

Chapter 1: The study in perspective

1.1 INTRODUCTION

Clothing is an extension of the self. It helps to define who a person is, what a person likes and how a person feels about him-/herself (Kaiser, 1990:145). Attributes of clothing that are often associated with positive feelings include an attractive appearance, comfort, freedom of movement and fashion. One of the basic qualities underlying all of these attributes is fit (Farmer & Gotwals, 1982:3). One of the most important consumer needs regarding clothing or apparel is that of well-fitting garments. Salusso-Deonier in Sieben and Chen-Yu (1992:74) states that consumers often use garment fit as a means of evaluating the quality of the garment. Le Pechoux (2000) as well as Brown and Rice (1998:39) agree with this view and states that fit affects comfort, as well as wear life or durability of a garment.

When a garment is ill-fitting, the consumer is dissatisfied, irrespective of the quality of the material or the workmanship, or the fashionability of the garment (Winks, 1997a:4). Ill-fitting garments will probably also have negative consequences for clothing retailers and manufacturers because the only true competitive advantage that the clothing industry has is keeping existing customers satisfied, since it is much more cost-effective for the retailer and manufacturer to retain loyal customers instead of seeking new customers all the time (Brown & Rice, 1998:38). The ideal situation for clothing retailers and manufacturers in South Africa is therefore to keep the consumer satisfied with regard to the fit of clothes. One of the challenges that the clothing industry therefore has to meet is to provide garments that will fit a three-dimensional human body form (Knight, 1994:1).

Dissatisfaction with fit of women's ready-to-wear clothing is widely expressed, both in the academic literature and in popular literature (Anderson, Brannon, Ulrich, Presley, Woronka, Grasso & Stevenson, 2001). The inability of the consumer to find satisfactory fit relates to the deviation of the human form from the standard pattern shape, as well as the great variety of human forms (Anderson et al, 2001). By improving the fit of garments, to be consistent with consumers' expectations and as a result improving the perceived quality of garments, clothing retailers and manufacturers can achieve a loyal customer base and expand their business at the same time (Brown & Rice, 1998:38).

From the clothing retailer's and manufacturer's point of view it is not possible to address the consumer's problems with fit without a set of accurate body measurements (Istook & Hwang, 2001:120). The ultimate success of any sizing system lies with the accuracy of body measurements, since problems with fit often originate from outdated and inaccurate measurement data. Size charts currently in use provide outdated standards, which remain the basis for pattern development (Anderson, Brannon & Pittman, 2005) and this eventually leads to ill-fitting garments. The development of new technology such as three dimensional body scanners makes accurate measurements a very real and achievable goal. It allows for the extraction of body measurements within seconds. It also allows consistent measurements and takes measurements without any physical contact, which would be the most desirable method for the majority of people (Simmons & Istook, 2003).

It is assumed that the standards used by the industry in South Africa are also outdated. To be able to revise current standards used by the South African clothing industry, it is first necessary to obtain current measurements of the South African population. It is however important to consider which measurements are needed, and also exactly how they should be measured on the body. One also needs to investigate what practices are followed by the industry in the process of supplying well-fitting garments.

1.2 THE CONCEPT OF FIT AS PART OF GARMENT QUALITY

Fit refers to the way a garment conforms to or differs from the body (Workman & Lentz, 2000:252) or the relationship between apparel and the body (Ashdown & DeLong, 1995:48). Well-fitting garments do not necessarily imply a close fit, it rather refers to the fit being fashionable at a given time (Farmer & Gotwals, 1982: 6). Good fit can be determined by four main factors, namely appearance, comfort, design and fabric. Appearance refers to the visual appeal of the garment when the consumer is wearing it. Attractive garments will however not be worn if they are not comfortable. It is thus important to be able to sit, bend, walk and stretch in any garment without feeling restricted or straining the seams. Design will determine the features of the garment. This creates a certain look, for example close-fitting or loose-fitting. Ease of movement and/or design ease are added to the body measurements when the pattern is created. This ensures that the desired look is created, a certain level of comfort is achieved, and in this way the appearance of the garment is enhanced. Fabric is crucial to good fit. The same style will look and fit differently according to the fabric type used – soft or crisp fabric, for example. The clinging tendency, drape, and grainline (for example, a bias cut) can lead to even a loose fitting garment defining the shape of the body (*Reader's Digest*, 1999:106). For this reason certain fabrics should be avoided when manufacturing for certain figure types. It is thus clear that the intrinsic cues related to fit are linked to the body measurements of the consumer. Consumers often use garment fit as a means of evaluating the quality of the garment (Salusso-Deonier in Sieben & Chen-Yu, 1992:74).

Garment quality is also evaluated by consumers in terms of the extrinsic cues, namely price, brand name, apparel firm's reputation, product presentation and advertising (Brown & Rice, 1998:39 and Glock & Kunz,1995:106). According to Brown and Rice (1998:38), consumers become loyal to certain brands because they can depend on that brand to deliver the same fit every time. Consumers want to be able to select the same size for different styles from the same brand or retailer, and expect a similar fit of the different garments (Glock & Kunz, 1995:106). Sizing and fit standards are often used by apparel firms as a marketing tool and a means of differentiating their products from the competition (Workman, 1991:33). This causes

confusion among consumers about which size to choose. The importance of quality control during production, to ensure consistency in sizing among different styles, is highlighted by Hudson (1980).

It is clear that fit enhances the consumer's evaluation of apparel quality by contributing to both intrinsic and extrinsic attributes of the garment, and that intrinsic as well as extrinsic factors that influence fit relate to body measurements and sizing. This is confirmed by Salusso-Deonier (in Sieben and Chen-Yu, (1992:74) by stating that sizing (and fit as a result) is an essential component of apparel quality assessment.

Apparel fit problems are costly and frustrating for manufacturers and retailers as well as for consumers. When a garment is ill-fitting, the customer is dissatisfied, irrespective of the quality of the material or the workmanship or the garment fashion (Winks, 1997a:4). It is therefore necessary to investigate problems relating to garment fit experienced by consumers. Because a satisfied consumer is so important to the industry, this study will address the problem of fit from the industry's viewpoint. This study aims to determine what the clothing industry is doing to provide their customers with well-fitting garments.

1.3 THE CONSUMER'S PROBLEMS WITH FIT

From the consumer's viewpoint, finding a garment that fits can be a time consuming and frustrating task. Consumers often have to try on several garments before finding one that fits. Sizing and size labelling is often used as a marketing tool or sales function, a way of differentiating between competitors' products (Workman, 1991:38). Accurate size information is beneficial to consumers as well as to manufacturers and retailers because it may improve consumers' perceptions of quality and therefore increase the manufacturers' and/or retailers' competitive edge (Le Pechoux & Ghosh, 2002:11 and Sieben & Chen-Yu, 1992:74). However, the information on size labels in many cases do not assist the consumer in finding the correct size since all the necessary body measurements to facilitate the selection of a garment are not

provided. A study by Chun-Yoon and Jasper (1995) concluded that consumers prefer a size labelling system that features both pictograms and key body dimensions. Such a system would quickly communicate to the consumer the body dimensions the garment was designed for. To add to the confusion, manufacturers often use the same size designation – the number that identifies each size – for clothing that fits different body measurements (Workman & Lentz, 2000: 252; Ashdown, 1998:327; Tamburrino, 1992a:44). Down-sizing strategies are designed to flatter the egos of consumers and are connected to each company's perception of its competitive advantage (Le Pechoux & Ghosh, 2002:11 and Desmarteau, 2000:1). It appeals to the female consumer because it enables her to wear a smaller size. This strategy promotes sales by making the consumer feel good about herself. It contributes to her psychological and social well-being and in this way creates loyalty to the brand or store. Women will always buy from the store where they take the smaller size providing the other factors influencing garment quality are perceived in a positive way (Workman, 1991:32).

Consumers' lack of knowledge concerning which body measurements are necessary when choosing certain garments aggravates the problem. They often do not know how to take their own measurements accurately or which measurements act as key indicators of size (Le Pechoux & Gosh, 2002:11). It therefore seems as if a proper size labelling system and education of salespeople as well as consumers might assist the consumers in their search for well-fitting garments. However, the best size labelling and education campaign will not ensure good fit if the clothing sizes are based on outdated and inaccurate anthropometric or body measurement data.

It is not only female consumers that insist on well-fitting garments. A study by Hogge, Baer and Kang-Park (1988:52) regarding men's clothing preferences, perceived availability and fitting problems, indicated that both older and younger men rate fit as the most important garment property. The clothing industry can therefore not afford to ignore the problem of fit. This is why it is important that the industry continuously renew the standards and systems used for the manufacturing of garments, particularly with regard to the sizing of garments.

1.4 THE INDUSTRY'S PROBLEM WITH FIT

Apparel fit problems are not a new phenomenon. It is however now highlighted by body-fitting fashions. As stated earlier, fit is not only judged in terms of how closely it relates to the body but also in terms of being fashionable at a given time (Farmer & Gotwals, 1982: 6). The current body fitting fashion is one of the reasons why there is a renewed worldwide interest in sizing and fit. One of the challenges that the apparel production and retail industry has to meet is to provide garments that will fit a three-dimensional human body form (Knight, 1994:1). According to Istook and Hwang (2001:120), it is not possible to address the consumer's problems with fit without a set of accurate body measurements. Body measurements are the basis for pattern construction (Workman, 1991:32). Pattern construction has a very important influence on the fit of the garment. Two bodies with the same dimensions but with different attributes may each require a different pattern (Tamburrino, 1992b:54), because the same garment will not fit individuals with similar body measurements but different proportions equally well. Body measurements must therefore be considered together with proportions to enable a decent fit for different people. The apparel industry is moving toward more diversity by providing more choices and therefore should evaluate the basis of its sizing systems and develop new systems that would provide more consumers with better fit (LaBat & DeLong, 1990:44). An accurate sizing system can benefit the retailer by facilitating the selling task in that customers would have to try on fewer garments, and thus reducing the number of returns. Consumers will also benefit from a better fit by having to make less alterations (Tamburrino, 1992c:72,74).

To industry the expense of fit problems may come in the form of returned merchandise, lost sales, more markdowns, unmarketable stock and dissatisfied customers (Senanayake & Little, 2001; Desmarteau, 2000; Winks, 1997b; Tamburrino, 1992c:72). A study by McVey, referred to in Workman (1991:33), revealed that 70% of garments on markdown racks end up as markdowns because of problems in workmanship and/or fit. Workman (1991:32) states that "...retailers [and manufacturers] lose money when garments do not fit properly, do not sell in a timely manner and have to be marked down". To the industry a dissatisfied customer means

lost sales. Dissatisfied customers can also harm the brand image and/or reputation of the manufacturer or retailer, resulting in great financial costs to improve this image again.

Industry's effort to supply well-fitting garments is based on their sizing systems. In its simplest form a sizing system is a set of pre-determined body sizes designated in a standard manner (Winks, 1997b:24). A sizing system generates the size charts, which provide the measurements necessary for garment production (Kunick, 1984:9). Various efforts have been made to standardise sizing systems. The ideal figure influences the underlying systems for sizing apparel. Sizing systems based on ideal proportions are however too limited (LaBat & DeLong, 1990:44).

Chun-Yoon and Jasper (1993) identified the problems with fit as the result of: (1) sizing systems being based on outdated anthropometric data and (2) sizing systems' lack of appropriate sizes to accommodate the full range of variation in body types that exist in the current population. Very few sizing systems accommodate differences in body proportions related to age, ethnicity or body weight (Winks, 1997a; Goldsberry, Shim & Reich, 1996b and Giddings & Boles, 1990). One of the problems encountered when designing for people, especially in South Africa with its multi-cultural population, is that they are different; for instance, tall or short, slim or fat, long arms, short legs, big heads, small feet, young or old (Ashby, 1978:1). This can be overcome if the variation in the size of a population is given due consideration. It is however necessary to establish limits to the variability that can be accommodated (Ashby, 1978:1,2), and this is the function of a sizing system for clothing. Current sizing systems are based on the principle that the difference between sizes is measurable in equal linear distances. Linear increments between sizes in a sizing system facilitate pattern making and grading. Actual human measurements, however, do not support the assumption that the difference between the principal girths is constant (Schofield in Desmarteau, 2000:2). It is clear that how and where these measurements should be measured on the human body must be described in detail, to be able to make accurate assumptions and comparisons.

The selection of key dimensions to develop sizing systems offers another problem. Key dimensions are measurements that serve as predictors of the sizes of other

parts of the body (Chun-Yoon & Jasper, 1996:90). A key dimension is a body dimension that has a strong relationship with most other body dimensions that are important to the garment. According to Winks (1990:22), the correlations among relevant body measurements are critical in the manufacture of body-fitting garments. Key dimensions are fundamental to the definition of body size and are used to assign an appropriately sized garment to a wearer (Winks, 1997b:24 and ISO/TR 10652, 1991:1). It is therefore critical for fit that one is exactly sure how and where these key dimensions should be measured on the human body. For consistency in sizing it is also important that the key dimensions be measured in a standardised way by all manufacturers and retailers. According to Green (1981:28), key dimensions could be used to generate the matrix of intervals on which an entire system of sizes could be imposed. Key dimensions should fulfil the following requirements: they should 1) be convenient to measure; 2) be an integral part of the garment; 3) have a high degree of correlation with other dimensions important in design and sizing; and 4) not correlate highly with each other (McConville in Chun-Yoon & Jasper, 1996:90).

Key dimensions, however, are not the only important factor in the prediction of body shape. Ashdown (1998:324), in collaboration with graduate student Beatrix Paal, developed a method from which an optimised sizing system can be inferred that uses as many body dimensions as are needed to account for the variability in the population. These sizing systems will potentially fit the population better than sizing systems based on one or two dimensions only, as is currently the case in most instances. The goal of any sizing system is to choose subgroups of the population in such a way that a limited number of sizes will provide clothing that fit most individuals in the population, while taking into account the variability within the population (Ashdown, 1998:324,325).

Differences in body shapes and sizes are repeatedly put forward as a reason why a workable standard sizing system cannot be reached (Winks, 1997b:46; Price & Zamkoff in Workman, 1991:32,34). Desmarteau (2000:6) considers body shape as the missing link to achieve better fit. It is also important to keep in mind that people's shape and proportion change over time as a result of change in nutrition, lifestyle, ethnic composition and age (Goldsberry, Shim & Reich, 1996a:109). Very few sizing systems accommodate differences in body proportions, for example as a result of

age, ethnicity or body weight (Winks, 1997a:4; Goldsberry, Shim & Reich, 1996b; Giddings & Boles, 1990). The most difficult aspect of sizing, especially large-size sizing, is the variance in body type. The differences between body types become more pronounced in larger women (Lebow, 1985:14). It is obvious that variation in body shape must be incorporated in any system that sets out to meet the requirements of the population. The best way to provide for variation in shape is to construct separate size charts for this purpose (Kunick, 1984:19). The development of new technology such as three-dimensional body scanners makes it possible to take body shape into account when developing sizing systems (Workman & Lentz, 2000:258). It also makes more accurate measurements a very real and achievable goal since the ultimate success of any sizing system lies with the accuracy of body measurements. Fit problems originate from outdated and inaccurate measurement data.

When designing for a market, it is necessary to have available reliable anthropometric data, otherwise the product (in the case of this study, apparel and shoes) may be totally unsuitable for the user (Ashby, 1978:4). Scientific garment cutting is based upon measurements of the human form. The correct set of body measurements related to the specific product is vitally important. Various aspects can determine which body measurements are required to manufacture certain garments, for example who the garment is for and which part of the body will be covered by the garment. Tamburrino (1992b:52,54) explains for example that a tailored jacket may require at least six dimensions for construction, namely chest or bust girth, waist girth, seat girth, jacket length, sleeve length and waist length, while a men's dress shirt requires three dimensions – neck girth, shoulder girth and sleeve length. These measurements are the first steps towards drafting a correct pattern. Fit is determined by pattern making (Hudson, 1980:109), and pattern making starts with the body measurements. According to Morris (194?:14), the finest cutting system in existence would be a complete failure if the measurements used in conjunction with it were inaccurate.

The situation in South Africa, with its multi-cultural population, regarding sizing and fit is not different from anywhere else in the world. To be able to solve fit problems, it is however necessary to know how the industry functions with regard to providing well-

fitting garments. The problem that exists and that will be addressed in this study is that very little is known about how the South African clothing industry ensures well-fitting garments.

1.5 CONCEPTUAL FRAMEWORK, PROBLEM STATEMENT AND OBJECTIVES FOR THE STUDY

This study is approached from the viewpoint that if population measurements are not current and accurate, all the other aspects cannot contribute to the achievement of an acceptable or proper fit. This is illustrated in the conceptual framework as presented in **Figure 1.1**.

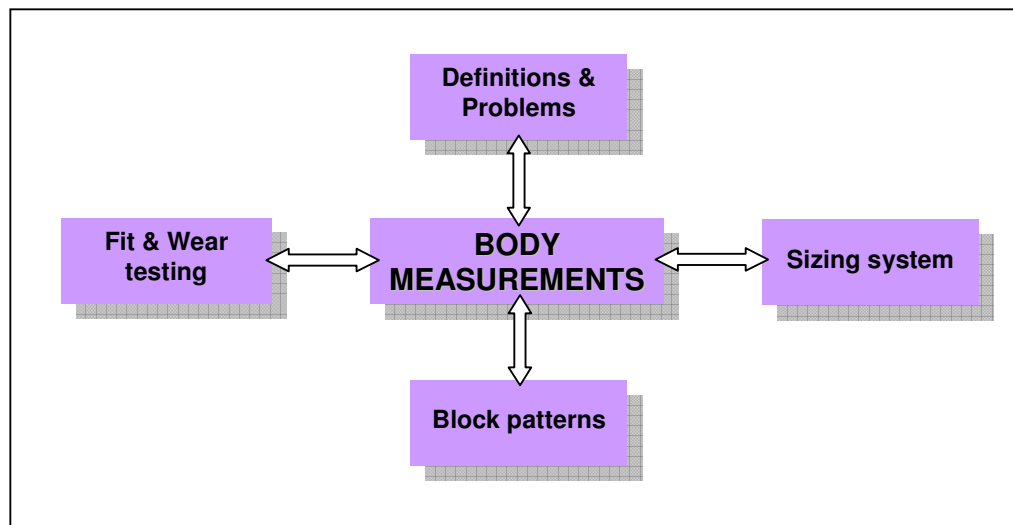


FIGURE 1.1: CONCEPTUAL FRAMEWORK

Body measurements are the focus of the study because they will determine the applicability of a sizing system for a population, the accuracy of the block patterns and the relevance of the fit and wear testing. Almost no information is available on how the South African clothing industry operates regarding the use of body measurements and ensuring well-fitting garments. The problem that will therefore be

addressed in this study is how the South African clothing industry ensures well-fitting garments for their customers.

Subproblems that arise are the following:

- ✓ Which measurements should be included in a South African database?
- ✓ How are these measurements described by the industry?
- ✓ What are the problems regarding body measurements?
- ✓ What is the origin of the South African sizing system?
- ✓ How do the sizing systems currently used in South Africa function?
- ✓ How are block patterns generated?
- ✓ How is fit testing done?
- ✓ How is wear testing done?

Since almost no information is available about the measurements and sizing systems used in the South African clothing industry, and keeping in mind the conceptual framework in **Figure 1.1**, the following objectives are set for this study:

1. To compile a comprehensive list of all body measurements required by South African apparel manufacturers and retailers, covering the garments in the following categories:
 - ✓ Men's/Boys'/Women's/Girls'/Babies' garments that cover the full body;
 - ✓ Men's/Boys'/Women's/Girls'/Babies' garments that cover the upper body;
 - ✓ Men's/Boys'/Women's/Girls'/Babies' garments that cover the lower body;
 - ✓ Men's/Boys'/Women's/Girls'/Babies' headwear;
 - ✓ Men's/Boys'/Women's/Girls'/Babies' gloves;
 - ✓ Men's/Boys'/Women's/Girls'/Babies' footwear.
2. To compare international descriptions of the identified body measurements with the South African respondents' descriptions and evaluation of the identified body measurements.
3. To describe the problems experienced with body measurements by the South African manufacturers and/or retailers.

4. To describe currently used South African sizing systems.
5. To describe how block patterns are generated by the South African manufacturers and/or retailers.
6. To describe how fit testing is done by the South African manufacturers and retailers.
7. To describe how wear testing is done by the South African manufacturers and retailers.

1.6 COURSE OF THE STUDY

1.6.1 Chapter 2: Theoretical framework

This chapter explains the theoretical framework of Ashdown, which forms the basis of the conceptual framework for the study. Concepts are clarified and the research problem is stated in this chapter.

1.6.2 Chapter 3: Research design

This is a discussion of the plan according to which the research is conducted. It gives the objectives of the study and then the research strategy, sampling, data collection methods, data analysis and ways to ensure validity and reliability of the data are explained.

1.6.3 Chapter 4: Results, discussion and interpretation

In this chapter the results of the research are presented in tables, bar charts and pie charts according to the objectives of the study. The results are also discussed and interpreted and possible explanations for the results are presented.

1.6.4 Chapter 5: Conclusion, recommendations and evaluation

In the final chapter conclusions are made regarding the South African clothing industry and the way that well-fitting garments are ensured. Recommendations are made to the clothing industry. The study is also evaluated in terms of strengths and weaknesses, and recommendations are made for future studies.

For further reference the questionnaires for the postal survey are included in **Addendum A**, the interview schedule in **Addendum B** and the results and discussion of the descriptions of some body measurements are included in **Addendum C**. These are the body measurements for which no international description is available, and where respondents gave only one or no description.

The technical presentation and references are done in accordance with the requirements of the Department of Consumer Science at the University of Pretoria. The method for referencing is a variation of the Harvard method. The report is written in British/South African English.