

## A Trend Analysis on the Research of Clothing Construction in Korea – for the recent ten years (1996 ~ 2005) –

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### Abstract

The purpose of this research is to propose the scientific and rational establishment of research projects and directions for research by analyzing the research trends on clothing construction. The 689 papers in the field of clothing construction are selected among 5433 papers published within the recent ten years (1996-2005) in Journal of the Korean Home Economics Association, Journal of the Korean Society of Clothing and Textiles, Journal of the Korean society of costumes, Research Journal of the Costume Culture, Journal of the Korean Society of Clothing Industry and Journal of Fashion Business. The trend of researches on clothing construction is analyzed by classifying the topics by design, body type, pattern, size of apparel, fitting of clothing, protective clothing and functional clothing, and the others, and the results are as follows.

The frequency order of the studies in the field of clothing construction is body type (32%) > pattern (24%) > size of apparel (13%) > protective clothing and functional clothing (10%) > the others (8%) > design-related clothing construction (6%) > fitting of clothing (4%) > sewing (3%). The major areas of research are body types, pattern, and sizes resulting from them. Most of researches are focused on women, and researches on men are relatively lacking. In addition to the deficiency of men-related research, Moreover, researches on characteristics of body types and on corresponding sizes of consumers in the target countries of export are necessary when the reality of Korean clothing and fashion industry that depends more on foreign demand than domestic demand is considered. For production of segmented and specialized results from clothing construction research, related tools such as CAD, 3D shape systems and dress form should be developed and utilized to contribute to precision of research results.

**Key Words** : clothing construction, trend analysis, body type, pattern, sizes

## I. Introduction

Clothing and textiles is a kind of science that studies all fields associated with clothes, garment materials, fashion accessories including hats, ornaments and footwear. It was introduced to Korea in 1929 and added to home economics of doing inclusive research on food, clothing and housing. The study of clothing and textiles was divided into history of clothing, design and aesthetics, textiles, clothing construction, fashion merchandising, social-psychological aspect of clothing due to increased demand and interest on diverse garments. Since mid 1960's, it has been further specialized, but its history as science is fairly short<sup>1)</sup>

Clothing and textiles can be considered in three aspects: artistic aspect (design of clothing, clothing construction, textile design, illustration, display etc.), aspect of cultural social science (history of costume, clothing aesthetics, social-psychology of clothing, fashion merchandising), and aspect of natural science (textiles, fabrics, environmental science of clothing, sewing). The ultimate goal is to approach the close relation among human body, clothing, garment materials at multi-angles, increase the quality of human life in clothing, establish and systemize the basic theory, improve the overall clothing culture by dealing with materials of clothing and functional, aesthetic and economic subjects of clothing as well as study of human as the object of clothing.

Especially, since the study of clothing construction is to investigate how to make clothing, the process of clothing production itself becomes the subject of the study. The ultimate aim of the study lies on the

development of new technology to create and express the beauty of clothing corresponding to the changing social circumstances and human sense by theoretical development and systemization. In the study of clothing construction, the planning of research on should be founded on complete theoretical bases, the phenomena related to clothing should be able to predicted and controlled. Also, the product of the research should be used to develop a new theory by interdisciplinary study. However, it is indicated that the difficulties in research on clothing construction are the fact that human body, clothing and garment materials have a variety of factors and the poor research environment to carry out experiments and training side by side to understand connections between clothing and human body. The prior researches that analyzed the trends of domestic science and the study of clothing and textiles are done by J. Cheong *et. al.* (1991)<sup>2)</sup>, S. Park (1981)<sup>3)</sup>, J. Lee *et. al.* (2000)<sup>4)</sup>, and M. Lee (2002)<sup>5)</sup>. Also, the trends of clothing construction was studied by H. Kim (1991)<sup>6)</sup>, O. Ham *et. al.* (1998)<sup>7)</sup>, and J. Lee *et. al.* (2001), and H. Lee (2003)<sup>8)</sup>. However, the contents of the research were limited to a few journals, or there is few study on recent trends. Lately, the world has entered the era of limitless competition because of sudden changes in the environment of textile and fashion industries. Thus, the academic world will have to recognize such situation and seek the direction of future research.

Therefore, this paper analyzes the research trends from the research papers on clothing construction published in the domestic journals of clothing and textiles and seek for

the future-oriented, scientific, rational establishment of research projects and directions of future research. The goals of this research are as follows.

- 1) To classify the domestic researches in the field of clothing construction by research topic.
- 2) To examine the distribution of research topics by journal and by publication year.
- 3) To analyze the research trends of the subordinate topics under major research topics and of domestic clothing construction.

## II. Research Method

### 1. Data Collection

The research papers in the field of clothing construction that were published in domestic journals on clothing and textiles, such as Journal of the Korean Home Economics Association, Journal of the Korean Society of Clothing and Textiles, Journal of the Korean Society of Costumes, the Research Journal of

the Costume Culture, Journal of the Korean Society of Clothing Industry, Journal of Fashion Business, are used as analysis data in this research. Six-hundred eighty nine papers in the field of clothing construction are selected and used in the analysis among 5433 papers published from 1996 to 2005. The details on the papers are provided in <Table 1>.

### 2. Analysis Items

Analysis items are classified by journal, publication year and research topic. Classification<sup>1)-4)</sup> by journal uses the original names of the journals, which are Journal of the Korean Home Economics Association, Journal of the Korean Society of Clothing and Textiles, Journal of the Korean Society of Costume, The Research Journal of the Costume Culture, Journal of the Korean Society of Clothing Industry, Journal of Fashion Business. Classification by year is analyzed in unit of one year out of ten years from 1996 to 2005. Classification by research topic is

<Table 1> Analysis Method

Name of Society	Name of Journal	T	C
The Korean Home Economics Association	Journal of the Korean Home Economics Association	1572	78
The Korean Society of Clothing and Textiles	Journal of the Korean Society of Clothing and Textiles	1306	255
The Korean Society of Costume	Journal of the Korean Society of Costume	953	95
The Costume Culture Association	The Research Journal of the Costume Culture	630	99
The Korean Society of Clothing Industry	Journal of the Korean Society of Clothing Industry	501	82
The Korean Society of Fashion Business	Journal of Fashion Business	471	80
Total		5433	689

T: Total number of papers (clothing and textiles)  
 C: Number of papers related to clothing construction

determined with reference to the prior studies, and the selected research topics in the field of clothing and construction are design-related clothing construction, body types, pattern, size of apparel, fitting of clothing, and protective clothing and functional clothing, sewing and the others. The classification system and subordinate contents of research topics in the field of clothing and textiles are as shown in <Table 2>.

Research topics are classified by area and subordinate topic, based on the title and introduction of research. Research papers with complex topics, were included in a corresponding class after the ultimate goals of the research are identified by reading the whole contents

### 3. Reliability of Data Analysis

The objectivity of analysis by research topic is reliability-tested. Firstly, one hundred papers among 689 papers for data analysis are randomly chosen. Secondly, two researchers classify the selected papers by research topic. Finally, coefficient of reliability is calculated by the following equation.

$$\text{Coefficient of Reliability} = \frac{2 \times M}{N_1 + N_2} = \frac{2 \times 91}{100 + 100} = 0.91$$

$N_1, N_2$  : Number of papers used in reliability test of classification by research topic

$M$  : Number of papers whose research topics matches

The resulting coefficient of reliability is 0.91, which is high.

<Table 2> The classification system and subordinate contents of research topics in the field of clothing and textiles

Research topic	Subordinate contents
Design	Relation between design elements and clothing design, experiments on the relation between body type and design, making of designed clothing for draping practice, the relation between visual effect and clothing construction factors, etc.
Body type	Classification of body types, research on body type characteristics related to age, body measurement, analysis of body types, development of dress form, etc.
Pattern	Design study of basic pattern, study on the draping method, ease of clothing, pattern for Korean traditional clothing, pattern making using computers such as computer-aided design (CAD), relations of pattern with body type, relations of pattern with motion, relations of pattern with clothing materials management of pattern department, situation of pattern education. etc.
Size of apparel	Research on the actual conditions of sizes, body type study for establishing size, statistical analysis of size for a grading, size systems for ready-made clothing, etc.
Fitting of clothing	Change of body surface in motion, Research on functionality by wearing test, research on the actual conditions of fitting, etc.
Protective clothing and functional clothing	Clothing for special body types, functional clothing, items for functional clothing, etc.
Sewing	Fusible Interlinings and sewing-related subsidiary materials, relation between physical properties of materials and sewing, relation between pattern and sewing, relation between physical properties of materials and sewing, etc.
The others	Clothing conditions, wearing attitude, CAD, computer system of the fashion design, etc.

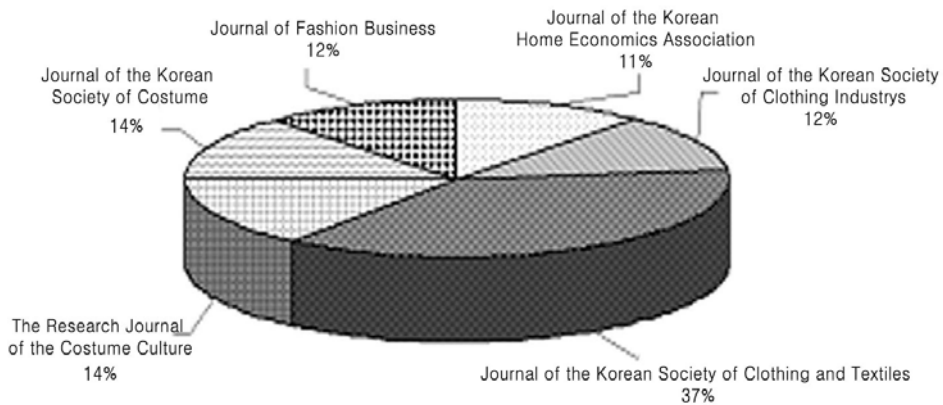
4. Analysis Method of Data

Collected data for analysis are examined by the classifications of journal, publication year and research topic. Also, the statistical analysis of the data is done by technical statistics and frequency analysis using SPSS.

III. Results and Discussion

1. Distribution by Journal and by Publication Year

The distribution of 689 journal papers in the field of clothing construction by journal and by

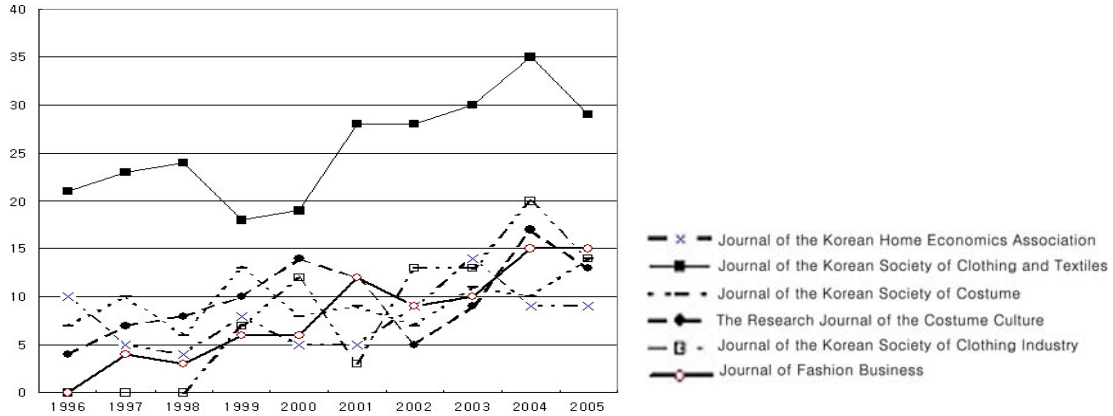


<Figure 1> Distribution of research papers on clothing construction by journal

<Table 3> Distribution of research papers on clothing construction among clothing and textiles researches

Name of Journal	Journal of the Korean Home Economics Association			Journal of the Korean Society of Clothing and Textiles			Journal of the Korean Society of Costume			The Research Journal of the Costume Culture			Journal of the Korean Society of Clothing Industry			Journal of Fashion Business		
	T	C	%	T	C	%	T	C	%	T	C	%	T	C	%	T	C	%
1996	155	10	12.82	100	21	8.23	61	7	7.37	29	4	4.04						
1997	156	5	6.41	128	23	9.02	86	10	10.53	46	7	7.07				28	4	5
1998	161	4	5.12	101	24	9.41	95	6	6.31	63	8	8.08				37	3	3.75
1999	117	8	10.26	117	18	7.06	111	13	13.68	75	10	10.1	49	7	8.54	40	6	7.5
2000	156	5	6.41	121	19	7.45	104	8	8.42	71	14	14.14	54	12	14.63	42	6	7.5
2001	156	5	6.41	133	29	11.37	96	9	9.47	63	12	12.12	61	3	3.66	53	12	15
2002	179	9	11.54	166	27	10.59	88	7	7.37	49	5	5.05	66	13	15.85	67	9	11.25
2003	172	14	17.95	143	30	11.76	96	11	10.53	73	9	9.09	79	13	15.85	64	10	12.5
2004	152	9	11.54	136	35	13.73	108	10	11.58	80	17	17.17	102	20	24.39	68	15	18.75
2005	168	9	11.54	161	29	11.37	108	14	14.74	81	13	13.13	90	14	17.07	72	15	18.75
total	1572	78	100	1306	255	100	953	95	100	630	99	100	501	82	100	471	80	100

T: Total number of papers (clothing and textile)  
 C: Number of papers related to clothing construction



<Figure 2> Trend of change in numbers of papers on clothing construction published in domestic journals by year.

publication year is provided in <Figure 1> and <Figure 2>, and <Table 3>.

The distribution of researches in clothing construction by journal is shown in Fig. 1. The total numbers of papers in the field of clothing construction published in domestic journals from 1996 to 2005 are presented in the following. Journal of the Korean Society of Clothing and Textiles (37%)> The Research Journal of the Costume Culture (14%)> Journal of Fashion Business (12%) > Journal of the Korean Society of Clothing Industry (12%) > Journal of the Korean Home Economics Association (11%). Journal of the Korean Society of Clothing and Textiles has the greatest number of papers on clothing construction for the ten years.

<Table 3> shows the numbers and percentages of research papers on clothing construction among clothing and textiles researches for the period from 1996 to 2005. Figure 2 provides the numbers of papers in the field of clothing construction published in domestic journals by year. As shown in <Fig. 2> and <Table 3>, the number of papers in

the field of clothing construction tends to increase at a similar rate without sudden changes in each journal for the ten years.

Particularly, Journal of the Korean Society of Clothing Industry, Journal of Fashion Business and The Research Journal of the Costume Culture has higher percentages of papers related to clothing construction, compared with Journal of the Korean Society of Clothing and Textiles, Journal of the Korean Home Economics Association, and the Journal of the Korean Society of Costumes, although the formers were founded twenty years later than the lateres. This is considered to show that the need for research on clothing construction has been increased for more scientific and rational clothing design. This tendency coincides with the research results by J. Li, *et. al.* (2001) and J. Kim (1999).

## 2. Distribution by research topic

Based on 689 journal papers for this research, the trend of research topics on clothing construction by publication year and

the distribution of research topics are presented in Figs. 3 and 4, and Table 4, respectively. As shown in <Figure 3>, body types (33%) and pattern (24%) are the most actively studied, and size of apparel (13%), protective clothing and functional clothing (10%), design-related clothing construction (6%), fitting of clothing (4%), sewing (3%) and the others (8%). A good number of studies of body type and clothing pattern were published each year as shown in Table 4, which exhibits the trend of research topics on clothing construction by publication year. This explains that the study of body type is a fundamental and essential research in making clothing suitable for human body and that research on characteristics of human body is needed more than any other research topics in the field of clothing construction. Also, body types should be studied in order to satisfy the increased demand by clothing consumers and be helpful for conducting the strategy of mass-customized marketing by

clothing manufacturers. Furthermore, apparel patterns reflecting diverse body types should be developed.

Also, the research on fitting of clothing has been increasing. Recently, as the interest in body figure and appearance is increased, the consumer demand tends to be diversified and segmented. Since the size of human body and morphological and industrial factors should be included to satisfy such demand, both fitting of clothing and size of apparel should be studied in parallel. On the other hand, the study of sewing has a decreasing tendency. The sewing industry in Korea had a comparative advantage over that in other countries as Korea's export-leading industry in 1960's and 1970's, but as sewing environment changed and problems in the growing process occurred.

The research trend described above for the ten year show that pattern study has increased significantly together with study of body type and that study of size system for better fitting of clothing has also increased.

<Table 4> Trend of research topics on clothing construction by publication year

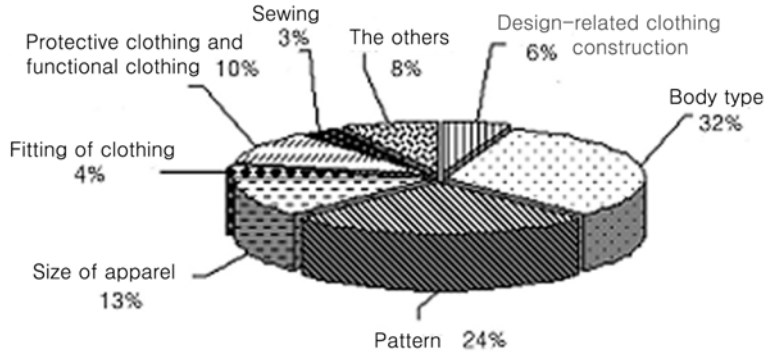
Topics	1996		1997		1998		1999		2000		2001		2002		2003		2004		2005	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
design-related clothing construction	4	10	4	8	0	0	2	3	3	5	5	7	3	4	6	7	3	3	9	9
Body type	9	21	9	18	17	38	20	33	20	31	18	27	23	33	22	25	46	43	38	40
Pattern	17	40	17	36	16	36	15	24	13	21	17	25	12	17	25	29	21	20	15	15
Size of apparel	2	5	4	8	2	5	9	15	9	14	9	13	11	15	12	14	13	12	17	18
Fitting of clothing	1	2	2	4	2	5	0	0	2	3	4	6	5	7	2	2	7	7	1	1
Protective clothing and functional clothing	4	10	4	8	1	2	7	11	10	16	10	14	9	13	12	14	9	9	5	5
Sewing	2	5	2	4	4	9	4	6	3	5	1	1	2	3	2	2	0	0	2	2
The others	3	7	7	14	2	5	5	8	3	5	5	7	6	8	6	7	6	6	10	10
Total	42	100	49	100	44	100	62	100	63	100	69	100	71	100	87	100	105	100	97	100

N: Number of papers

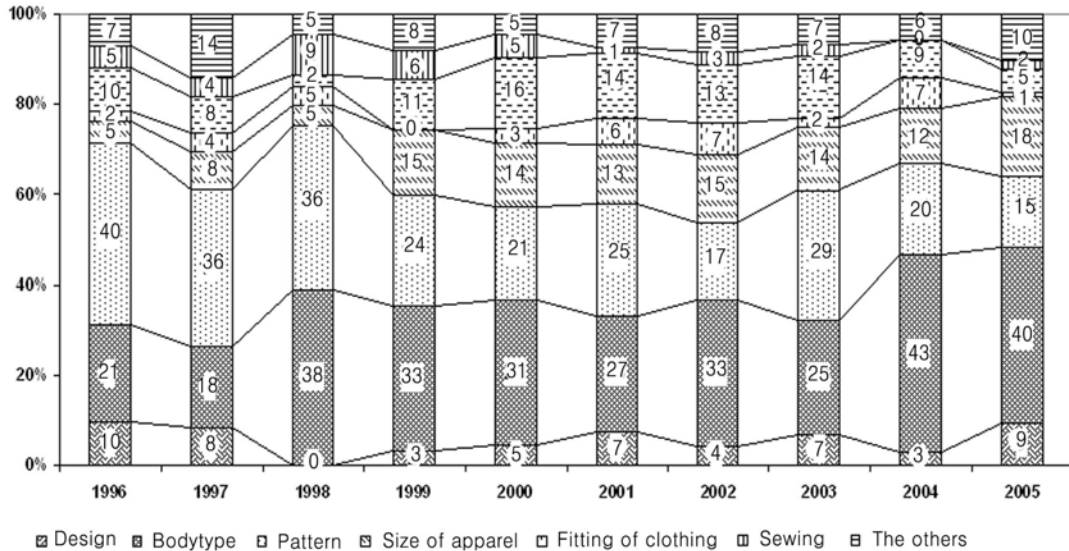
Study of design-related clothing construction is also expected to advance as new research results on design effects according to various factors in constructing clothing are brought out because of development of new technologies. Study of protective clothing and functional clothing should be studied, since functional aspects of clothing is required even in normal clothing.

### 3. Distribution by Subordinate Topic

The trend of research in clothing construction by subordinate topic is studied and summarized in Table 5. Firstly, design is a study on design effects according to various factors in constructing clothing. As its subordinate topics, there are the relation between



<Figure 3> Distribution of papers on clothing construction by research topics



<Figure 4> Trend of research topics by publication year



clothing construction and design, theories and experiments on the relation between body type and design, style proposal and draping practice. Their percentages are as follows. The relation between visual effect and factors for clothing construction (45%) > experiments on the relation between body type and design (33%) > making of designed clothing for draping practice (19%) > the relation between clothing construction and design (3%). The detailed contents of the subordinate topics are examined and categorized: Study on visual effects of suits of mid-age women, obese women and senescent women for morphological beauty, suit design for suitable to body type for mid-aged men, study on developing custom ties with consideration of body type, study of princess design according to body type, visual evaluation according to change in location of a belt on an one-piece dress, and study on type of partial bodies including study on face type and study of harmony of clothing neckline. In the draping and design practice and making real clothing, there is a study of reproducing real clothing based on data in the Journal of the Korean Society of Costumes.

The trends of the subordinate topics in the studies of body type are examined in four ways: classification of body types, study of body types by age, measurement of human body and analysis of body type. Studies on analysis of body type have the highest percent, 38%, of the subordinate topics, and, development of dress form (19%) > body type characteristics related to age (12%) > body measurement (8%). Since studies of body types should provide satisfaction and tranquility by enabling clothing to be made suitable to human body, the clothing pattern

should be designed to enhance suitability of clothes, based on good understanding of the characteristics of body types. Especially, it is essential to classify body types by precise measurement of wearers' bodies in making ready-made clothes in order to decrease loads of clothing-making and increase suitability. Classification of body types attaches great importance to understanding of detailed characteristics of body types. Since upper and lower halves of human bodies have little relation between measurements of human bodies, basic patterns for them are designed differently. Therefore, types of upper and lower halves of human bodies are studied separately. Parts in studies of body types are provided with their percentages in the following. Whole body (44%) > lower body (17%) > upper body (15%) > head and face (7%) > breast (6%) > feet (5%) > neck (2%) > hands (2%) > arms (1%) > shoulders (1%). This shows, in comparison to the prior studies, that studies of body types are broken down from the whole body and upper and lower halves to body parts such as head, breast, feet, arms, shoulders and so on. The contents of body type studies has changed as well. Previously, height and length items representing vertical dimension of human body and circumference and width items representing its horizontal dimension are classified, as the other items analyzed and studied with a few index items. However, recent studies are devoted to revealing the complex relation of various factors of human body in building body types, such as index items, proportion, ideal body type and standard body type, based on principles of size and ratio of human body.

Studies of body types began in Korea when useful data of body types as well as sizes of each part of a human body were needed for designing clothing suitable to unspecified human bodies as ready-made clothes became universal due to mass production in 1970's. Recently, new methods of body type study are proposed as up-to-date technologies are introduced to the clothing industry due to development of information technology. Especially, methods of measuring human body have changed. In the past, body sizes measured by Martin measuring instruments were analyzed and used to examine characteristics of consumers' body types and to evaluate the problems of body types by analyzing wrinkles made when dressed<sup>11)</sup>. Lately, data on body sizes and shapes using non-contact three dimensional (3D) electromagnetic human body scanners are collected, and clothing patterns are designed to fit consumers' body types and sizes or method of pattern grading for sizes. In order to increase the functionality and ease of design by building a database of 3D-scanned human bodies reflecting changes in body sizes of the young generation, projects for measuring human body are being carried in countries like United States, Netherlands, and Italy. Also, it is expected to develop as a field of science. However, the items and methods of measurement using a 3D body scanner have not yet been standardized, and there are limited uses of shape data collected using a 3D body scanner<sup>12)13)</sup>. Therefore, the study on methods using 3D-scanned shape data directly in making clothing patterns is at its beginning stage, and further details on measurement methods should be provided in the future.<sup>14)</sup>

Body types by age are studied by considering factors for the change of body types caused by aging since factors comprising shapes of people in each age group are different. The target age groups are children of school age, middle school and high school students, the middle-aged and the old-aged, but most emphasis of the studies are placed on teenagers and people coming of age (20-19). In particular, patterns for women's clothing by age, by body parts, by clothing items are extensively studied, but studies on men's clothing are still in short although they has been slightly increasing since a study of patterns for men's vests in 1995. This is because of ease of finding the problems in women's clothing, relative ease of supplying study subjects and test objects, wide-spread studies on women's clothing in school educations. However, as men take a great interest in their appearance, body figure and clothing, they begin to express fashion-oriented desire. Accordingly, it is necessary to develop patterns considering characteristics of men's body types and products with various designs for men, but it is pointed out that men's clothing has an absolute shortage in education materials and pattern development for women's clothing.

Subordinate topics of studies on clothing pattern are examined: design study of pattern, study on the draping method, ease of clothing, pattern for Korean traditional clothing, pattern drawing using computers such as computer-aided design (CAD), relations of pattern with body type, motion and clothing materials, and the others. The percentages of each topic are as follows. Design study of basic pattern (34%) > relation between body type and pattern (22%) > pattern drawing using

<Table 5> Distribution of studies of clothing construction by subordinate topics

Topics	Subordinate topics	N	%	Topics	Subordinate topics	N	%
design - related clothing constru ction	Relation between design elements and clothing design.	1	3	Size of apparel	Research on the actual conditions of sizes	14	16
	Experiments on the relation between body type and design	12	33		Body type study for establishing sizes	36	41
	Making of designed clothing for draping practice	7	19		Statistical analysis of size for a grading	8	9
	The relation between visual effect and clothing construction factors	16	45		Size systems for ready-made clothing.	30	34
	Total	36	100		Total	88	100
Body type	Classification of body types	51	23	Fitting of clothing	change of body surface in motion	2	7
	Research on body type Characteristics Related to Age	26	12		Research on functionality by wearing test	13	49
	Body measurement	18	8		Research on the actual conditions of fitting	12	44
					Total	27	100
	Analysis of body types	85	38	Protective clothing and functional clothing	Clothing for special body types	11	15
	Development of dress form	42	19		Functional clothing	53	74
Total	222	100	Items for functional clothing		8	11	
			Total	72	100		
Pattern	Design study of basic pattern	59	34	Sewing	Fusible Interlinings and sewing-related subsidiary materials	3	14
	Study on the draping method	2	1		Relation between physical properties of materials and sewing	3	14
	Ease of clothing	13	8		relation between pattern and sewing	2	9
	Pattern for Korean traditional clothing	10	6		Relation between physical properties of materials and sewing	5	23
	Pattern making using computers such as computer-aided design (CAD)	16	10		the others	9	40
	Relations of pattern with body type	37	22		Total	22	100
	Relations of pattern with motion	10	6	The others	Clothing Conditions, Wearing Attitude	46	85
	Relations of pattern with clothing materials	6	4		CAD , computer System of the Fashion Design	6	11
	the others	15	9		the others	2	4
Total	168	100	Total		54	100	

CAD (10%) > the others (9%) > ease of clothing (8%) > pattern for Korean traditional clothing (6%) > relation between motion and pattern (6%) > relation between clothing material and pattern (4%) > study on the draping

method (1%). Studies on pattern design and on the relation between body type and pattern took a combined percent of 56. This implies that it is important to study the pattern and understand relation between body type and

pattern because clothing made without pattern study is affected by various factors. Study items of pattern design are subdivided into patterns for bras, hats and an armhole, in addition to basic patterns such as basic existing pattern of bodice, basic skirts pattern and basic slacks pattern. Particularly, the study of sleeve pattern design is segmented and specialized as a wearing test and study of functionality are done in combination due to the fact that the motion of human body should be considered in designing. Furthermore, it is a desirable phenomenon that correlations among pattern, body types, and materials are studied. In the study of clothing patterns, although there are more studies on women's clothing than men's, men's clothing has been researched increasingly since 1994 and ready-made clothing by mass production became more prevalent than custom clothing. Thus, basic patterns for men's clothing should be established, based on studies of body types, and clothing with better wearing sensation should be made. Also, the studies of body type and pattern for men's clothing are urgent for at least two reasons. Firstly, consumers' demand becomes more specific and segmented. Secondly, there is no systemized method for pattern making, which is for lack of not only basic data used for pattern making but exchange of such data between industries and academia, in addition to the fact that techniques acquired from pattern studies for men's clothing has been handed down in somewhat closed ways, compared to those for women's.<sup>15)</sup>

Subordinate topics of studies on clothing size are inspected: research on the actual conditions of sizes, body type study for establishing sizes, statistical analysis of size

for a grading test, and size systems for ready-made clothing patterns. The size establishment by body type studies has meanings for enhancing both manufacturers' and consumers' understanding and recognition on size standards in consumers' standpoint and helping consumers purchase clothing suitable for their body sizes. In manufacturers' point of view, it is necessary to investigate body sizes of target groups appropriate for their brands and to understand the distribution of their sizes in order to prevent losses resulting from producing clothing with inadequate sizes. Especially, a standard size system should be established for online shopping and home shopping since diversity and accuracy of sizes of clothing are not examined in such shopping methods. Moreover, global economy is being unified into a single market and a global competition era of marketing all around the world began. Thus, many countries are putting efforts to standardize the sizes of clothing that can accommodate various body types of their people. The need for standardization of clothing sizes is suggested to provide corresponding sizes for one country by comparing size standards of two countries, based on each country's size data. To cope with the situations like the globalization of clothing industry and opening Korea's markets to the world, research on size systemization and internationalization of clothing products is necessary.

The trend of studies on fitting of clothing is investigated in three subordinate topics. The research trend is as follows. Research on functionality by a wearing test (49%) > research on the actual conditions of fitting (44%) > change of body surface in motion (7%). The functionality research for a dressing

test is to rationalize the relation between clothing and its wearer since functionality of clothing is an important standard affecting effectiveness of human motion, capability of performing operations and productivity. The actual conditions of fitting are inspected as a way of yielding sizes for various types of bodies and parts and as a fundamental research for internationalization of clothing size systems in conjunction with a survey in a target country.

Protective clothing and functional clothing are studied in the following order of the subordinate topics. Functional clothing (74%) > items for functional clothing (11%) > clothing for special body types (5%). Studies of functional clothing in conjunction with related items for the clothing are 85%. The objects of study are protective clothing for fire fighters, clothing for doctors and nurses, police uniforms and related clothing items. In the studies, multiple functions together with aesthetic appreciation are taken into consideration. Since jobs and work environments are specialized and segmented as industries are diversified and specialized, functions of clothing suitable for fulfilling diverse jobs or works are required. Accordingly, it is expected that more researches on functional clothing will be conducted. As far as the studies of clothing for special body types are concerned, only a few studies of clothing for the disabled and maternity dresses are carried out.

Increase in efficiency of sewing, relation between physical properties of materials and sewing, fusible interlinings and sewing-related subsidiary materials, relation between pattern and sewing, and the others are the subordinate topics of sewing studies. Sewing has not been studied extensively although

sewing is a measure of evaluating the quality of clothing and an important research field that determines external appearance, practical durability, shape stability and so forth. Clothing with good quality is demanded and special and unique materials are favored, as propensity to consume clothing products is diversified and personalized. Therefore, studies to solve various problems that could occur in textile sewing should be conducted.<sup>16)</sup>

As the others, pattern and size of apparel are studied as basics of design development by investigating the wearing attitude, the actual conditions of clothing, or preference. Recently, researches on Chinese consumers' preference and the actual conditions of dressing gain significant attention as the interest on the Chinese market is increased.

#### IV. Conclusion

The purpose of this research is to propose the scientific and rational establishment of research projects and directions for research by analyzing the research trends on clothing construction. The 689 papers in the field of clothing construction are selected among 5433 papers published within the recent ten years (1996–2005) in Journal of the Korean Home Economics Association, Journal of the Korean Society of Clothing and Textiles, Journal of the Korean society of costumes, Research Journal of the Costume Culture, Journal of the Korean Society of Clothing Industry and Journal of Fashion Business. The trend of researches on clothing construction is analyzed by classifying the topics by design, body type, pattern, size of apparel, fitting of clothing, protective clothing and

functional clothing, and the others, and the results are as follows.

1. The distribution by journal of research papers on clothing construction among the whole clothing and textiles papers is Journal of the Korean Society of Clothing and Textiles (37%) > Research Journal of the Costume Culture (14%) > Journal of Fashion Business (12%) > Journal of the Korean Society of Clothing Industry (12%) > Journal of the Korean Home Economics Association (11%).

2. The distribution by research topics is body type (32%) > pattern (24%) > size of apparel (13%) > protective clothing and functional clothing (10%) > the others (8%) > design-related clothing construction (6%) > fitting of clothing (4%) > sewing (3%). It shows that body types and pattern are the most actively studied.

3. The trend of research in clothing construction by subordinate topic is studied.

Firstly, subordinate topics of design studies are the relation between visual effects and various factors for clothing construction (45%) > experiments on the relation between body type and design (33%) > making of real clothing by draping (19%) > the relation between clothing construction and design (3%).

Secondly, distribution of research papers on body types are studies on the analysis of body types (38%) > development of dress form (19%) > age-related characteristics of body types (12%) > body measurement (8%). In particular, the studies are focused on identifying multi-dimensional factors affecting body types to make clothing highly suitable to

human body. Women's body types are extensively investigated in various categories, but studies on men's body types are deficient.

Thirdly, pattern studies are exclusively done using CAD. This is interpreted as a sign reflecting the reality of the clothing industry. Pattern drawing is focused on women's clothing and needs to be extended into men's clothing and other types of clothing. Also, integrated studies of topics focus on the interrelation between body types and pattern, materials and pattern, motion and pattern.

Fourthly, the study on a size system for ready-made clothing is predominant among subordinate topics under the studies on size of apparel. Moreover, the issue of the international exchange of sizes is mentioned.

Fifthly, studies on fitting of clothing are investigated. A dressing test is focused on the functionality study with emphasis on the relation between clothing and wearers, and, in parallel, the actual conditions of fitting are inspected as a way of yielding sizes. Also, surveys are conducted in target countries as internationalization of clothing size systems is needed.

Sixthly, researches on protective clothing and functional clothing paid attention to functions of clothing together with aesthetic appreciation. Since jobs or work environments are specialized and segmented as industries are diversified and specialized, studies on clothing with corresponding functions will be increased. However, only a few studies of clothing for the disabled and maternity dresses are carried out.

Finally, pattern and size of apparel are studied as basics of design development by investigating the dressing attitude, the actual

conditions of dressing, or preference. Particularly, researches on Chinese consumers receive considerable attention as the interest on the Chinese market is increased.

In summary, the frequency order of the studies in the field of clothing construction from 1995 to 2005 is body type (32%) > pattern (24%) > size of apparel (13%) > protective clothing and functional clothing (10%) > the others (8%) > design-related clothing construction (6%) > fitting of clothing (4%) > sewing (3%).

The major areas of research are body types, pattern, and sizes resulting from them. Most of researches are focused on women, and researches on men are relatively lacking. In addition to the deficiency of men-related research, men begin to express fashion-oriented desire as they increase their interest in appearance and body figure. Therefore, from these situations, a research related to men is urgent. Moreover, researches on characteristics of body types and on corresponding sizes of consumers in the target countries of export are necessary when the reality of Korean clothing and fashion industry that depends more on foreign demand than domestic demand is considered. For production of segmented and specialized results from clothing construction research, related tools such as CAD, 3D shape systems and dress form should be developed and utilized to contribute to precision of research results.

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