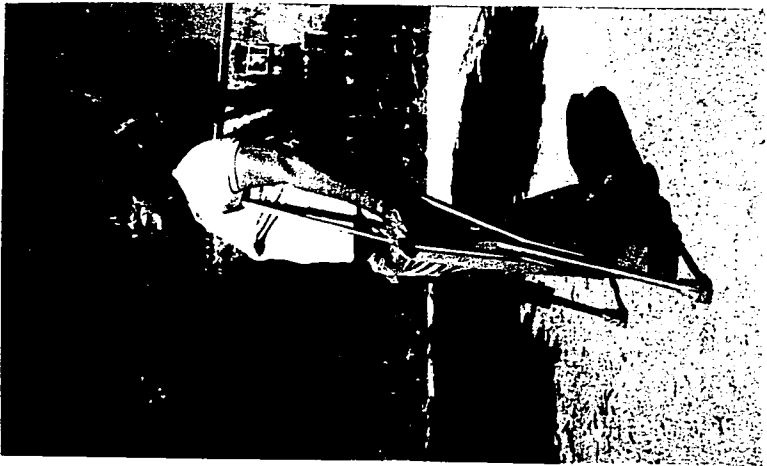
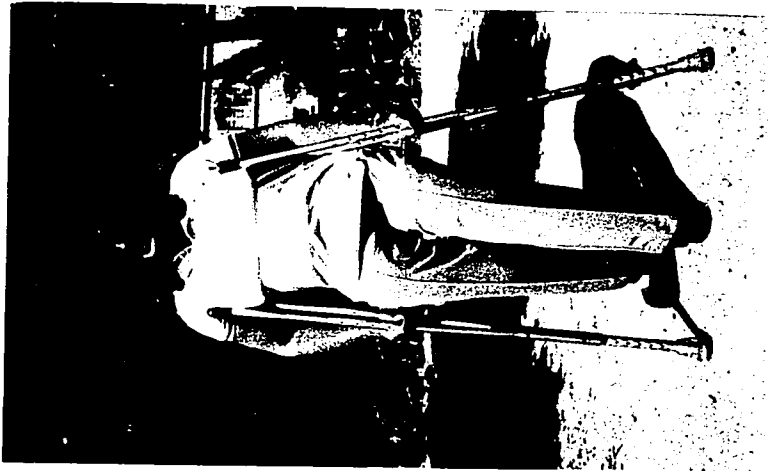


FIGURE 8.2

Subject #2 in the Prototype Designs



forward to a right angle so it requires her to lie on the bed for donning pants or skirts. She does not use dressing devices.

The subject chose jacket design (iii) and skirt design (ii) as her prototype designs. She had never worn a jacket or a two-piece suit before. This was an opportunity to consider it. The shorter center front of the jacket design (iii) was suitable for her when using the wheelchair. A royal blue fabric with small black plaid was chosen. The fabric contained 50% polyester and 50% rayon. The suit's lining was made from a 100% polyester fabric. The price of fabric and notions was approximately \$30.

The photographs in Figure 9.1 show the subject in her own dress. If compared with Figure 9.2, when subject wore the designed garments, one can find underarm and skirt hem area improved as there is less displacement.

The subject didn't consider changing her design choice, because she really liked this suit. The underarm gussets and the way the skirt lays were attractive to her. She thought everything was taken into consideration, and the garments were very comfortable, attractive, and suitable for her professional situation. In fact, she believed she would enjoy her first experience of wearing a suit.

4.3-4 Case 4

Poliomyelitis is the major cause of subject four's disability. For about 51 years she has worn leg braces, and a heavy body corset. Now, being overweight aggravates her condition. There is no movement limitation

FIGURE 9.1

Subject #3 in Her Own Garments



FIGURE 9.2

Subject #3 in the Prototype Designs



except for her left leg which can't bend to a right angle. She also does not use dressing devices.

In her business, she rarely wears a skirt, and only sometimes wears a dress. She still chose a pant and a blouse for her prototype designs. Blouse design (ii) and pant design (ii) were her choice.

A pink solid knitted 50/50 polyester/cotton fabric was selected for the blouse and a pink solid plain 81% polyester and 19% rayon fabric, with resiliency, for the pant. The cost of materials was about \$18.

The subject wears a heavy body corset accentuating the importance of fitting and ease of garments. Figure 10.1 points out the necessity of ease at her waist and right leg. The proportion of upper torso is quite apparently larger than the lower torso (Table 4.4). How to add ease in the lower torso and the balance the proportion of upper torso became a predominant consideration in pattern construction. In Figure 10.2, photographs present the outcome of the designed garments. The shortcoming of right leg, upper arm, and back width area were already camouflaged.

The subject liked the stretch fabric and the garment design which provided a lot of freedom through the shoulders and in the upper arm. The separates give her flexibility in fitting the top and bottom. She thought both fit satisfactorily. The only thing the subject didn't particularly care for was the color. The researcher was unable to find suitable fabric in the darker coral of her choice.

FIGURE 10.1

Subject #4 in Her Own Garments



FIGURE 10.2

Subject #4 in the Prototype Designs



4.3-5 Case 5

Subject number five has had a birth defect, spina bifida, for about 57 years. It affected her body below the waist. She wears two long leg braces and can't lift her left leg. The right leg can only be lifted to 45 degrees. She can bend to 90 degrees when she sits, but she does not need dressing devices.

As a part-time worker she doesn't require special kinds of clothing. Dress design (i) was chosen for her prototype. A 50%/50% rayon/polyester blend and 100% polyester were chosen as her dress fabric and lining. The spring floral print and stylish center front line were used to camouflage her asymmetric body. Fabrics and notions cost about \$23.

Due to the position of the subject's legs, the skirt needed extra room (Fig. 11.1). The different degrees of shoulder slope showed the necessity of different sized shoulder pads. In Figure 11.2, it shows appropriate ease of skirt, shoulder pads, and the adjusted proportion of upper body. The underarm gussets also proved functional, although it was in an enlarged-armhole sleeve.

The subject would like to remain with her choice after trying it on. She liked the design features, such as the shoulder design and back pleats. The garment is also easy to put on and fits well.

4.3-6 Criteria for Evaluating Garment Designs (Table 4.7)

The last question of questionnaire II(B) asked subjects to evaluate the prototype design again. The result are shown in Table 4.7. Comfort, fit and aesthetics were important factors for all subjects. In the prior questionnaire

FIGURE 11.1

Subject #5 in Her Own Garments



FIGURE 11.2

Subject #5 in the Prototype Designs



asking factors in selecting styles (Table 4.6), esthetics wasn't mentioned. The different reaction may be as a result of real clothing; people having experience in choosing and trying on garments rather than only looking at clothing illustrations.

Other criteria in response to trial of prototype garments were quality of workmanship, and freedom to move when using crutches. These criteria also were the result of the experience of trying on the real garments.

TABLE 4.7
CRITERIA FOR EVALUATING GARMENT DESIGNS (Questionnaire IIB)

	PERMANENT USERS				
	1	2	3	4	5
Comfort	X	X	X	X	X
Fit	X	X	X	X	X
Fabric		X	X	X	X
Esthetics	X	X	X	X	X

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Although the sample size of this study was small, and the results can not be generalized, they can be used as reference points. In this research, permanent crutch users really showed stronger function valued orientation than temporary users. Permanent crutch users liked set-in sleeves and buttoned cuffs. Their preferred styles are totally different from those of temporary crutch users.

All five permanent crutch users consider function, fit, and fabric when they select clothing to fit their physical needs. Comfort and esthetics were other criteria found important considerations when they tried on garment prototypes. The researcher found that color may be an important factor, because subject #4 criticized the designed prototype garment's color as it didn't match the rest of her wardrobe.

The results of comparing the subjects' measurements with standard sizing showed that the proportion of permanent crutch users is different from that of temporary crutch users. The upper torso of permanent crutch users is larger than the lower torso. It is evident that separates are most suitable for the permanent crutch user. The permanent crutch user should rather look for different sizes for the upper and lower torso for best fit. Fit was the most important factor in selecting clothing for this sample. In other words, approaching fit beyond personal needs of case studies was the major purpose of making the garment prototypes. The evaluations of the

prototype designs were positive. It means the general rules of altering patterns, adjusting hem height, and modifying shoulder slope to the same level to get a well fitting garment are worthwhile. The measurement items are also an effective auxiliary in constructing a prototype.

Underarm gussets, upper back pleats, and an elasticized waist proved to be good features for incorporation in the design process. False pockets on jackets, medium skirt length, and no slits in skirts are the preferred style feature suggestions from the subjects.

Until now, the apparel industries in Taiwan have not explored clothing products for disabled people. The disabled people in Taiwan have difficulty in finding well fitting clothing as do the disabled people in the U.S.A. The results of this research of case studies could become a useful references for future implementation in Taiwan, thus enriching disabled people, not only in their appearance but also in their everyday lives.

5.2 Recommendations

Recommendations for further studies are that: 1. the sample be enlarged to determine the common characteristics of permanent crutch users; 2. replication of the study in Taiwan with a larger sample of permanent crutch users, to provide data on Taiwan's disabled people; 3. replication of the comparison of body measurements used in this study with a larger sample size, to distinguish between standard sizing and those of permanent crutch users, will also be useful to apparel designers of special needs clothing; 4. construction of a complete design paradigm of the garment altering processes for disabled people with similar

characteristics, would provide a basis for designers of special needs clothing.

APPENDIX A

Cover Letter



THE UNIVERSITY OF ARIZONA
TUCSON, ARIZONA 85721

COLLEGE OF AGRICULTURE
SCHOOL OF FAMILY AND CONSUMER RESOURCES

Dear Ms. :

Please let me introduce myself. I am Margaret Wu, a graduate student of clothing & Textiles at University of Arizona. Dr. Reich is my advisor. Recently I submitted a proposal for my master's thesis which includes case-studies of clothing for female crutch users. I am writing to inquire about problems you may have encountered with clothing. I would like permission to interview you at a mutually convenient time.

The purpose of my study is to investigate clothing design preferences and factors female crutch users consider when selecting clothing. My study will be divided into two phases. One is to invite you to participate in a personal interview to help develop a basic data base of clothing needs of female crutch users. The second phase is to design and illustrate several basic clothing items and obtain your reaction as to how well they meet your needs.

I will be very grateful if you would become a participant of my study. Enclosed are my address and phone number. Please don't hesitate to call or write me! A stamped envelope is enclosed for your response.

Sincerely yours

Margaret Wu.
Jan. 6, 1990.

Tel: (602) 882-0892 evenings
cc. Dr. Naomi Reich

APPENDIX B

Consent Form



THE UNIVERSITY OF ARIZONA
TUCSON, ARIZONA 85721

COLLEGE OF AGRICULTURE
SCHOOL OF FAMILY AND CONSUMER RESOURCES

CONSENT FORM

**CLOTHING FOR THE FEMALE CRUTCH USER:
CASE STUDIES OF THE CLOTHING WORN BY
THE MIDDLE CLASS AMERICAN FEMALE CRUTCH USER**

YOU ARE BEING ASKED TO READ THE FOLLOWING MATERIAL TO ENSURE THAT YOU ARE INFORMED OF THE NATURE OF THIS RESEARCH STUDY AND OF HOW YOU WILL PARTICIPATE IN IT IF YOU CONSENT TO DO SO. SIGNING THIS FORM WILL INDICATE THAT YOU HAVE BEEN SO INFORMED AND THAT YOU GIVE YOUR CONSENT. FEDERAL REGULATIONS REQUIRE WRITTEN INFORMED CONSENT PRIOR TO PARTICIPATION AND CAN DECIDE TO PARTICIPATE OR NOT PARTICIPATE IN A FREE AND INFORMED MANNER.

We would like to invite you to volunteer to take part in the research project named above. The purpose of my study is to investigate clothing design preferences and factors female crutch users considered when selecting clothing. You are being invited to participate because you are using crutches. Approximately 10 subjects will be enrolled in this study.

If you agree to participate, you will be asked to agree to the following: The study will be divided into two phases. One is to invite you to participate in a personal interview to help develop a basic data base of clothing needs of female crutch users. Thirty-eight critical body measurements for garment design will be taken over the subjects foundation garments in inches. The second phase is to design and illustrate several basic clothing items and obtain your reaction as to how well they meet your needs. Each questionnaire will take about thirty minutes of your time. For permanent crutch users, risks are possible allergy to fabrics.

If you agree to participate, your responses will be completely confidential and no individual responses will be revealed. There will be no cost to you for participating and you will not be paid. The benefits of the result is potential for better fitting clothing via investigator's designs.

Thank you for your cooperation.



THE UNIVERSITY OF ARIZONA
TUCSON, ARIZONA 85721

COLLEGE OF AGRICULTURE
SCHOOL OF FAMILY AND CONSUMER RESOURCES

IN GIVING MY CONSENT BY SIGNING THIS FORM, I AGREE THAT THE METHODS, INCONVENIENCES, RISKS, AND BENEFITS HAVE BEEN EXPLAINED TO ME AND MY QUESTIONS HAVE BEEN ANSWERED. I UNDERSTAND THAT I MAY ASK QUESTIONS AT ANY TIME AND THAT I AM FREE TO WITHDRAW FROM THE PROJECT AT ANY TIME WITHOUT CAUSING BAD FEELINGS. MY PARTICIPATION IN THIS PROJECT MAY BE ENDED BY THE INVESTIGATOR OR BY THE SPONSOR FOR REASON THAT WOULD BE EXPLAINED. NEW INFORMATION DEVELOPED DURING THE COURSE OF THIS STUDY WHICH MAY AFFECT MY WILLINGNESS TO CONTINUE IN THIS RESEARCH PROJECT WILL BE GIVEN TO ME AS IT BECOMES AVAILABLE. I UNDERSTAND THAT THIS CONSENT FORM WILL BE FILED IN AN AREA DESIGNATED BY THE HUMAN SUBJECTS COMMITTEE WITH ACCESS RESTRICTED TO THE PRINCIPAL INVESTIGATOR, MENG-HUI M. WU, OR AUTHORIZED REPRESENTATIVE OF THE CLOTHING AND TEXTILES DEPARTMENT. I UNDERSTAND THAT I DO NOT GIVE UP ANY OF MY LEGAL RIGHTS BY SIGNING THIS FORM. A COPY OF THIS SIGNED CONSENT FORM WILL BE GIVEN TO ME.

Subject's Signature

Date

I have carefully explained to the subject the nature of the above project. I hereby certify that to the best of my knowledge the person who is signing this consent form understands clearly the nature, demands, benefits, and risks involved in her participation and her signature is legally valid. A medical problem or language or educational barrier has not precluded this understanding.

Signature of Investigator

Date

APPENDIX C

Questionnaire I

PHASE I QUESTIONNAIRE

I. This section of the questionnaire deals with information relation to your physical handicap:

1. Please check the main causative factor of your disability which required your using underarm crutches?

- Accidental causes
- Arthritis: Rheumatoid Osteoarthritis
- Amputation
- Cerebral palsy
- Diabetis
- Multiple Sclerosis
- Military Combat
- Muscular Dystrophy
- Poliomyelitis
- Spina Bifida
- Others: _____

2. Do you have another disease or limitation which aggravates your condition?

- incontinence
- ostomy
- mastectomy
- burns
- none
- others _____

3. Are you a temporary or permanent crutch user?

- temporary: yrs months
- permanent: yrs months

4. Your disability affects the following parts and joints of your body: (check all applicable)

- | | |
|--------------------------------------|--|
| <input type="checkbox"/> neck area | <input type="checkbox"/> knee |
| <input type="checkbox"/> below waist | <input type="checkbox"/> upper leg |
| <input type="checkbox"/> upper back | <input type="checkbox"/> lower leg |
| <input type="checkbox"/> lower back | <input type="checkbox"/> ankle |
| <input type="checkbox"/> hips | <input type="checkbox"/> feet or toes |
| <input type="checkbox"/> hands | <input type="checkbox"/> others: _____ |

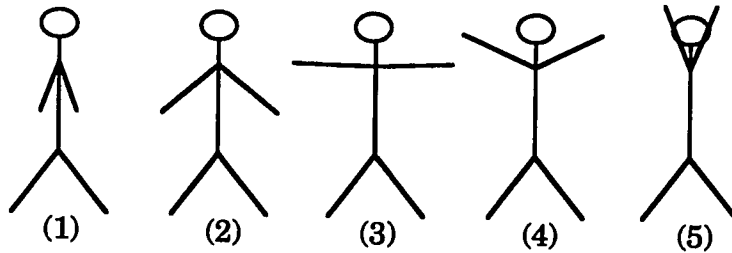
5. What kind of brace does your disability require?

83

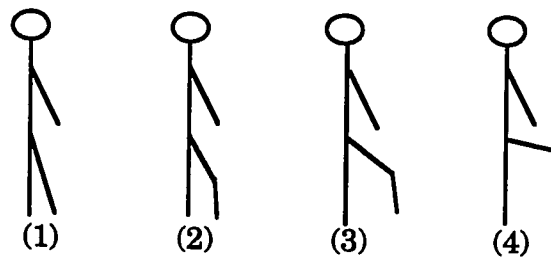
- neck
- body
- leg
- none
- others: _____.

6. Circle the following illustration which best describe any range of what you can't do.

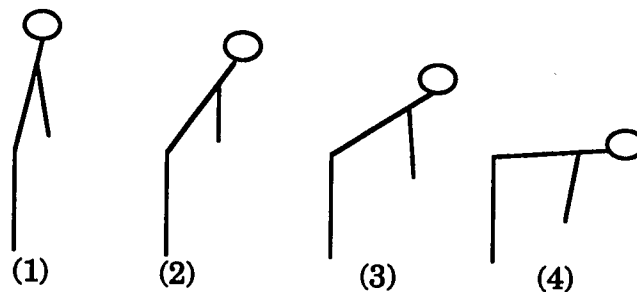
(A) Arm movement:



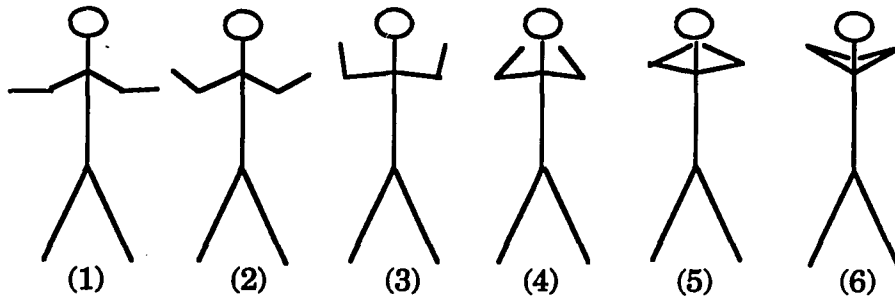
(B) knee and leg movement:



(C) Waist movement:

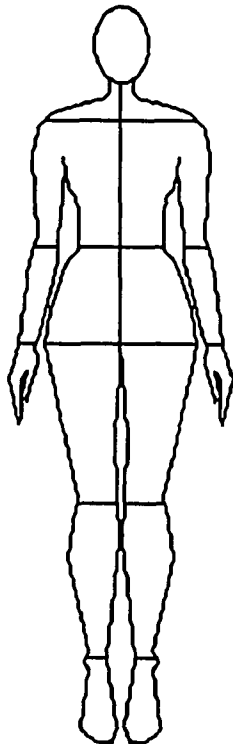


(D) Elbow movement:

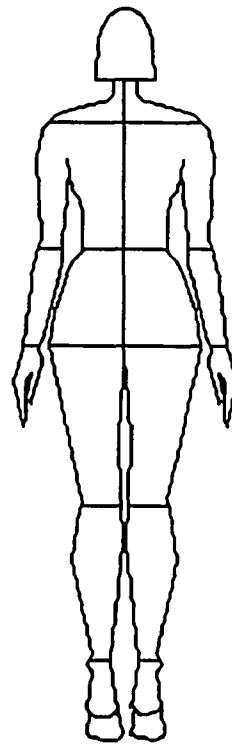


7. What parts of your body shows irregularly because of your physical impairment? (Please circle the location) front and back on the figures below.

FRONT



BACK



II. The section deals with information relating to design of special clothing⁸⁵

1. Did you ever buy or wear specially designed clothing which is suitable for your condition?

yes
 no, skip Q.2.

2. Are you satisfied with the functional design of your clothing?

yes, why: _____
 no, why: _____

3. What size garments do you buy in ready-to-wear?

SIZE	BRAND NAME (give it if you can)
<input type="checkbox"/> unknown	
<input type="checkbox"/> dress	_____
<input type="checkbox"/> blouse	_____
<input type="checkbox"/> skirt	_____
<input type="checkbox"/> pants	_____
<input type="checkbox"/> jacket	_____

4. What price range are you prepared to pay in dollars for a specially designed garment?

Dress below \$40.00
 \$40-\$60
 \$60-\$80
 \$80-\$100
 above \$100

Blouse below \$20.00
 \$20-\$40
 \$40-\$60
 \$60-\$80
 \$80-\$100
 above \$100

Skirt below \$20.00
 \$20-\$40
 \$40-\$60
 \$60-\$80
 \$80-\$100
 above \$100

Pants below \$20.00
 \$20-\$40
 \$40-\$60
 \$60-\$80
 \$80-\$100
 above \$100

Jacket below \$40.00
 \$40-\$60
 \$60-\$80
 \$80-\$100
 \$100-\$120
 \$120-\$140
 above \$140

5. Are you allergic to a fabric/fiber?

No.
 Yes, which fiber/fabric? _____
 and in what way? _____
 (Rash, dermatitis, itching etc.)

6. What fiber content do you prefer in fabric?

<input type="checkbox"/> cotton	<input type="checkbox"/> linen
<input type="checkbox"/> wool	<input type="checkbox"/> mohair
<input type="checkbox"/> acrylic	<input type="checkbox"/> modacrylic
<input type="checkbox"/> polyester	<input type="checkbox"/> nylon
<input type="checkbox"/> blends	<input type="checkbox"/> others: _____

7. What fabric texture do you prefer?

soft and fuzzy surface
 smooth and slippery
 coarse and rough
 firm and stable
 stretch and recover
 all
 others: _____

8. Do you perspire easily?

yes. no.

9. Do you do your laundry yourself?

yes. no.

10. Do you prefer to have your garments dry cleaned?

yes no.

11. Do you dress independently?

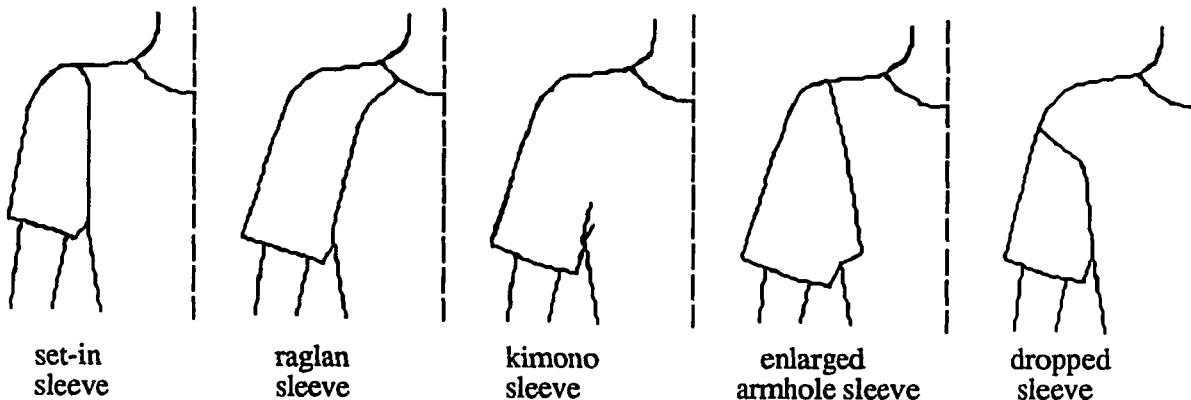
yes. no.

12. Do you need devices in your dressing activity?

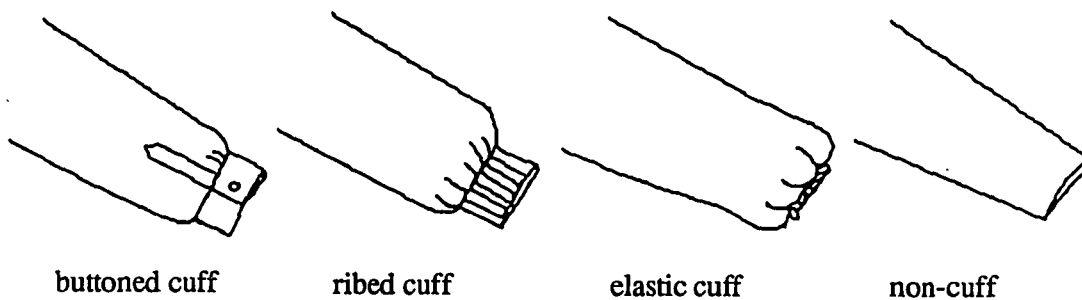
yes, what kind: _____
 no.

13. Please circle the most preferred one from each category.

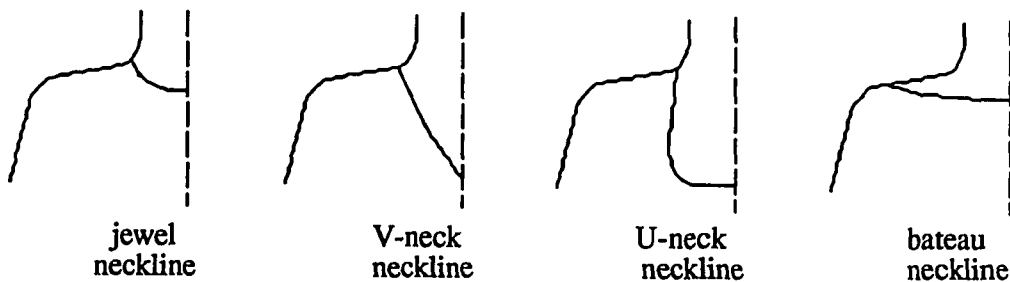
(a) Sleeve



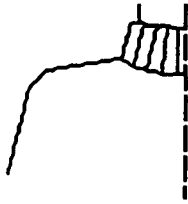
(b) Cuff



(c) Neckline



(d) Collar



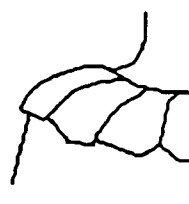
**turtleneck
collar**



**convertible
collar**



**shawl
collar**



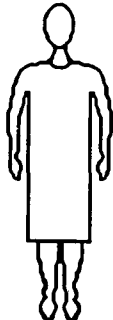
**frill
collar**

(e) Silhouette

A-line



Boxy



Princess



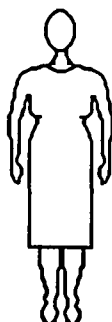
Tapered



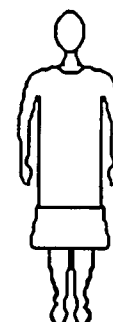
Bloused



X-line



Empired



Low-waist

III. Body measurements: (in inch)

Standing Girth & ARC Measurements

NB	WB	
_____	_____	1. Neck, Base (button-type collar location)
_____	_____	2. Bust, Full
_____	_____	3. Waist
_____	_____	4. Hips, Full
<u> L </u> <u> R </u>	<u> L </u> <u> R </u>	5. Thigh, Maximum
<u> L </u> <u> R </u>	<u> L </u> <u> R </u>	6. Knee, (Kneecap)
<u> L </u> <u> R </u>	<u> L </u> <u> R </u>	7. Calf
<u> L </u> <u> R </u>	<u> L </u> <u> R </u>	8. Upper Arm (level of armscye - arm down)
<u> L </u> <u> R </u>	<u> L </u> <u> R </u>	9. Elbow (over bone with arm bent)
<u> L </u> <u> R </u>	<u> L </u> <u> R </u>	10. Wrist
<u> L </u> <u> R </u>	<u> L </u> <u> R </u>	11. Vertical Trunk - Total (shoulder /inseam /shoulder)
<u> L </u> <u> R </u>	<u> L </u> <u> R </u>	12. Vertical Trunk - Front (shoulder to front inseam)
<u> L </u> <u> R </u>	<u> L </u> <u> R </u>	13. Vertical Trunk - Back (inseam to back shoulder)
_____	_____	14. Bust, Front Arc-- Standing

Vertical Measurements

_____	_____	15. Waist Length, Back (cervical to waist)
<u> L </u> <u> R </u>	<u> F </u> <u> B </u>	16. Waist Height, Back (to floor)
<u> L </u> <u> R </u>	<u> L </u> <u> R </u>	17. Crotch Height (inseam to floor)
<u> L </u> <u> R </u>	<u> L </u> <u> R </u>	18. Knee Height (from crease at back of knee to floor)

Width and Length Measurements

_____	_____	19. Cross-Back Width (from arm breakpoint to breakpoint)
_____	_____	20. Cross-Shoulder Width (from shoulder/armscye to the point opposite)
_____	_____	21. Cross-Chest Width (from arm breakpoint to breakpoint)
_____	_____	22. Neck to Bust Point (from neck/shoulder to bust point)
<u> L </u> <u> R </u>	<u> L </u> <u> R </u>	23. Armscye to Waist (at underarm)
_____	_____	24. Waist to Hips (at underarm)
<u> L </u> <u> R </u>	<u> L </u> <u> R </u>	25. Shoulder Length (neck base to shoulder/armscye)

26. Arm Length, Shoulder to Elbow
(arm slightly bent)
27. Arm Length, Shoulder to Wrist
(arm slightly bent)
28. Crotch Length, Total
(front waist/inseam/back waist)
29. Crotch Length, Front (front waist/inseam)
30. Crotch Length, Back (inseam/back waist)
31. Cervical to Center front Waist
(from center back neck to center front waist)
32. Waist Length, Front
(from center front neck to center front waist)
33. Shoulder Slope (degree--left side)

Girth & Arc Seated Measurements

34. Sitting Spread -Seated (taken over hip)
35. Waist, Front -- Seated (arc measurement)
36. Abdominal, Front --Seated (arc measurement)

Height & Weight

37. Stature (Total Height)
38. Weight, Approximate (1 kg =2.2046 pounds)

PERSONAL INFORMATION: name: _____.

career: _____.

income: under \$5,000
 \$5,000--\$10,000
 \$10,000--\$15,000
 \$15,000--\$20,000
 \$20,000--\$25,000
 \$25,000--\$30,000
 \$30,000--\$35,000
 \$35,000--\$40,000
 above \$40,000

age: 18-29
 30-39
 40-49
 50-59
 60-69
 above 70

APPENDIX D

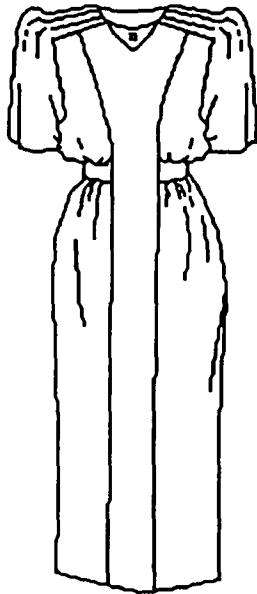
Questionnaire II(A)

PHASE II (A) QUESTIONNAIRE

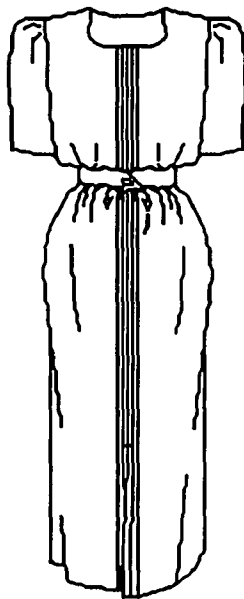
Please rank the designs below in order of preference(1 being best) and answer related questions from each section:

1. Dress:

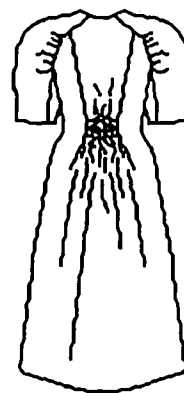
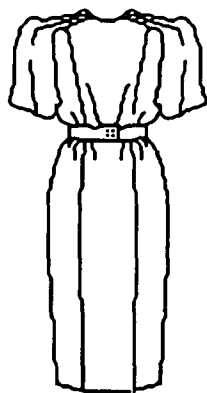
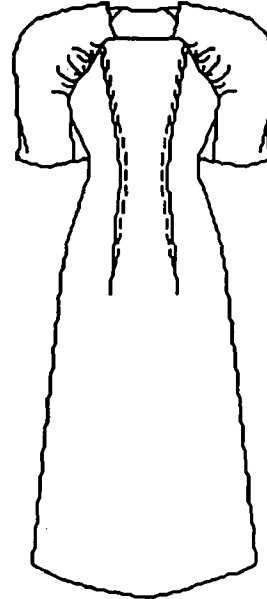
design(i)



design(ii)



design(iii)



(a) How often do you wear a dress?

- Never
- Sometimes

Frequently
 Always

(b) What factors did you consider when you selected the dress?

Function
 Fabric
 Fit
 Esthetics
 Occasion
 Others: _____

(c) Do you think design(i) is suitable for your condition?

Yes
 No

Why: _____

(d) Do you think design(ii) is suitable for your condition?

Yes
 No

Why: _____

(e) Do you think design(iii) is suitable for your condition?

Yes
 No

Why: _____

(f) Do you have any other reason for selecting your most preferred dress design from (i), (ii) or (iii)?

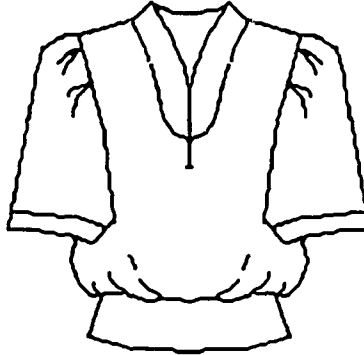
(g) Is your most preferred (#1) dress attractive to you because you ever have had a similar designed dress which was your favorite?

Yes
 No

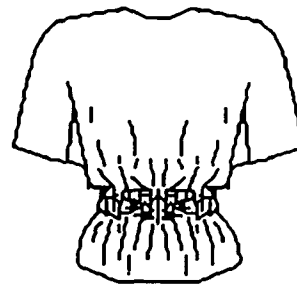
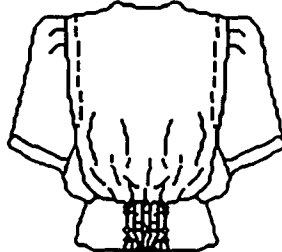
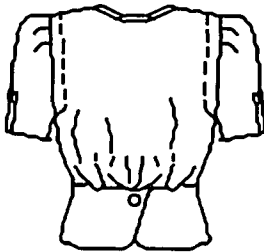
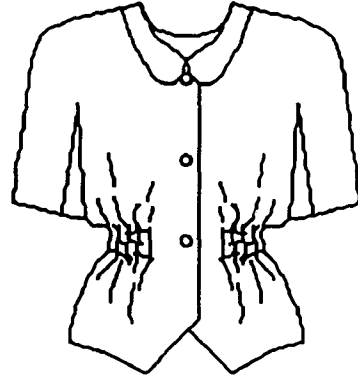
design(i)



design(ii)



design(iii)



(a) How often do you wear a blouse?

- Never
- Sometimes
- Frequently
- Always

(b) What factors did you consider when you selected the blouse?

- Function
- Fabric
- Fit
- Esthetics
- Occasion
- Others: _____

(c) Do you think design(i) is suitable for your condition?

- Yes
- No
- Why: _____

(d) Do you think design(ii) is suitable for your condition?

Yes

No

Why: _____

(e) Do you think design(iii) is suitable for your condition?

Yes

No

Why: _____

(f) Do you have any other reason for selection your most preferred blouse design from (i), (ii) or (iii)?

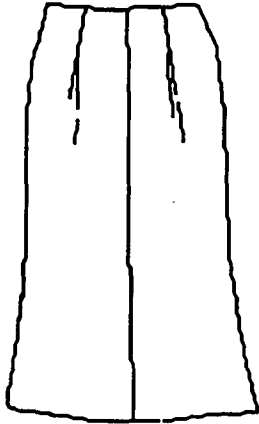
(g) Is your most preferred (#1) blouse attractive to you, because you ever have had a similar designed blouse which was your favorite?

Yes

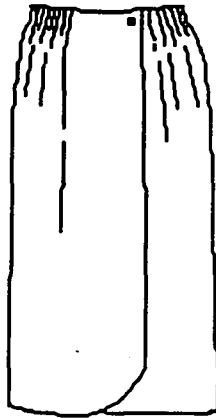
No

3. Skirt:

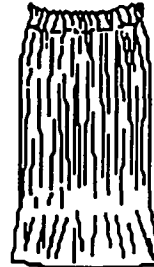
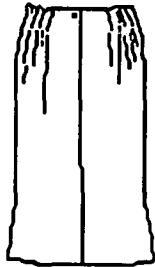
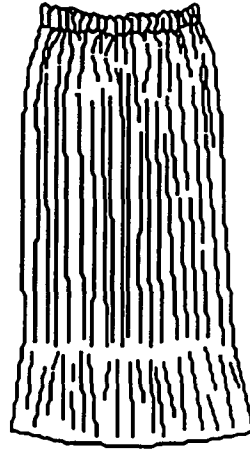
design(i)



design(ii)



design(iii)



(a) How often do you wear a skirt?

- Never
- Sometimes
- Frequently
- Always

(b) What factors did you consider when you selected the skirt?

- Function
- Fabric
- Fit
- Esthetics
- Occasion
- Others: _____

(c) Do you think design(i) is suitable for your condition?

- Yes
- No
- Why: _____

(d) Do you think design(ii) is suitable for your condition?

Yes

No

Why: _____

(e) Do you think design(iii) is suitable for your condition?

Yes

No

Why: _____

(f) Do you have any other reason for selection your most preferred skirt design from (i), (ii) or (iii)?

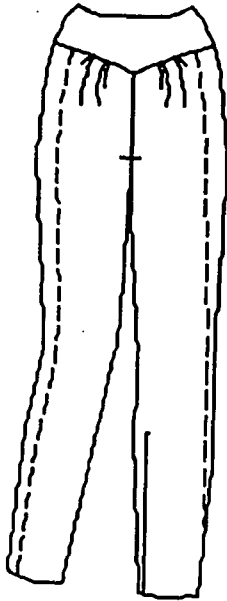
(g) Is your most preferred (#1) skirt attractive to you, because you ever have had a similar designed skirt which was your favorite?

Yes

No

4. Pant:

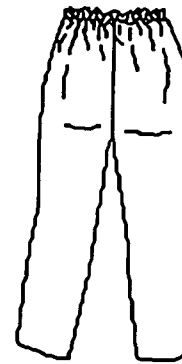
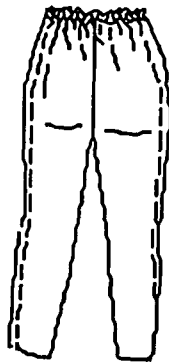
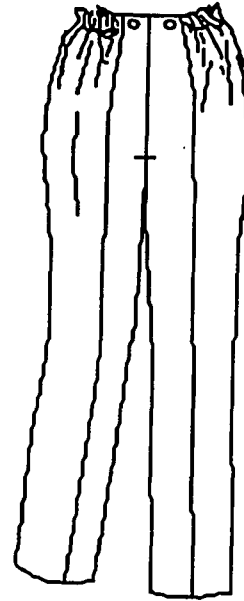
design(i)



design(ii)



design(iii)



(a) How often do you wear pants?

- Never
- Sometimes
- Frequently
- Always

(b) What factors did you consider when you selected the pants?

Function

Fabric

Fit

Esthetics

Occasion

Others: _____

(c) Do you think design(i) is suitable for your condition?

Yes

No

Why: _____

(d) Do you think design(ii) is suitable for your condition?

Yes

No

Why: _____

(e) Do you think design(iii) is suitable for your condition?

Yes

No

Why: _____

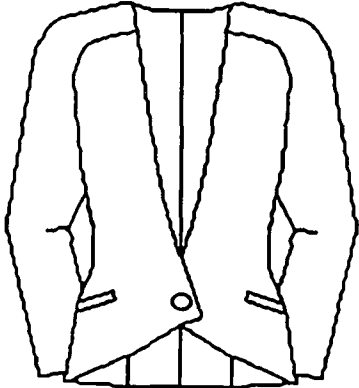
(f) Do you have any other reason for selection your most preferred pant design from (i), (ii) or (iii)?

(g) Is your most preferred (#1) pants attractive to you, because you ever have had a similar designed pants which was your favorite?

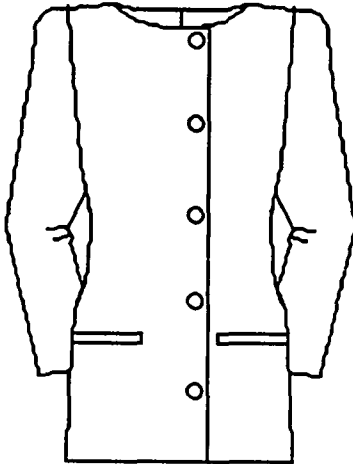
Yes

No

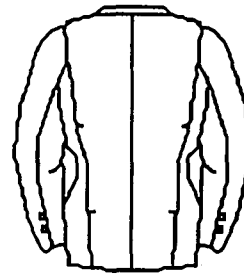
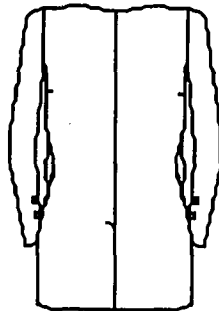
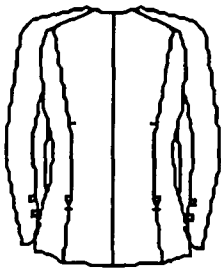
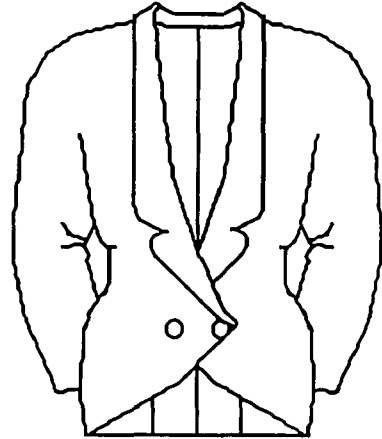
design(i)



design(ii)



design(iii)



(a) How often do you wear a jacket?

- Never
- Sometimes
- Frequently
- Always

(b) What factors did you consider when you selected the jacket?

- Function
- Fabric
- Fit
- Esthetics
- Occasion
- Others: _____

(c) Do you think design(i) is suitable for your condition?

Yes

No

Why: _____

(d) Do you think design(ii) is suitable for your condition?

Yes

No

Why: _____

(e) Do you think design(iii) is suitable for your condition?

Yes

No

Why: _____

(f) Do you have any other reason for selection your most preferred jacket design from (i), (ii) or (iii)?

(g) Is your most preferred (#1) jacket attractive to you, because you ever have had a similar designed jacket which was your favorite?

Yes

No

(h) How often do you wear two-piece suits?

Never

Sometimes

Frequently

Always

APPENDIX E

Questionnaire II(B)

PHASE II (B) QUESTIONNAIRE

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1. Did your choice remain the same after your evaluation?

Yes
 No, you'd rather try another design _____

2. Is the garment you tried really suitable for your condition?

3. Why do you like this garment?

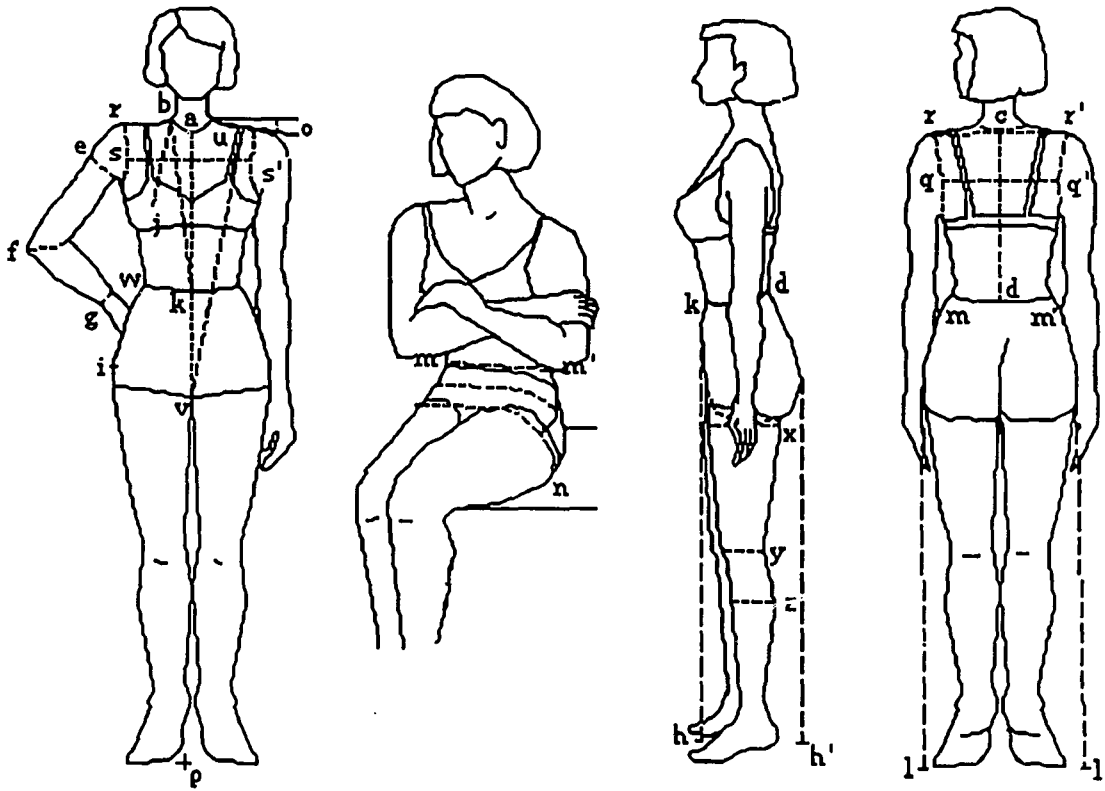
4. Why don't you like this garment?

5. What criteria did you use when you evaluated this garment design?

Comfort
 Fit
 Fabric
 Esthetics
 Others: _____

APPENDIX F

Body Measurements



- | | |
|---|---|
| 1. Neck, Base: a-c-a | 20. Cross-Shoulder Width: r-c-r' |
| 2. Bust, Full | 21. Cross-Chest Width: s-s' |
| 3. Waist | 22. Neck-Bust Point: b-j |
| 4. Hips, Full | 23. Armscye to Waist: t-w |
| 5. Thigh, Maximum: x-x | 24. Waist to Hips: w-i |
| 6. Knee: y-y | 25. Shoulder Length: r-b |
| 7. Calf: z-z | 26. Arm Length-Elbow: r-f |
| 8. Upper Arm: e-e | 27. Arm Length-Wrist: r-g |
| 9. Elbow: f-f | 28. Crotch Length, Total: k-v-d |
| 10. Wrist: g-g | 29. Crotch Length, Front: k-v |
| 11. Vertical Trunk-Total: u-v-u | 30. Crotch Length, Back: v-d |
| 12. Vertical Trunk-Front: u-v | 31. Cervical to Center Front Waist: c-b-k |
| 13. Vertical Trunk-Back: v-u | 32. Waist Length, Front: a-k |
| 14. Bust, Front Arc | 33. Shoulder Slope: o |
| 15. Waist Length, Back: c-d | 34. Sitting Spread: n-n |
| 16. Waist Height: F; k-h, B; d-h', L; m-l, R; m'-l' | 35. Waist, Front: m-m' |
| 17. Crotch Height: v-p | 36. Abdominal, Front |
| 18. Knee Height: y-h | 37. Stature |
| 19. Cross-Back Width: q-q' | 38. Weight |

DEFINITIONS:

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1. Neck, Base: Measured around the neck touching the cervical at the back, and the upper borders of the collar bone at the front.
2. Bust, Full: Measured Horizontally at the level of the maximum bust girth.
3. Waist: Measured horizontally at the waist level.
4. Hip, Full: Measured horizontally at the hip level.
5. Thigh, Maximum: Measured horizontally around the upper part of the leg, close up to the crotch.
6. Knee: Measurement horizontally around the leg over the knee cap.
7. Calf: Measurement horizontally around the calf at the level of maximum girth.
8. Upper Arm: With the arm down, measured around the arm with the upper edge of the tape measure at the level of the armscye.
9. Elbow: With the forearm at right angle to the upper arm, measure diagonally around the arm over the lower prominence on the elbow.
10. Wrist: Measured around the arm over the prominence at the lower end of ulna.
11. Vertical Trunk-Total: Measured from the middle point of the shoulder through the crotch back to the shoulder.
12. Vertical, Trunk-Front: Measured from the shoulder to front inseam.
13. Vertical Trunk-Back: Measured from inseam to back shoulder.
14. Bust, Front Arc: The front portion of the full bust from side seam to side seam.
15. Waist Length, Back: Measured along the spine from cervical to waist level.
16. Waist Height : Measured from waist to soles of feet.
17. Crotch Height: Measured from base of trunk to soles of feet.
18. Knee Height: Measured from knee to soles of feet.
19. Cross-Back Width: Measured across the back from armscye to armscye approximately at the same level as the cross-chest width.
20. Cross-Shoulder Width: Measured along the shoulder from one armscye line to another.
21. Cross-Chest Width: Measured across the front of the chest from armscye to armscye midway between shoulder and bottom of armscye.
22. Neck to Bust Point: Measured from intersection of shoulder and neck base to bust point.
23. Armscye to Waist: Measured from the mid-underarm point downward along the side of the body to the waist level.

24. **Waist to Hips:** Measured along the side of the body from the waist level to the hip point directly below.
25. **Shoulder Length:** Measured along a line corresponding to the customary shoulder line of a garment from the neck base line to the armscye line.
26. **Arm Length, Shoulder to Elbow:** Measured from the intersection of the armscye and shoulder lines along the outside surface of the arm to the greatest prominence of the elbow.
27. **Arm Length, Shoulder to Wrist:** Measured from the intersection of the armscye and shoulder lines along the outside surface of the arm, with arm slightly bend, over the elbow to the greatest prominence on the outside of the wrist.
28. **Crotch Length, Total:** Measured from waist level at the front through the crotch to the waist level at the back without constriction.
29. **Crotch Length, Front:** Measured from waist level at the front to the center of the inner thigh.
30. **Crotch Length, Back:** Measured from the center of the inner thigh to waist level at the back.
31. **Cervical to Center Front Waist:** Measured from cervical at center back, along the neck line to shoulder line and then down the figure to the waist level at the center front.
32. **Waist Length, Front:** Measured at center front from neck base girth line to waist level.
33. **Shoulder Slope:** Slope in degrees of the shoulder with respect to the horizontal.
34. **Sitting Spread-Seated:** Measured around hips at the most lateral extension of the hips, when the subject is seated.
35. **Waist, Front-Seated:** Measured around front waist arc, from side seam to side seam, at most lateral extension of the waist when the subject is seated.
36. **Abdominal, Front-Seated:** Measured the front arc around abdominal, from side seam to side seam, when the subject is seated.
37. **Stature:** Measured from crown to soles of the feet.
38. **Weight:** Taken with only foundation garments.

APPENDIX G

Subject's measurements

SUBJECT #1 MEASUREMENTS

MEASUREMENT ITEMS	SUBJECT'S (in.)	PS42-70(12P)	difference
1. Neck, Base	15 3/8		
2. Bust, Full	39 3/4	35	+4 3/4
3. Waist	31	26	
4. Hip, Full	38	37	+1
5. Thigh, Maximum	(19)	21 1/4	-2 1/4
6. Knee	(14 3/16)		
7. Calf	(10 1/4)	12 3/4	-2 1/2
8. Upper Arm	13	10 1/2	+2 1/2
9. Elbow	10		
10. Wrist	6 3/8		
11. Vertical Trunk-Total	59 1/8		
12. Vertical Trunk-Front	29 1/2		
13. Vertical Trunk-Back	29 5/8		
14. Bust, Front Arc	23	20 1/4	+2 3/4
15. Waist Length, Back	15 3/4	14 3/4	
16. Waist Height	38 1/4		
17. Crotch Height	(29 1/2)		
18. Knee Height	17 1/4		
19. Cross-Back Width	13 1/4	12 7/8	+3/8
20. Cross-Shoulder Width	16 1/2		
21. Cross-Chest Width	13	12 3/8	+5/8
22. Neck-Bust Point	13 1/2		
23. Armscye to Waist	10 1/4		
24. Waist to Hips	5 1/2		
25. Shoulder Length	4 3/4		
26. Arm Length-Elbow	12 1/8		
27. Arm Length-Wrist	22 1/8		
28. Crotch Length, Total	24 1/2	27 1/8	-2 5/8
29. Crotch Length, Front	10		
30. Crotch Length, Back	13 1/2		
31. Cervical to Center Front Waist	23		
32. Waist Length, Front	16 5/8		
33. Shoulder Slope	25.5		
34. Sitting Spread	39		
35. Waist, Front	17 1/2		
36. Abdominal	20		
37. Stature	61	60 1/2	
38. Weight	120	118	

() With Brace
+ Larger
- Smaller

SUBJECT #2 MEASUREMENTS

MEASUREMENT ITEMS	SUBJECT'S (in.)	PS42-70(12P)	difference
1. Neck, Base	14 1/2		
2. Bust, Full	39 3/4	35	+4 3/4
3. Waist	32	26	
4. Hip, Full	37	37	0
5. Thigh, Maximum	(20 1/8)	21 1/4	-1 1/8
6. Knee	(16 7/8)		
7. Calf	(13 3/8)	12 3/4	+5/8
8. Upper Arm	13 1/16	10 1/2	+2 9/16
9. Elbow	10 1/2		
10. Wrist	6 3/4		
11. Vertical Trunk-Total	56 1/2		
12. Vertical Trunk-Front	26		
13. Vertical Trunk-Back	30 1/2		
14. Bust, Front Arc	22 1/2	20 1/2	+2
15. Waist Length, Back	13 3/8	14 3/4	
16. Waist Height	36 5/16		
17. Crotch Height	29		
18. Knee Height	(20 5/8)		
19. Cross-Back Width	12 3/4	12 7/8	-1/8
20. Cross-Shoulder Width	14 3/4		
21. Cross-Chest Width	12 3/8	12 3/8	0
22. Neck-Bust Point	10 3/8		
23. Armscye to Waist	9		
24. Waist to Hips	3 1/2		
25. Shoulder Length	4 3/8		
26. Arm Length-Elbow	14		
27. Arm Length-Wrist	24 3/8		
28. Crotch Length, Total	24 3/4	27 1/8	-2 3/8
29. Crotch Length, Front	8 1/2		
30. Crotch Length, Back	16 1/4		
31. Cervical to Center Front Waist	19 5/8		
32. Waist Length, Front	13 1/2		
33. Shoulder Slope	15.5		
34. Sitting Spread	37		
35. Waist, Front	18 1/2		
36. Abdominal	21		
37. Stature	58 3/4	60 1/2	
38. Weight	117	118	

SUBJECT #3 MEASUREMENTS

MEASUREMENT ITEMS	SUBJECT'S (in.)	PS42-70(18 1/2)	difference
1. Neck, Base	17 1/4		
2. Bust, Full	48 3/4	40	+8 3/4
3. Waist	42 1/4	32	
4. Hip, Full	49	41	+8
5. Thigh, Maximum	20	23 3/4	-3 3/4
6. Knee	15		
7. Calf	12 5/8	13 5/8	--1
8. Upper Arm	16 3/8	12 5/8	+3 3/4
9. Elbow	11 1/4		
10. Wrist	6 13/16		
11. Vertical Trunk-Total	63 5/8		
12. Vertical Trunk-Front	30		
13. Vertical Trunk-Back	33 5/8		
14. Bust, Front Arc	25 1/2	23 1/4	+2 1/4
15. Waist Length, Back	14 1/2	15 1/8	
16. Waist Height	32 1/2		
17. Crotch Height	20 1/4		
18. Knee Height	12 3/4		
19. Cross-Back Width	18 1/2	14	+4 1/2
20. Cross-Shoulder Width	17		
21. Cross-Chest Width	13 1/2	12 7/8	+5/8
22. Neck-Bust Point	12 5/8		
23. Armscye to Waist	8		
24. Waist to Hips	4		
25. Shoulder Length	4 3/4		
26. Arm Length-Elbow	13 5/8		
27. Arm Length-Wrist	23 7/8		
28. Crotch Length, Total	28 1/2	30 7/8	-2 3/8
29. Crotch Length, Front	9		
30. Crotch Length, Back	19 1/2		
31. Cervical to Center Front Waist	20 11/16		
32. Waist Length, Front	17		
33. Shoulder Slope	12.5		
34. Sitting Spread	50		
35. Waist, Front	25 3/4		
36. Abdominal	31		
37. Stature	58	61 1/2	
38. Weight	160	153	

SUBJECT #4 MEASUREMENTS

MEASUREMENT ITEMS	SUBJECT'S (in.)	PS42-70(38)	difference
1. Neck, Base	17 1/2		
2. Bust, Full	46 3/4	42	+4 3/4
3. Waist	41	34	
4. Hip, Full	(44 3/4)	43	+1 3/4
5. Thigh, Maximum	21 1/2	25	-3 1/2
6. Knee	14		
7. Calf	13	14 1/8	-1 1/8
8. Upper Arm	17 3/4	13 1/4	+4 1/2
9. Elbow	12 5/16		
10. Wrist	7 1/4		
11. Vertical Trunk-Total	(70 1/4)		
12. Vertical Trunk-Front	(33 3/4)		
13. Vertical Trunk-Back	(36 1/2)		
14. Bust, Front Arc	27	24 5/8	+2 3/8
15. Waist Length, Back	18 1/2	16 1/4	
16. Waist Height	(37 1/4)		
17. Crotch Height	(27 3/4)		
18. Knee Height	(17 9/16)		
19. Cross-Back Width	20	14 1/2	+5 1/2
20. Cross-Shoulder Width	17		
21. Cross-Chest Width	13	13 1/4	-1/4
22. Neck-Bust Point	13 1/2		
23. Armscye to Waist	9 3/8		
24. Waist to Hips	6		
25. Shoulder Length	4 1/4		
26. Arm Length-Elbow	15 1/4		
27. Arm Length-Wrist	24 1/4		
28. Crotch Length, Total	(32)	32 1/8	-1/8
29. Crotch Length, Front	(15)		
30. Crotch Length, Back	(17)		
31. Cervical to Center Front Waist	22		
32. Waist Length, Front	13 3/4		
33. Shoulder Slope	8		
34. Sitting Spread	(46 1/2)		
35. Waist, Front	(19)		
36. Abdominal	(24 1/2)		
37. Stature	64	65 1/2	
38. Weight	180	173	

SUBJECT #5 MEASUREMENTS

MEASUREMENT ITEMS	SUBJECT'S (in.)	PS42-70(12 1/2)	difference
1. Neck, Base	14		
2. Bust, Full	36 1/2	36	+1/2
3. Waist	29	28	
4. Hip, Full	38 1/2	37	+1 1/2
5. Thigh, Maximum	19	21 1/4	-2 1/4
6. Knee	14		
7. Calf	(14 3/4)	12 5/8	+2 1/8
8. Upper Arm	11 1/8	11 3/8	-1/4
9. Elbow	9 1/2		
10. Wrist	6 1/2		
11. Vertical Trunk-Total	59		
12. Vertical Trunk-Front	27 3/4		
13. Vertical Trunk-Back	31 1/4		
14. Bust, Front Arc	20 1/4	20 1/2	-1/4
15. Waist Length, Back	13 1/2	14 5/8	
16. Waist Height	35 7/16		
17. Crotch Height	26 7/8		
18. Knee Height	17 3/8		
19. Cross-Back Width	13 1/4	13	+1/4
20. Cross-Shoulder Width	13 1/2		
21. Cross-Chest Width	12 1/2	12 1/8	+3/8
22. Neck-Bust Point	8 1/4		
23. Armscye to Waist	8 5/16		
24. Waist to Hips	5 1/2		
25. Shoulder Length	3 3/4		
26. Arm Length-Elbow	14 1/8		
27. Arm Length-Wrist	24 1/8		
28. Crotch Length, Total	26 1/2	29 3/8	-2 7/8
29. Crotch Length, Front	10		
30. Crotch Length, Back	16 1/2		
31. Cervical to Center Front Waist	20 1/4		
32. Waist Length, Front	14		
33. Shoulder Slope	3.5		
34. Sitting Spread	40		
35. Waist, Front	17		
36. Abdominal	20 3/4		
37. Stature	59	60 1/2	
38. Weight	125	123	

SUBJECT #6 MEASUREMENTS

MEASUREMENT ITEMS	SUBJECT'S (in.)	PS42-70(8)	difference
1. Neck, Base	13 3/4		
2. Bust, Full	32 1/2	32 1/2	0
3. Waist	28	23 1/2	
4. Hip, Full	35	34 1/2	+1/2
5. Thigh, Maximum	17 5/16	19 1/2	-2 3/16
6. Knee	13 3/16		
7. Calf	11	11 7/8	-7/8
8. Upper Arm	10 3/16	9 7/8	+5/16
9. Elbow	7 13/16		
10. Wrist	5 5/8		
11. Vertical Trunk-Total	55 1/8		
12. Vertical Trunk-Front	-		
13. Vertical Trunk-Back	-		
14. Bust, Front Arc	19	18 1/2	+1/2
15. Waist Length, Back	14	15	
16. Waist Height	39 3/8		
17. Crotch Height	27 1/2		
18. Knee Height	15 3/4		
19. Cross-Back Width	12 1/2	12 1/4	+1/4
20. Cross-Shoulder Width	13		
21. Cross-Chest Width	13	12	+1
22. Neck-Bust Point	10		
23. Armseye to Waist	7 3/8		
24. Waist to Hips	5 1/4		
25. Shoulder Length	3 1/4		
26. Arm Length-Elbow	12 1/2		
27. Arm Length-Wrist	21 7/8		
28. Crotch Length, Total	24 1/2	27 1/8	-2 5/8
29. Crotch Length, Front	-		
30. Crotch Length, Back	-		
31. Cervical to Center Front Waist	18 1/2		
32. Waist Length, Front	12		
33. Shoulder Slope	18		
34. Sitting Spread	36 1/4		
35. Waist, Front	15 1/4		
36. Abdominal	18 1/4		
37. Stature	61 1/4	63	
38. Weight	105	106	

SUBJECT #7 MEASUREMENTS

MEASUREMENT ITEMS	SUBJECT'S (in.)	PS42-70(12T)	difference
1. Neck, Base	14 1/2		
2. Bust, Full	36	35	+1
3. Waist	26	26	
4. Hip, Full	35 3/4	37	-1 1/4
5. Thigh, Maximum	21 1/2	21 1/4	+1/4
6. Knee	14 3/4		
7. Calf	14 1/4	12 3/4	+1 1/2
8. Upper Arm	11 7/16	10 1/2	+15/16
9. Elbow	9 3/4		
10. Wrist	6 1/4		
11. Vertical Trunk-Total	62 13/16		
12. Vertical Trunk-Front	29 3/8		
13. Vertical Trunk-Back	33 7/16		
14. Bust, Front Arc	20 1/2	20 1/4	+1/4
15. Waist Length, Back	17 3/4	16 1/4	
16. Waist Height	42 1/2		
17. Crotch Height	32 1/4		
18. Knee Height	20		
19. Cross-Back Width	13 1/4	12 7/8	+3/8
20. Cross-Shoulder Width	13 3/4		
21. Cross-Chest Width	11 3/4	12 3/8	-5/8
22. Neck-Bust Point	10 3/4		
23. Armseve to Waist	9 3/8		
24. Waist to Hips	8 5/8		
25. Shoulder Length	4 1/4		
26. Arm Length-Elbow	14 1/8		
27. Arm Length-Wrist	24 1/8		
28. Crotch Length, Total	27	30 3/8	-3 3/8
29. Crotch Length, Front	12 1/2		
30. Crotch Length, Back	14 1/2		
31. Cervical to Center Front Waist	20 1/4		
32. Waist Length, Front	14		
33. Shoulder Slope	13.75		
34. Sitting Spread	39 1/2		
35. Waist, Front	13 1/2		
36. Abdominal	18		
37. Stature	69	68	
38. Weight	133	131	

SUBJECT #8 MEASUREMENTS

MEASUREMENT ITEMS	SUBJECT'S (in.)	PS42-70(11)	difference
1. Neck, Base	14 1/2		
2. Bust, Full	34	34 1/2	-1/2
3. Waist	26	25	
4. Hip, Full	36	36 1/2	-1/2
5. Thigh, Maximum	19 3/4	20 3/4	-1
6. Knee	13 1/4		
7. Calf	12 1/2	12 5/8	-1/8
8. Upper Arm	10 7/8	10 1/4	+5/8
9. Elbow	9 1/4		
10. Wrist	5 15/16		
11. Vertical Trunk-Total	59		
12. Vertical Trunk-Front	28 1/2		
13. Vertical Trunk-Back	27 1/2		
14. Bust, Front Arc	19 1/2	19 1/2	0
15. Waist Length, Back	14 1/4	15 1/4	
16. Waist Height	40 13/16		
17. Crotch Height	30 7/8		
18. Knee Height	17 1/2		
19. Cross-Back Width	13 1/8	12 3/4	+3/8
20. Cross-Shoulder Width	15 1/4		
21. Cross-Chest Width	11 3/4	12 1/4	-1/2
22. Neck-Bust Point	9 1/2		
23. Armseye to Waist	8 1/4		
24. Waist to Hips	8 1/4		
25. Shoulder Length	4 1/8		
26. Arm Length-Elbow	12 3/4		
27. Arm Length-Wrist	22		
28. Crotch Length, Total	28 3/4	27 1/2	+1 1/4
29. Crotch Length, Front	12		
30. Crotch Length, Back	16 3/4		
31. Cervical to Center Front Waist	19 1/2		
32. Waist Length, Front	12 1/2		
33. Shoulder Slope	21.25		
34. Sitting Spread	37 1/2		
35. Waist, Front	13		
36. Abdominal	19		
37. Stature	64	63 1/2	
38. Weight	120	119	

SUBJECT #9 MEASUREMENTS

MEASUREMENT ITEMS	SUBJECT'S (in.)	PS42-70(14T)	difference
1. Neck, Base	15 3/4		
2. Bust, Full	40 1/2	36 1/2	+4
3. Waist	29 7/8	27 1/2	
4. Hip, Full	37 1/2	38 1/2	-1
5. Thigh, Maximum	22 1/4	22 1/4	0
6. Knee	13 9/16		
7. Calf	13 9/16	13 1/4	+5/16
8. Upper Arm	12 1/8	10 7/8	+1 1/4
9. Elbow	9 9/16		
10. Wrist	9		
11. Vertical Trunk-Total	60 3/8		
12. Vertical Trunk-Front	28 5/8		
13. Vertical Trunk-Back	31 6/8		
14. Bust, Front Arc	25	21 1/4	+3 3/4
15. Waist Length, Back	17 3/4	16 1/2	
16. Waist Height	43 1/4		
17. Crotch Height	32 3/8		
18. Knee Height	21		
19. Cross-Back Width	15 1/2	13 1/4	+2 1/4
20. Cross-Shoulder Width	16 1/4		
21. Cross-Chest Width	14 1/2	12 5/8	+1 7/8
22. Neck-Bust Point	12 1/4		
23. Armscye to Waist	9 11/16		
24. Waist to Hips	6 1/2		
25. Shoulder Length	4 5/16		
26. Arm Length-Elbow	13 11/16		
27. Arm Length-Wrist	24 9/16		
28. Crotch Length, Total	27	31 1/8	-4 1/8
29. Crotch Length, Front	12 1/2		
30. Crotch Length, Back	14 1/2		
31. Cervical to Center Front Waist	21 3/8		
32. Waist Length, Front	13 3/4		
33. Shoulder Slope	16.5		
34. Sitting Spread	40		
35. Waist, Front	16 3/4		
36. Abdominal	19 1/2		
37. Stature	68	68 1/2	
38. Weight	146	142	

SUBJECT #10 MEASUREMENTS

MEASUREMENT ITEMS	SUBJECT'S (in.)	PS42-70(20)	difference
1. Neck, Base	16 1/4		
2. Bust, Full	45	42	+3
3. Waist	39 5/8	33	
4. Hip, Full	45	44	+1
5. Thigh, Maximum	25 15/16	25 3/5	-3 1/2
6. Knee	18 5/16		
7. Calf	16 1/8	14 3/4	-1 1/2
8. Upper Arm	15 7/8	12 1/2	-1 5/8
9. Elbow	11		
10. Wrist	6 1/8		
11. Vertical Trunk-Total	65		
12. Vertical Trunk-Front	31 1/2		
13. Vertical Trunk-Back	33 1/2		
14. Bust, Front Arc	25	25	0
15. Waist Length, Back	17	16 1/2	
16. Waist Height	40 13/16		
17. Crotch Height	30		
18. Knee Height	18 3/8		
19. Cross-Back Width	16	14 5/8	+1 3/8
20. Cross-Shoulder Width	16 1/4		
21. Cross-Chest Width	14	13 5/8	+3/8
22. Neck-Bust Point	12 3/4		
23. Armscye to Waist	9 7/8		
24. Waist to Hips	8 1/4		
25. Shoulder Length	4 3/4		
26. Arm Length-Elbow	13 3/8		
27. Arm Length-Wrist	23 1/8		
28. Crotch Length, Total	29 1/4	31 1/8	-2 3/8
29. Crotch Length, Front	12 1/2		
30. Crotch Length, Back	16 3/4		
31. Cervical to Center Front Waist	23 1/2		
32. Waist Length, Front	16		
33. Shoulder Slope	23.5		
34. Sitting Spread	43 1/4		
35. Waist, Front	22		
36. Abdominal	23 1/2		
37. Stature	67	66	
38. Weight	180	176	

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