SIZING FOR ETHNICITY IN MULTI-CULTURAL SOCIETIES: VALIDATION OF THE SIZE SPECIFICATIONS FOR YOUNG SOUTH AFRICAN WOMEN OF AFRICAN DESCENT

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OPSOMMING

Muthambi *et al* (2015) het grootte-spesifikasies voorgestel vir jong Suid-Afrikaanse vroue van Afrika-afkoms met driehoekvormige liggaamsbou. Hierdie opvolgstudie was daarop gemik om vas te stel of die grootte-spesifikasies soos voorgestel in Muthambi *et al* (2015) aan Suid-Afrikaanse vroulike studente van Afrika-afkoms met driehoekvormige liggaamsbou 'n verbeterde algehele kwaliteit van passing bied. Kwaliteit van passing is geëvalueer op 'n nie-verteenwoordigende steekproef van een deelnemer per grootte. 'n Paneel vakkundiges met ervaring in die evaluering van kledingpassing (*apparel fit*) het die toetskledingstukke se kwaliteit van passing geëvalueer. Die bevindinge dui daarop dat die heersende Suid-Afrikaanse groottebepaling (*sizing*) nie voldoende voorsiening maak vir aanvaarbare algehele kwaliteit van passing vir jong Suid-Afrikaanse vroue van Afrika-afkoms met driehoekvormige liggaamsbou nie. Die eenheid van analise is gekenmerk deur 'n heupmaat wat groter is as die borsmaat. Die deelnemers het toetskledingstukke benodig wat, gebaseer op die heersende Suid-Afrikaanse standaardmates, twee groottes groter gesny moes word, dit wil sê volgens die grootte-spesifikasies soos voorgestel in Muthambi *et al* (2015) om hul groter heupmate te akkommodeer. Die toetskledingstukke wat volgens die heersende Suid-Afrikaanse standaardmates ontwikkel is, het dus 'n te los passing in die bolyf getoon. Die toetskledingstukke wat gesny is volgens die grootte-spesifikasies voorgestel in Muthambi *et al* (2015), was ontwerp om die groter onderlyfmate van die deelnemers te akkommodeer, en het derhalwe vir die deelnemers 'n verbeterde algehele kwaliteit van passing gebied. Daar word aan die hand gedoen dat die grootte-spesifikasies wat in Muthambi *et al* (2015) voorgestel word, as riglyn gebruik word by die bepaling van standaardgroottes vir kledingstukke bedoel vir Suid-Afrikaanse vroue van Afrika-afkoms met driehoekvormige liggaamsbou.

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INTRODUCTION

Findings of recent studies conducted on the apparel fit satisfaction of African women have repeatedly shown that female consumers from all cultural backgrounds are dissatisfied with the quality of fit of ready-to-wear apparel (Jason, 2011:iv; Nkambule, 2010:iii; Zwane & Magagula, 2007). The problems experienced with the quality of fit of ready-to-wear apparel may be attributed to ready-to-wear apparel being designed to fit women with the Western ideal body shape (Zwane & Magagula, 2007). However, according to findings of recent anthropometric studies, the majority of African women do not have the Western ideal body shape (Lee *et al*, 2007; Makhanya *et al*, 2014; Mastamet-Mason, 2008:154). In South Africa,

Article based on a paper read at the joint 11th International SAAFECS Conference and the 6th IHEA Regional African Conference, Pretoria, South Africa. 27 February 2013 – 1 March 2013.

the findings of a recent anthropometric study suggest that 58,7% of South African women of African descent have a triangular body shape (Makhanya *et al*, 2014).

South African consumers, and especially the growing black middle class, are brand conscious and are willing to pay high prices for luxury apparel items of high quality (PricewaterhouseCoopers, 2012). This challenges manufacturers and retailers in South Africa to provide black consumers with well-fitting clothes.

Muthambi *et al* (2015) proposed size specifications for young women of African descent with triangular shaped bodies. The findings of Muthambi *et al* (2015) suggest that current South African sizing based on the Western ideal body shape may not adequately accommodate young South African females of African descent with a triangular body shape. This exploratory study therefore aimed to determine whether the size specifications proposed in Muthambi *et al* (2015) offer South African female students of African descent with triangular body shapes an improved overall quality of fit.

LITERATURE

Apparel fit

Apparel fit is defined as the conformance of the garment to the shape and size of the human body (Chen, 2007; Yu, 2004:31). It is difficult to define a universally well-fitted garment since the concept of appropriate fit is influenced by fashion trends, the fit preferences of the individual, and many other factors (Ashdown & O'Connell, 2006; Pisut & Connell, 2007; Song & Ashdown, 2010; Yu, 2004:31). Well-fitted garments are comfortable to wear, allow sufficient ease for freedom of movement, and are free of undesirable wrinkles (Song & Ashdown, 2010). According to Chen (2007), apparel fit problems arise when there is an incongruent relationship between the garment and the human body. Chen (2007) is of the opinion that the garment's conformance to the shape and size of the human body depends on the five principles of apparel fit i.e. ease, line, set, balance, and grain. These are present in every garment and provide a framework to describe good fit (Petrova & Ashdown, 2008). Good fit is present when all five principles of apparel fit are present and is lacking if any of the five principles of apparel fit is absent.

In addition to the five principles of apparel fit, several standards of apparel fit have been formulated for the evaluation of the quality of fit of apparel. The standards of apparel fit are basic rules that describe how specific areas of a garment should fit (Myers-McDevitt, 2009:242). The principles of apparel fit provide a generic framework to evaluate apparel fit, as they are not rules that describe how specific areas of a garment should fit. The standards of apparel fit, however, provide criteria for evaluating the fit of the different areas of the garment.

Fit evaluation

Clothing fit is generally evaluated by qualitative methods, but the main drawback is the lack of precision and ineffective communication (Yu, 2004:72). Objective methods, on the other hand, are generally time consuming and often require expensive equipment. Bye and DeLong (1994) used an expert panel of 11 members for the visual analysis of the results of two pattern grading methods. Kohn and Ashdown (1998) used video-captured images for the fit analysis of women's jackets, while Schofield *et al* (2006) used a panel of four experts and video images to assess the fit of women's pants. Ashdown *et al* (2004) used three-dimensional body scans for visual fit analysis and found this method to be reliable. All these researchers found visual analysis combined with expert analysis capable of defining the interactions of the garment/body interface. However, the challenge of precision and effective communication remains.

Body shapes and apparel fit

The apparel industry and consumers alike have dismissed the notion of the 'unique body and expect all bodies to fit into standard-sized garments' in the same manner (Bye *et al*, 2006). The problems experienced with the fit of ready-to-wear apparel may be attributed to ready-to-wear apparel being designed to fit women with an ideal body shape (Zwane & Magagula, 2007). In the ideal body shape, the body appears well-balanced due to the upper body and the lower body being similar in proportion (Mastamet-Mason, 2008:57; Zwane & Magagula, 2007). Apparel sizing systems are at present based on the ideal body shape. With ready-to-wear apparel being designed to fit the ideal body shape, women with other body shapes may experience poor quality of fit due to the anatomical differences between the ideal body shape and the other body shapes. In a study by Zwane and Magagula

TABLE 1:   COMPARATIVE SIZE SPECIFICATIONS

Horizontal measurements		6/30	8/32	10/34	12/36	14/38	Grade
Bust	Proposed	81,00 cm	85,00 cm	89,00cm	93,00 cm	97,00 cm	±4,00 cm
	Current	81,00 cm	85,00 cm	89,00 cm	93,00 cm	97,00 cm	±4,00 cm
Waist	Proposed	70,08 cm	73,36 cm	76,64 cm	79,92 cm	83,20 cm	±3,28 cm
	Current	61,00 cm	65,00 cm	69,00 cm	73,00 cm	77,00 cm	±4,00 cm
Hips	Proposed	96,37 cm	100,42 cm	104,47 cm	108,51 cm	112,56 cm	±4,05 cm
	Current	88,00 cm	92,00 cm	96,00 cm	100,00 cm	104,00 cm	±4,00 cm
Shoulder	Proposed	11,05 cm	11,29 cm	11,54 cm	11,78 cm	12,03 cm	±0,25 cm
	Current	12,33 cm	12,67 cm	13,00 cm	13,33 cm	13,67 cm	±0,33 cm
Across chest	Proposed	29,05 cm	30,27 cm	31,48 cm	32,69 cm	33,90 cm	±1,21 cm
	Current	31,33 cm	32,67 cm	34,00 cm	35,33 cm	36,67 cm	±1,33 cm
Across back	Proposed	31,05 cm	31,77 cm	32,49 cm	33,21 cm	33,93 cm	±0,72 cm
	Current	34,33 cm	35,67 cm	37,00 cm	38,33 cm	39,67 cm	±1,33 cm
Bust span	Proposed	17,66 cm	18,01 cm	18,36 cm	18,70 cm	19,05 cm	±0,35 cm
	Current	16,67 cm	17,33 cm	18,00 cm	18,67 cm	19,33 cm	±0,67 cm
Vertical measurements		6/30	8/32	10/34	12/36	14/38	Grade
Centre front	Proposed	35,80 cm	35,80 cm	35,80 cm	35,80 cm	35,80 cm	±0,00 cm
	Current	36,67 cm	37,33 cm	38,00 cm	38,67 cm	39,33 cm	±0,67 cm
Centre back	Proposed	40,38 cm	40,38 cm	40,38 cm	40,38 cm	40,38 cm	±0,00 cm
	Current	40,33 cm	41,17 cm	42,00 cm	42,83 cm	43,67 cm	±0,83 cm
Front shoulder height	Proposed	42,59 cm	42,59 cm	42,59 cm	42,59 cm	42,59 cm	±0,00 cm
	Current	43,00 cm	44,00 cm	45,00 cm	46,00 cm	47,00 cm	±1,00 cm
Back shoulder height	Proposed	42,29 cm	42,29 cm	42,29 cm	42,29 cm	42,29 cm	±0,00 cm
	Current	44,00 cm	45,00 cm	46,00 cm	47,00 cm	48,00 cm	±1,00 cm
Bust-to-waist	Proposed	17,40 cm	17,40 cm	17,40 cm	17,40 cm	17,40 cm	±0,00 cm
	Current	15,83 cm	16,17 cm	16,50 cm	16,83 cm	17,17 cm	±0,33 cm
Side seam	Proposed	23,92 cm	23,92 cm	23,92 cm	23,92 cm	23,92 cm	±0,00 cm
	Current	19,33 cm	19,67 cm	20,00 cm	20,33 cm	20,67 cm	±0,33 cm
Waist-to-hip	Proposed	21,26 cm	21,26 cm	21,26 cm	21,26 cm	21,26 cm	±0,00 cm
	Current	18,67 cm	19,33 cm	20,00 cm	20,67 cm	21,33 cm	±0,67 cm
Waist-to-knee	Proposed	52,91 cm	52,91 cm	52,91 cm	52,91 cm	52,91 cm	±0,00 cm
	Current	51,54 cm	52,54 cm	53,54 cm	54,54 cm	55,54 cm	±1,00 cm

(2007), sizing based on the ideal body shape was found to be incapable of providing Swazi women with a triangular body shape with overall good quality of fit. Muthambi *et al* (2015) developed a sizing system to accommodate the body sizes of young African women with a triangular body shape. Table 1 shows the differences between the current sizing system and the proposed sizing system.

METHODOLOGY

Sampling

Non-probability purposive convenience sampling was used to select the participants that were used as models for the fit evaluation. The sample for the fit evaluation was drawn from the same urban University in South Africa where the sample for the size specifications presented in Table 1 was drawn. The participants were of African descent and were aged between 18 and 25 years. The participants were recruited through word of mouth and snowball sampling. Interested participants were screened against the measurements of the proposed size specifications. The bust, waist, hip, and centre back measurements were used for participant screening. The centre back measurement was the only vertical measurement used, since all vertical measurements have good correlation with each other according to Gupta and Gangadhar (2004). The key dimensions for the different sizes and the key dimensions of the participants are shown in Table 2. The participants selected for the study, despite not having the exact measurements required for participation in the study, were selected because most of their measurements were close to the required body measurements. Considering the exploratory nature of the study and the time-consuming nature of fit evaluation (Petrova & Ashdown, 2008), quality of fit was evaluated on a non-representative sample of

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one participant per size. Quality of fit was evaluated only up to size 12/36 as there were no individuals wearing size 14/38 willing to participate in the study.

Construction of the test garments

A basic sheath dress was chosen as the test garment for this study as it conforms closely to the key body measurements (i.e. bust, waist, and hips). Drafting of the patterns and construction of the test garments are discussed in the following paragraphs.

To draft the patterns for the test garments sized according to the current size specifications, a basic sheath dress was drafted to fit a size 10/34 *Figure Forms™* dress form. The shape of the dress form used in the study closely resembles the Western ideal body shape on which the current apparel sizing is predominantly based, and which is widely used in the South African apparel industry. The basic sheath dress was drafted according to the method set out in the patternmaking text *Make your own patterns* by Bergh (1995:14-25), using free2Design™ software (version 2007.1.106.3). Due to the close fit required for this study, a 4 cm, 2 cm and 4 cm ease allowance was added to the bust, waist and hip measurements respectively. The size 10/34 basic sheath dress pattern was then graded into different sizes using the grades specified in *Professional pattern grading for women's, men's, and children's apparel* by Handford (2003:17-48. To draft the pattern for the test garments based on the proposed size specifications, a basic sheath dress was drafted to fit the measurements of size 10/34 of the proposed size specifications

and graded according to the grades specified in the developed size specifications.

Toiles were constructed from calico to test the fit of the patterns prior to constructing the final test garments. The quality of fit of the toiles was evaluated on adjustable dress forms. The researcher did not observe any fit problems on the toiles. No adjustments were thus made on the patterns before the final test garments were constructed.

The final test garments were constructed from gingham using the same construction techniques, to ensure uniformity in the appearance of the test garments and to avoid creating bias during fit evaluation (Murphy, 1993:65). Gingham was selected for the construction of the test garments because the lengthwise and crosswise grains are clearly visible, which makes fit evaluation easier. The sheath dress had a centre back zipper opening. Closed seams, finished with an over-locker were used throughout the dress, with the exception of the open seam at centre back where the zipper was inserted. The neckline and armholes were finished with bias binding. The hem was folded and topstitched by machine. The sizes shown in Table 3 were constructed (despite not all the test garments being evaluated for fit on the participants.

Fit evaluation

Since the concept of appropriate fit varies amongst different people, and in order to enhance inter-rater reliability, the evaluators were given fit standards on which to evaluate the quality of fit of the test garments, for

TABLE 2: KEY DIMENSIONS FOR PARTICIPANT SELECTION

Key body dimensions for participant selection					
Participant	A	B	C	D	E
Size	6/30	8/32	10/34	12/36	14/38
Bust	81,00 cm	85,00 cm	89,00 cm	93,00 cm	97,00 cm
Waist	70,08 cm	73,36 cm	76,64 cm	79,92 cm	83,20 cm
Hip	96,37 cm	100,42 cm	104,47 cm	108,51 cm	112,56 cm
Centre back	40,38 cm	40,38 cm	40,38 cm	40,38 cm	40,38 cm
Actual body dimensions of the participants					
Participant	A	B	C	D	E*
Size	6/30	8/32	10/34	12/36	14/38
Bust	80,00 cm	89,00 cm	90,00 cm	92,00 cm	-
Waist	73,00 cm	71,00 cm	74,50 cm	77,00 cm	-
Hip	98,00 cm	100,00 cm	103,50 cm	110,50 cm	-
Centre back	40,00 cm	38,00 cm	42,00 cm	39,00 cm	-

* There were no individuals wearing size 14/38 willing to participate in the study.

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TABLE 3:   SIZES OF THE TEST GARMENTS CONSTRUCTED

Proposed test garments	Current test garments
6/30*	6/30
8/32*	8/32
10/34*	10/34*
12/36*	12/36*
14/38	14/38*
	16/40*
	18/42
	20/44

* Test garments evaluated on the participants

example, the standard for fit around the bust stated that 'The garment fits smoothly over the bust without excess ease or strain' (Bye *et al*, 2008; Myers-McDevitt, 2009:244).

An evaluation form was compiled to evaluate the quality of fit of the test garments (see Table 5 for the 17 items included in the evaluation form). The form consisted of nine-point bipolar semantic differential scales (ranging from –4 to +4). For example, to measure the quality of fit of the test garment over the bust, two bipolar statements were formulated, namely 'the bodice is too tight over the bust' and 'the bodice is too loose over the bust'. The middle position '0' of each scale indicated a good quality of fit (Yu, 2004:38). The semantic differential scales were supplemented with a few open-ended questions to measure aspects of apparel fit that could not be measured accurately using the semantic differential scales. A self-anchored rating scale measuring the overall quality of fit of a test garment on a scale of 1 to 9 was included at the end of the questionnaire, with a rating of 1 representing a poor quality of fit and a rating of 9 representing a good quality of fit.

A panel of three professionals with experience in apparel fit evaluation evaluated the quality of fit of the test garments on young African women with triangular shaped bodies wearing size 6/30 to size 12/36 (refer to Table 2 for the body measurements of the participants). The fit evaluators were academics, each with more than five years' experience in teaching pattern design, pattern fitting and garment construction. The fit panel members were not involved in the

study, in order to increase the objectivity of the fit evaluation. Each member of the panel independently evaluated the quality of fit of each test garment during the individual fit evaluation sessions. The test garments were labelled A to H to avoid creating size perception bias (Campbell & Horne, 2001).

Sizing in the apparel industry is currently based on the ideal body shape (Zwane & Magagula, 2007); consequently, the test garments developed from the current size specifications have similar bust and hip measurements (see Table 1). With the unit of analysis being characterised by hips that are larger than the bust, the participants required test garments sized according to the current size specifications that were two sizes larger than test garments sized according to the proposed size specifications, to accommodate their larger hips. For instance, Participant B (with body measurements corresponding to size 8/32 in the proposed size specifications) wore a size 12/36 test garment sized according to the current size specifications during the fit evaluation session to accommodate her larger hips (the sizes worn by the participants are shown in Table 4). In Zwane and Magagula (2007) the participants required test garments that were three sizes larger to accommodate their larger hips.

Data analysis

Descriptive statistical techniques (i.e. means) were used to determine whether the proposed size specifications offer South African female students of African descent with triangular body

TABLE 4:   SIZES WORN BY THE PARTICIPANTS

Participant	A	B	C	D	E*
Current test garments	10/34	12/36	14/38	16/40	-
Proposed test garments	6/30	8/32	10/34	12/36	-

* There were no individuals wearing size 14/38 willing to participate in the study

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TABLE 5:   QUALITY OF FIT ATTAINED FROM THE PROPOSED SIZE SPECIFICATIONS

Fit evaluation on body parts	6/30	8/32	10/34	12/36	Mean
The fit of the test garment around the neckline*	2,00	2,33	3,00	2,67	2,50
The fit of the test garment across the shoulders*	2,67	3,00	3,00	2,67	2,84
The alignment of the shoulders of the test garment with the shoulders of the participant*	2,67	3,00	3,00	2,00	2,67
The fit of the test garment across the chest*	2,67	3,00	3,00	2,33	2,75
The fit of the test garment across the upper back*	3,00	2,67	2,67	2,67	2,75
The fit of the test garment around the armhole*	3,00	3,00	3,00	3,00	3,00
The fit of the test garment around the bust*	3,00	3,00	3,00	3,00	3,00
The position of the bust on the test garment*	3,00	2,00	2,00	1,33	2,08
The fit of the test garment around the midriff*	2,67	2,33	3,00	3,00	2,75
The position of the waist on the test garment*	2,67	3,00	3,00	3,00	2,92
The fit of the test garment around the waist*	2,67	2,67	2,67	3,00	2,75
The fit of the test garment over the abdomen*	2,33	2,33	2,33	2,33	2,33
The position of the hips on the test garment*	3,00	3,00	2,33	2,67	2,75
The fit of the test garment around the upper hips*	2,33	2,67	2,00	2,00	2,25
The fit of the test garment around the hips*	3,00	2,67	2,33	2,67	2,67
The set of the hem at the front of the test garment*	3,00	3,00	2,67	3,00	2,92
The set of the hem at the back of the test garment*	3,00	3,00	3,00	2,67	2,92
Overall quality of fit	2,75	2,75	2,71	2,59	2,70

*Evaluation scale: 3 = good quality of fit; 2 = moderate quality of fit; 1 = poor quality of fit

shapes an improved quality of fit.

Prior to calculating the means, the nine categories of the semantic differential scales were reduced to three categories and assigned scores of 1 to 3, with a score of 1 representing the category of poor quality of fit and a score of 3 representing the category of good quality of fit. With the quality of fit measured on a scale of –4 to +4, the means were not calculated from the raw data since the raw data has the potential of distorting the means due to the addition of positive and negative numbers. In Schofield *et al* (2006) the fit evaluation data was also summarised into three categories, namely of 'good fit', 'moderate fit', and 'poor fit'.

RESULTS AND DISCUSSION

It is clear from Table 5 that the proposed size specifications provided the participants with a moderate-to-good quality of fit at all key fit points, with the means in the range of 2,08 to 3,00 and a mean of 2,70 for an overall quality of fit. Around the bust and the armholes, the proposed size specifications provided the participants with perfect fit (mean = 3). High moderate quality of fit was attained at the following key fit points, namely across the shoulders (mean = 2,84), across the chest and upper back (means = 2,75), around the midriff (mean = 2,75), around the waist (mean = 2,75), the position of the waist (mean = 2,92), the

position of the hips (mean = 2,75), and around the hips (mean = 2,67). Poor quality of fit was not reported at any key fit point in the proposed test garments; however, the poorest quality of fit was reported at the position of the bust (mean = 2,08), over the abdomen (mean = 2,33), and around the upper hips (mean = 2,25).

Table 6 shows that the current size specifications provided a mean of 2,40 for overall quality of fit, which is less than the mean of the proposed size specifications for overall quality of fit (mean = 2,70). Moderate-to-good quality of fit was attained at key fit points, such as the shoulder position (mean = 2,83), around the neckline (mean = 2,92), the position of the hips (mean = 3,00), and around the hips (mean = 2,84). Around the hips, a fairly good quality of fit was anticipated and attained as the sizes for the current test garments had to be chosen according to the participants' hip measurements, since they could not fit into current test garments selected according to their bust measurements. Consequently it was anticipated that a good quality of fit would not be attained around the bust. As may be seen in Table 6, the poorest quality of fit, due to the loose fit, was reported around the bust (mean = 1,83), the position of the bust (mean = 1,42), and around the midriff (mean = 1,75). The test garments also did not fit well across the chest (mean = 2,08) and the upper back (mean = 2,25), where loose fit was also experienced.

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TABLE 6:   QUALITY OF FIT ATTAINED FROM THE CURRENT SIZE SPECIFICATIONS

Fit evaluation on body parts	10/34	12/36	14/38	16/40	Mean
The fit of the test garment around the neckline*	3,00	3,00	2,67	3,00	2,92
The fit of the test garment across the shoulders*	2,50	2,67	2,00	2,67	2,46
The alignment of the shoulders of the test garment with the shoulders of the participant*	2,33	3,00	3,00	3,00	2,83
The fit of the test garment across the chest*	2,00	2,00	2,00	2,33	2,08
The fit of the test garment across the upper back*	2,33	2,00	3,00	1,67	2,25
The fit of the test garment around the armhole*	3,00	2,33	2,67	2,33	2,58
The fit of the test garment around the bust*	1,67	2,00	2,33	1,33	1,83
The position of the bust on the test garment*	1,00	1,67	2,00	1,00	1,42
The fit of the test garment around the midriff*	1,67	1,67	2,33	1,33	1,75
The position of the waist on the test garment*	2,33	2,33	2,33	2,00	2,25
The fit of the test garment around the waist*	2,33	2,00	2,67	2,67	2,42
The fit of the test garment over the abdomen*	2,33	2,33	3,00	2,67	2,58
The position of the hips on the test garment*	3,00	3,00	3,00	3,00	3,00
The fit of the test garment around the upper hips*	2,67	2,67	2,67	2,67	2,67
The fit of the test garment around the hips*	2,67	3,00	3,00	2,67	2,84
The set of the hem at the front of the test garment*	3,00	2,67	3,00	3,00	2,91
The set of the hem at the back of the test garment*	2,33	1,67	2,33	2,00	2,08
Overall quality of fit	2,36	2,35	2,59	2,31	2,40

* Evaluation scale: 3 = good quality of fit; 2 = moderate quality of fit; 1 = poor quality of fit

TABLE 7:   COMPARATIVE MEANS FOR THE QUALITY OF FIT OF THE TEST GAR-

Fit evaluation on body parts	Proposed	Current
The fit of the test garment around the neckline*	2,50	2,92
The fit of the test garment across the shoulders*	2,84	2,46
The alignment of the shoulders of the test garment with the shoulders of the participant*	2,67	2,83
The fit of the test garment across the chest*	2,75	2,08
The fit of the test garment across the upper back*	2,75	2,25
The fit of the test garment around the armhole*	3,00	2,58
The fit of the test garment around the bust*	3,00	1,83
The position of the bust on the test garment*	2,08	1,42
The fit of the test garment around the midriff*	2,75	1,75
The position of the waist on the test garment*	2,92	2,25
The fit of the test garment around the waist*	2,75	2,42
The fit of the test garment over the abdomen*	2,33	2,58
The position of the hips on the test garment*	2,75	3,00
The fit of the test garment around the upper hips*	2,25	2,67
The fit of the test garment around the hips*	2,67	2,84
The set of the hem at the front of the test garment*	2,92	2,91
The set of the hem at the back of the test garment*	2,92	2,08
The overall fit of the test garment	2,70	2,40

* Evaluation scale: 3 = good quality of fit; 2 = moderate quality of fit; 1 = poor quality of fit

The means of the current test garments were on average lower than the means of the proposed test garments, as is shown in Table 7. In terms of overall quality of fit, the proposed test garments have a mean of 2,70 with the current test garments having a mean of 2,40. From Table 7, and from Figures 1 and 2, it is clear that the test garments developed from the proposed size specifications generally offered the unit of analysis an improved overall quality of fit compared to the test garments developed from the current size specifications. The test garments developed from the current size specifications were found to have a loose fit in

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FIGURE 1:   QUALITY OF FIT ATTAINED FROM THE CURRENT SIZE SPECIFICATIONS ON PAR-TICIPANT B

FIGURE 2:   QUALITY OF FIT ATTAINED FROM THE PROPOSED SIZE SPECIFICATIONS ON PAR-TICIPANT B

the upper body when the test garments fitted the lower bodies of the participants, as is shown in Figure 1. The proposed test garment in Figure 2 has a closer fit in the upper body due to the absence of the excess ease that is noticeable in the test garment sized according to the current size specifications. Consequently, the proposed test garments were considered to offer the young South African women of African descent with a triangular body shape an improved overall quality of fit.

Despite the proposed test garments offering the participants an improved overall quality of fit, the proposed test garments did not offer the participants an improved quality of fit around the hips. The current test garments have a mean of 2,84 whereas the proposed test garments have a mean of 2,67. The proposed test garments were considered to have loose fit around the hips. The loose fit that was observed by the panel of professional fit evaluators may be attributable to the slightly weaker correlation between the bust and the hips reported in Muthambi *et al* (2015). In Muthambi *et al* (2015), the bivariate correlation analysis indicated a correlation (r_{xy}) of 0,81 between the bust and the waist, and a correlation of 0,75 between the bust and the hips (Table 8). Consequently, the proposed test garments had a better quality of fit around the waist compared to the quality of fit around the hips, due to the higher correlation between the bust and the waist compared to the correlation between the bust and the hips.

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

The findings of the study suggest that current South African sizing based on the ideal body shape may not adequately provide young South African women of African descent with a triangular body shape, with an acceptable overall quality of fit. With South African ready-to-wear apparel sizing based on the Western ideal body shape, there are problems with the quality of fit of ready-to-wear apparel, as the findings of this study suggest. In Muthambi *et al* (2015), the findings suggested that young South African women of African descent with triangular shaped bodies may experience loose fit in the upper body of garments sized according to current South African size specifications, due to the current South African size specifications being based on the balanced ideal body shape. In confirmation, the test garments developed from the current size specifications were found to have a loose fit in the upper body when the test garment fitted the lower body of the participant.

The findings of the study are also consistent with the findings of Zwane and Magagula (2007), which suggest that sizing based on the ideal body shape is not capable of providing women with a triangular body shape with overall good quality of fit. In Zwane and Magagula (2007), the test garments were found to have a tight fit in the lower body when the test garments

TABLE 8:   BIVARIATE CORRELATION ANALYSIS (n = 64)

	Pearson's correlation coefficient (r_{xy})
Bust	1,00
Waist	0,81
Hips	0,75

Extracted from Muthambi *et al,* 2015

fitted the upper bodies of Swazi women with triangular body shapes. By contrast, in this study the current test garments were found to have a loose fit in the upper body when a test garment fitted the lower body of the participant. From the findings of the study, it may be concluded that sizing based on the ideal body shape is not capable of providing young South African women of African descent with a triangular body shape, with an overall good quality of fit.

Based on the improved overall quality of fit attained from the proposed size specifications, it is suggested that the proposed size specifications developed in Muthambi *et al* (2015) be used as a guide to size garments for South African women of African descent with a triangular body shape. However, it must be noted that a small convenient sample was used to develop the proposed size specifications, using univariate statistics. Regardless of these limitations, the implications of the findings of this study should not be regarded as insignificant. The test garments constructed from the proposed size specifications were found to have an improved overall quality of fit despite the proposed size specifications being developed from a small convenient sample using univariate statistics. The findings of this exploratory study merit further research on apparel sizing within the South African context using multivariate statistics; such research may improve the quality of fit attained from ready-to-wear apparel in South Africa and may thus lead to increased levels of consumer satisfaction.

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