

# Developing a scale to measure problems in finding a good fit

A Scale to  
measure PFGF

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## Abstract

**Purpose** – The purposes of this study were twofold: (1) to develop a scale for measuring consumers' perceived problems of finding a good fit (PFGF) and (2) to provide evidence of several types of scale validities including nomological validity through examining the relationship between PFGF and body esteem based on attribution theory.

**Design/methodology/approach** – Scale development took place in three steps: (1) An initial pool of items was generated based on a previous study; (2) preliminary quantitative tests of reliability and validity of items were performed, including confirmatory factor analyses (CFAs); and (3) final scale validation through a discriminant and nomological validity test was conducted using CFA and the structural equation model (SEM). CFAs and SEM with the mediation effect were performed using Preacher and Hayes' (2008) bootstrap procedure in Mplus.

**Findings** – Of the 20 items (four items for physical, eight items for aesthetic and eight items for functional) generated in Step 1, a total of 14 items (four items for physical, five items for aesthetic and five items for functional) were remained through preliminary tests of reliability and validity of the scale in Step 2. In Step 3, the 14 items were finalized and validated through testing the hypothesized mediating effect of internal attribution of fit problems between the PFGF scale and the measures of body esteem. The results of consumers' internal causal attribution process of fit problems supported attribution theory.

**Originality/value** – The study contributes to understanding consumer fit perceptions by developing a scale to assess PFGF that may be a key factor influencing multiple apparel shopping behaviors. The multidimensional scale of perceived PFGF should be useful to provide solutions to PFGF based on information from customers. Better understanding of perceived PFGF will ultimately increase consumer satisfaction with apparel.

**Keywords** Scale development, Fit problems, Body esteem, Internal causal attribution

**Paper type** Research paper

Fit is an important concept in the apparel industry and is a key component in purchase decisions made by consumers (Eckman *et al.*, 1990; Hsu and Burns, 2002; Rosa *et al.*, 2006). As reported by Shin and Damhorst (2018), consumers are likely to evaluate fit not solely based upon a garment's physical relationship to the body but also based on how garment fit is perceived visually and functionally on the body. Although researchers have qualitatively and quantitatively investigated fit and confirmed that consumers evaluate fit in multiple aspects, many previous studies have only measured perception of physical aspects of fit (e.g. Ashdown and Loker, 2010).

For the present research, the authors conceptualized problems of finding a good fit (PFGF) as a consumer's generalized perception of fit problems based on prior experience with physical, aesthetic and functional aspects of clothing. Developing the scale of PFGF is important because prior experience with fit may be a crucial determinant of purchase decisions. Nonetheless, no measures are yet developed to assess PFGF perceived by



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consumers. A measure of perceived PFGF will broaden the understanding of consumers' past experiences with fit by capturing all dimensions of fit more accurately and will serve as a reliable and valid measure to use in future research.

Thus, the purpose of this study was to develop a scale for measuring perceived PFGF and provide empirical evidence of several types of scale validities, including nomological validity through examination of the relationship between PFGF and body esteem. Nomological validity refers to the extent to which the construct measured by the scale relates to other concepts such as antecedents or consequences based on existing theory or a theoretical model (Castleberry *et al.*, 1999). In previous research (e.g. LaBat and DeLong, 1990; Rosa *et al.*, 2006), fit evaluation and satisfaction have been related to body esteem, which is "self-evaluations of one's body or appearance" (Mendelson *et al.*, 2001, p. 90). Based on attribution theory (Folkes, 1988) and relationships between fit and body perceptions (LaBat and DeLong, 1990), the authors established the PFGF scale's nomological validity by confirming the effects of fit problems on body esteem through consumers' internal causal attribution.

## Literature review

### *Conceptualizations of fit*

Apparel fit has been studied by numerous researchers; however, there is a lack of consensus on the concept of fit. Frost (1988) defined apparel fit as "visual as well as physical satisfaction [with] the garment and its function on the body" (p. 2). A good fit is perceived when clothing conforms well to the body, is comfortable and results in a positive appearance (Frost, 1988). Similar to Frost (1988), LaBat (1987) conceptually defined clothing fit as the relationship of clothing to the body based on analysis of visual fit and comfort performance of a garment. According to Newcomb and Istook (2011), apparel fit is defined in two dimensions: "aesthetic fit, which relates to the appearance of the garment in relation to the body, and functional fit, which relates to the comfort and performance of the garment with respect to the body" (p. 391).

As these previous efforts indicate, the definition of fit has multiple dimensions. In the present study, the authors build on findings that consumers evaluate three aspects of fit: physical (e.g. fit related to the relationship between clothing and body), aesthetic (e.g. visually evaluated fit related to the appearance of the body and attractiveness) and functional (e.g. fit related to movement). These three aspects of fit have been confirmed by McKinney and Shin (2016) and Shin and McKinney (2017) in a content analysis of online reviews. They found that female consumers tended to evaluate and report whether online rented formal wear fit well or not in terms of the three aspects of fit; Shin and Damhorst (2018) also found that young adult consumers considered each of the three dimensions when discussing problems with fit.

### *Existing measures of fit perception*

Measurements of fit have been developed from two different perspectives: designer and consumer perspectives. A scale of fit (i.e. fit analysis scale) as perceived by technical designers or product developers was developed in laboratory settings to visually evaluate garment fit (Bye and McKinney, 2010). In contrast, several scales (i.e. wearer acceptability, fit preference, fit satisfaction, concerns with fit and fit problems) were developed to measure fit from the consumer's perspective in relation to body-related experiences, including consumer's preferred fit (Alexander *et al.*, 2005; Anderson *et al.*, 2000), satisfaction with fit (LaBat and DeLong, 1990) and concerns with fit and size (Kim and Damhorst, 2013).

*Designer perspective.* In the traditional approach, technical designers evaluate fit by observing a live model walk, sit and perform a normally expected range of body motions while wearing a garment (Ashdown *et al.*, 2004; Ashdown and O'Connell, 2006). In addition, researchers also employed fit analysis with three-dimensional (3D) scan technology to evaluate visual fit (Ashdown *et al.*, 2004; Bye and McKinney, 2010; Loker *et al.*, 2005). Body scanners have an advantage in that they can capture 3D images that enable the evaluator to perform visual analysis of many aspects of fit (Ashdown and Loker, 2010). For example, using 3D scanned images, Ashdown *et al.* (2004) and Loker *et al.* (2005) visually analyzed the pants' fit of participants and rated the front and back overall fit of the pants (unacceptable, marginal and acceptable). Bye and McKinney (2010) developed a fit analysis scale for dress and pant slopers using two-dimensional and 3D body scanned images of a live model. Two judges used a 5-point scale (1: unacceptable fit, 2: poor fit, 3: acceptable fit, 4: good fit and 5: excellent fit) and visually evaluated the fit of several dresses and pants in three criteria groups, including overall alignment, dart placement and looseness/tightness with individual criteria for certain parts of the garments.

*Consumer perspective.* To capture consumer perception of clothing fit, various scales have been developed. Although there are multiple dimensions in the concept of fit, most research on clothing fit satisfaction has focused solely on investigating the overall fit at specific body sites, such as the wearer acceptability scale (Huck *et al.*, 1997), scales of fit preference (Alexander *et al.*, 2005; Anderson *et al.*, 2000), fit satisfaction (LaBat and DeLong, 1990) and the fit problems scale (Goldsberry *et al.*, 1996).

The wearer acceptability scale by Huck *et al.* (1997) was defined to measure a wearer's feelings and perception of physical fit and comfort of clothing while performing exercises (e.g. standing erect, kneeling, etc.). With 13 pairs of adjectives, the wearer's acceptance of fit of a garment using a 9-point scale was measured, including ease of movement in three different body parts (arms, legs and torso), feelings while wearing clothing (e.g. comfortable, acceptable and tired), usability (e.g. easy to put on and move in), attitude (e.g. like/dislike), closeness of fit (e.g. loose/tight and crotch too far from body), satisfaction with fit and fabric properties (e.g. flexible/stiff). This scale is useful in measuring a specific garment's overall physical fit and comfort.

Fit preference is defined as the consumer's subjectively preferred fit resulting from the degree of difference between the garment and the body (Alexander *et al.*, 2005; Anderson *et al.*, 2000). It measures consumer's preference for fit with three levels of fit (fitted, semifitted or loosely fitted) using line drawings of six garment categories (jackets, skirts, dresses, tops, jeans and pants). From the illustrations, respondents were asked to choose the garments that they would buy.

Satisfaction with clothing fit refers to the degree of a consumer's satisfaction with the fit of a garment on specific parts of their bodies (LaBat and DeLong, 1990). LaBat and DeLong (1990) proposed a scale to measure fit satisfaction in general at 22 sites, including pant length, crotch, thigh, buttocks and hip. Results of most fit satisfaction studies that used this scale have consistently shown that women are more dissatisfied with clothing fit in their lower body than in their upper body (Feather *et al.*, 1996, 1997; LaBat and DeLong, 1990; Shim and Bickle, 1993). According to Frost (1988), satisfaction with clothing fit is defined as a combination of the consumer's physical comfort, psychological comfort and overall appearance.

Similarly, fit problems at particular body sites have also been measured by researchers focusing on physical aspects of fit in terms of tightness and length. Self-reported clothing fit problems were first measured in a study by Goldsberry *et al.* (1996). In their study, fit problems were measured by asking whether the respondents had problems in 15 body locations. Alexander *et al.* (2005) found that consumers had fit problems in eight body and

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garment parts. In addition, a recent study by [Makhanya et al. \(2014\)](#) measured apparel fit problems in ready-to-wear at each of seven selected body parts with respect to the degree of tightness (tight, loose or fits) to compare the fit problems of African American and Caucasian women with different body shapes (triangle, hourglass or rectangle).

A few researchers incorporated the aesthetic dimension of fit in their scales. For example, [Chattaraman and Rudd \(2006\)](#) developed a scale of aesthetic attribute preference to measure consumer's preference in length and tightness of garment. Garment length and tightness not only are aspects of physical fit but also involve aesthetic judgment and preferences. With two illustrations of a woman's body (upper and lower body), raters applied a 7-point semantic differential scale to seven body sites, such as top length, sleeve length, neckline and waist ([Chattaraman and Rudd, 2006](#)).

Concerns with fit and size of garments, as initially introduced by [Kim and Damhorst \(2013\)](#), also involved the aesthetic dimension of fit. Concerns with fit and size of garments is defined as "the subjectively determined expectation and amount of risk perceived by a shopper in relation to the fit and size of the garment in contemplating a particular purchase decision" ([Kim, 2009](#), p. 18). Using focus group interviews, [Kim and Damhorst \(2013\)](#) developed a scale of garment fit and size concerns in multiple distinct but interrelated dimensions for in-store shopping (i.e. concerns with body image and overall appearance, product performance, unavailability of size, projecting a correct impression and uncertainty about the sizing system) and online shopping (i.e. concerns with overall appearance, unavailability of size, projecting a correct impression, inability to try clothing on and imagining fit/size) ([Kim and Damhorst, 2013](#)).

Although the studies of fit satisfaction, fit preference and fit problems have primarily focused on physical aspects of fit, consumers have been found to consider fit in physical, aesthetic and functional aspects based on their previous experiences of apparel shopping in general (e.g. [Shin and Damhorst, 2018](#)). Investigating only physical fit restricts an understanding of consumers' fit perception because such perceptions are affected by many factors, including personal style, current fashion trends and body image ([Alexander et al., 2005](#)). Furthermore, most of these previous studies were conducted prior to 2014; there have been few recent efforts to develop a measure of consumers' perceptions of fit problems. Thus, the scale of fit problems needs to incorporate consumer's prior experience with fit in all three aspects to capture fit problems more accurately. The three aspects of fit are discussed in the following section.

#### *Conceptualizations of problems in finding a good fit*

*Physical fit.* Physical fit is defined as "features of fit that are physically perceived in terms of the relationship between clothing and body, such as tightness and length" ([Shin, 2013](#), p. 44). Qualitative findings by [Shin and Damhorst \(2018\)](#) revealed that consumer preferences for tightness differ depending on the type of clothing and parts of the body covered by that clothing. Height was strongly associated with consumer's perceived garment length; taller people preferred clothing that was long enough for their arms and legs, while shorter consumers preferred length that was not too long for their body ([Shin and Damhorst, 2018](#)). Thus, perceptions of past problems in getting a good physical fit may be determined by the extent to which consumers have had difficulties in finding clothing that provides an appropriate length and tightness for their body type during prior shopping experiences.

*Aesthetic fit.* Aesthetic fit is defined as "features of fit that are visually perceived and assessed when looking at an individual's dressed body, such as overall appearance related to the body and attractiveness" ([Shin, 2013](#), p. 44). In that study, consumers evaluated aesthetic aspects of fit, i.e. whether clothing looked good or attractive on them and whether clothing showed their body in a positive way or hid their body flaws. Other studies also

noted that aesthetic fit relates to “the appearance of the garment in relation to the body” (Newcomb and Istook, 2011, p. 391; Outling, 2007). Thus, problems in getting a good aesthetic fit can be measured by the extent to which consumers have had difficulties in finding clothing that gives them a pleasing, fashionable or desired appearance.

*Functional fit.* Functional fit refers to “features of fit that are perceived when the dressed body is moving for activities, related to restriction or lack of restriction of movement” (Shin, 2013, p. 44). In the Shin and Damhorst (2018) study, participants described that clothing with good fit allowed them to move for activities and to move comfortably in the garment. Depending on the activities in question and personal preferences, different levels of functional fit may be preferred at different times. Consumers were likely to use the word “comfort” to describe their preferred fit of clothing. Other researchers noted that functional fit is related to “the comfort and performance of the garment due to the fit” (Newcomb and Istook, 2011, p. 391). Therefore, problems in getting a good functional fit can be measured by the extent to which consumers have had difficulties in finding clothing that enables them to move comfortably.

*Problems in finding a good fit as an antecedent to body esteem through internal causal attribution of fit problems*

Body esteem is defined as “a deeply held and generalized like or dislike of one’s body” (Rosa et al., 2006, p. 80). According to Mendelson et al. (2001), body esteem has three dimensions: physical appearance (general feelings about appearance), weight (weight satisfaction) and attribution (evaluations attributed to others about one’s body and appearance) (Mendelson et al., 2001). In this study, the first two dimensions of body esteem (i.e. body esteem-appearance [BE-A] and body esteem-weight [BE-W]) were considered as consequences of PFGF. The two subscales focus on self-attribution.

Many previous studies supported the relationship between apparel fit and body evaluations. LaBat and DeLong (1990) examined the relationship between body satisfaction or body esteem and concerns with fit. In the context of online apparel purchase order decisions, Kim and Damhorst (2010) found that body dissatisfaction was positively related to consumer fit concerns. The results from Rosa et al. (2006) indicated that consumers with high body esteem were more interested in and gave greater importance to body-related products such as apparel, which consequently resulted in overall concerns with fit in the online shopping context. Conversely, when consumers have greater fit problems, they may have lower body esteem.

Considering the negative relationship between fit problems and one’s body esteem, it is important to explore how consumers’ fit problems are negatively related to body esteem. However, researchers have not yet reported how consumers’ fit problems relate to body esteem through a self-attribution process. According to attribution theory, internal locus of causality means that causes are related to personal factors (Folkes, 1988; Heider, 1958). When evaluating one’s own body based on fit experience, internal causal attribution to the body may occur when consumers consider whether their body is the main reason for causing fit problems. Thus, this study explores the process of attributing fit problems to one’s body and thus how it relates to one’s body esteem.

Folkes (1984) noted that locus of causality is essential for understanding the consequences of product failure. In consumer research, the locus of causality can be either in the consumer or in the manufacturer/seller (Folkes, 1984). Consumer’s causal attribution of product failure is determined based on “whether the cause of failure has something to do with the consumer or is located somewhere in the production or distribution of the product” (Folkes, 1984, p. 399). For internal locus of causality, consumers tend to make inferences as to the causes of problems with a service or product

lying within his or her personal disposition (Vázquez-Caielles *et al.*, 2007) and personal reasons (Folkes, 1988; Heider, 1958).

Similarly, when an individual experiences problems in finding good clothing fit, he/she may attribute the problem either to his or her own body (internal) or to the garment manufacturer or retailer (external). As mentioned above, the authors focused on internal causal attribution of fit problems, defined as the extent to which the individual believes that the cause of fit problems lies in herself (internal attribution). Through the internal attribution of fit problems, consumers who have more PFGF may be more likely to have lower body esteem toward their physical appearance and weight. This means that internal attribution of fit problems may mediate the relationship between fit problems and body esteem. Thus, a two-part hypothesis was proposed and tested to establish the nomological validity of the scale:

- H1. Problems in finding a good fit are negatively related to (a) physical appearance esteem and (b) weight esteem mediated by internal causal attribution of fit problems.

## Method

Scale development is conducted “to measure phenomena that we believe to exist because of our theoretical understanding of the world but that we cannot assess directly” (DeVellis, 2017, p. 15). The authors used procedures of scale development outlined by Churchill (1979) and Böttger *et al.* (2017) and augmented by other recommendations (e.g. Bentler and Bonnet, 1980; DeVellis, 2017). Scale development took place in three steps: (1) item generation from focus group interviews through face and content validity procedures; (2) preliminary quantitative tests of reliability and discriminant validity of scale items, including confirmatory factor analyses (CFAs) and (3) scale validation through discriminant and nomological tests of the proposed hypothesis.

### *Step 1: Generation of scale items*

To generate scale items, the focus group interviews in Step 1 were completed as part of a previous study which was conducted with female and male undergraduate students at a large Midwestern university (Shin and Damhorst, 2018). Open-ended questions were used to capture focus groups’ ideas about elements of good/bad fit and overall perceptions of fit based on past experiences (e.g. “What is good/bad fit in clothing to you?” “What kind of criteria tell you that fit is good/bad in apparel?”) (Shin and Damhorst, 2018). Based on the participants’ responses, scale items were developed to encompass the three aspects of fit problems reflected in the qualitative responses (physical, aesthetic and functional).

*Face validity and content validity.* Face validity is defined as the degree to which a measure accurately reflects the target that it is intended to measure (Nunnally and Bernstein, 1994). To test face validity of the initially developed scale items, two experts in social-psychological aspects of apparel and consumer behavior (one with more than 30 years and another with 3 years as faculty member and researcher) reviewed the generated scale items to confirm whether the instrument appeared to assess the desired constructs. Content validity affirms whether the items of the scale cover all theoretical content domains of the construct (Nunnally and Bernstein, 1994). The experts were given the conceptual definition of “problems in finding a good fit” and were instructed to retain and/or modify items of the scale based on the representation of components of the conceptual definition and clarity of wording. They corrected ambiguity, double-barreled questions, jargon, colloquialisms and confusing items of the scale.

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### Step 2: Preliminary test of reliability and validity

To refine and validate the PFGF, a representative sample of female and male consumers with a broad range of ages (18 years and over) and geographic locations in USA was recruited using Amazon's Mechanical Turk (AMT). A total of 400 participants, female and male respondents, completed a web-based survey that included 20 items in the scale developed in Step 1 and representing the three latent variables (four items for physical, eight items for aesthetic and eight items for functional aspects of PFGF).

AMT offers several advantages, including collection of data with low susceptibility to cover error caused by gaps between the sample and the total population and low risk of multiple responses by one person (Paolacci *et al.*, 2010). In order to avoid spammers, qualification tests were included in the questionnaire (e.g. "To ensure that you are thoroughly reading each question please check disagree"; Please select "seldom"). Time spent in completing the questionnaire was also checked to determine poor or low-effort responses. If the completion time fell below a predetermined minimum amount of time necessary for actually completing the questionnaire, the response was dropped. Also, the respondents' location was restricted to USA to increase the likelihood that the respondents had a basic level of English proficiency.

A three-factorial measurement model was generated using Mplus 7.4 (Muthén and Muthén, 2014) including all 20 potential scale items. A series of CFAs were conducted until the results indicated a good model fit. Modification indices were examined; if the random error terms for two scale items were highly correlated, the item with the lowest factor loading on the construct was removed to improve the model fit (Brown, 2006). A number of indices were employed to evaluate the goodness of model fit: comparative fit index (CFI; 0.95 = good fit), root mean square error of approximation (RMSEA; 0.07 = good fit) (Hair *et al.*, 2006) and standardized root mean square residual values (SRMR; 0.08 = good fit) (Hu and Bentler, 1999).

Following previous studies of scale development (e.g. Arnold and Reynolds, 2003; Böttger *et al.*, 2017), convergent validity of the developed scale was assessed through testing item loadings and average variance extracted (AVE) for each aspect of fit problems. If the values were above suggested thresholds (Fornell and Larcker, 1981), convergent validity was achieved. For example, convergent validity is achieved when associated scale items belong to the latent variable to be measured (Wang *et al.*, 2015). When factor loadings and AVE are 0.5 and above, it is acceptable as convergent validity (Hair *et al.*, 2019). Internal reliability was assessed via Cronbach's  $\alpha$  and composite reliability (CR) (thresholds: 0.7 and above) as suggested by Fornell and Larcker (1981).

Discriminant validity among the three dimensions was examined to see whether the three-factor model was better than one-factor and two-factor models in the developed scale. Discriminant validity refers to the uniqueness of the constructs (Pedhazur and Schmelkin, 1991), indicating that each dimension of PFGF is different from other dimensions. Discriminant validity among the three dimensions of PFGF was assessed using a  $\chi^2$  difference test between each pair of constructs in which the fit of correlated two-factor models and a three-factor model was compared with that of one-factor models for each possible pair of dimensions. The results of  $\chi^2$  difference tests for each pair indicated discrimination among the dimensions even though the correlations among the three dimensions were strong.

### Step 3: Scale validation

To establish the discriminant and nomological validity of the PFGF scale, responses were collected from a new sample of female participants. Step 3 replicated the tests for reliability,

convergent validity and discriminant validity in Step 2. Nomological validity provides evidence of a construct's antecedents and consequences (Tian *et al.*, 2001). Nomological validity of the scale was evaluated by testing the hypothesized mediating effect of internal attribution of fit problems between the PFGF scale and the measures of body esteem. A structural equation model (SEM) with the mediation effect was tested using Preacher and Hayes' (2008) bootstrap procedure in Mplus. Four items of internal causal attribution of fit problems scale (e.g. My fit problems are due to my body shape) were adapted from a previous measure of locus of causality (Cronbach's  $\alpha = 0.88$ ) (Russell, 1982) and confirmed by two professionals in the apparel merchandising area. A total of 18 items of the body esteem scale were adopted from Mendelson *et al.* (2001) (10 items on physical appearance, Cronbach's  $\alpha = 0.92$ , and eight items for weight, Cronbach's  $\alpha = 0.94$ ).

## Results

### *Initial item generation (Step 1)*

Through discussions among eight focus groups of male and female participants ( $n = 66$ ), Shin and Damhorst (2018) generated an initial pool of 20 items for the scale to represent perceived PFGF in three dimensions (physical, aesthetic and functional). Four emergent items described the physical dimension of PFGF (PFGF-P) related to overall size, tightness and length. Eight scale items tapped the aesthetic dimension of PFGF (PFGF-A), encompassing the difficulties in finding apparel that provides a visually good fit related to the appearance of the body, physical modesty and attractiveness. Eight scale items described the functional dimension of PFGF (PFGF-F), related to the difficulty in finding apparel that accommodates movement. Face and content validities were confirmed; the scale items appeared to assess the desired constructs and covered all domains of the construct. The generated scale items were incorporated into a 7-point Likert-type scale that measured varying degrees of agreement with each item or statement (1 = strongly disagree, 7 = strongly agree).

### *Preliminary test of reliability and validity (Step 2)*

The scale was tested for reliability and discriminant validity. A total of 400 respondents who were 18 years or older and lived in USA completed the survey. Of these, 336 responses were usable based on survey completion time (minimum of 3 min) and correct answer to an attention filter question. Each participant was paid 25 cents upon survey completion.

The 336 respondents consisted of 238 females (70.8 per cent), 96 males (28.6 per cent) and one participant with a gender identity of "other." The mean age of respondents was 36.04 years (SD = 11.92). Most participants were White or European American (75.9 per cent) (Table I).

As a result of a series of CFAs, six items of the scale (three items from the aesthetic and functional dimensions, respectively) were eliminated to reasonably improve the model fit. The model including 14 scale items and three factors was found to fit the data very well ( $\chi^2 = 215.56$ ,  $df = 74$ ,  $p < 0.0001$ , RMSEA estimate = 0.08, CFI = 0.95, TLI = 0.94 and SRMR = 0.06).

Following previous studies on scale development (e.g. Arnold and Reynolds, 2003; Böttger *et al.*, 2017), convergent validity and reliability of the developed scale were assessed. All the factor loadings from the three latent variables to the corresponding indicators were statistically significant at  $p < 0.0001$  and ranged from 0.62 to 0.96 (see Table II). In addition, AVEs for each dimensional fit problem were  $AVE_{PFGF-P} = 0.56$ ,  $AVE_{PFGF-A} = 0.59$  and  $AVE_{PFGF-F} = 0.71$ . The results indicated evidence of convergent validity because the values were above the suggested thresholds (Fornell and Larcker, 1981; Hair *et al.*, 2019). Cronbach's  $\alpha$  values (0.84–0.94) and CR (0.83–0.92) for each factor exceeded the cutoff point of 0.70, which indicates high internal consistency among the items of the scale within each factor.

Discriminant validity among the three dimensions of PFGF was assessed. A  $\chi^2$  difference test was conducted to determine whether the two-factor model or three-factor model was significantly better than the one-factor model. All the two-factor models and three-factor model had a better fit than the one-factor model for all three possible pairs of dimensions (Table III).

To compare factor loadings across gender groups, CFA was conducted with unconstrained and constrained models to compare  $\chi^2$  values between the two models. The differences ( $\chi^2_{diff} = 9.17$ ,  $df_{diff} = 11$ ) were not significant between the two models, indicating no significant differences in factor loadings across gender groups. This indicated that items of the developed scale can be used across both gender groups, thus validating the decision to collect data among only female participants in Step 3.

### Scale validation (Step 3)

To further test discriminant validity and assess nomological validity of the PFGF scale, data were collected through AMT. Only female participants were tested at this stage. Of a total of 500 female respondents who were 18 years or older and lived in USA, 444 responses were usable based on the survey completion time (over 3 min) as well as correct answers to two attention filter questions. In addition, the survey was only accessible to participants whose internet protocol (IP) addresses were located within USA to increase likelihood that participants had a basic level of English proficiency. Each participant was paid 50 cents upon her survey completion.

The mean age of respondents was 37 years ( $SD = 13.01$ ) with a broad range of ages (18–73 years old). Most participants were White or European American (65.1 per cent) followed by Asian or Asian American (9.9 per cent), Black or African American (8.3 per cent) and Hispanic or Latino (7.0 per cent).

Based on the results of CFA, the model with 14 items in the scale and three factors was found to fit the data very well ( $\chi^2 = 225.99$ ,  $df = 74$ ,  $p < 0.0001$ , RMSEA estimate = 0.07, CFI = 0.97, TLI = 0.96 and SRMR = 0.03). Convergent validity was achieved based on AVE and CR values for all three dimensions of fit problems (PFGF-P: AVE = 0.61, CR = 0.86; PFGF-A: AVE = 0.62, CR = 0.89; PFGF-F: AVE = 0.75, CR = 0.94). Further tests confirmed that the scale had suitable reliability (Cronbach's  $\alpha = 0.87$ , 0.89 and 0.94, respectively). Cronbach's  $\alpha$  values for body esteem of physical appearance and weight ranged from 0.88 to 0.90 and 0.89 for internal causal attribution. Discriminant validity was established through replicated analyses from Step 2 (see Table IV).

	Step 2 ( $n = 336$ )				Step 3 ( $n = 444$ )			
	<i>f</i>	%	<i>M</i>	SD	<i>f</i>	%	<i>M</i>	SD
Age			36.04	11.92			37.01	13.01
Gender								
Male	96	28.6						
Female	238	70.8			444	100.0		
Others	1	0.3						
Ethnicity								
Native American	1	0.3			15	3.4		
Black or African American	20	6.0			37	8.3		
Asian or Asian American	23	6.8			44	9.9		
Hispanic or Latino	13	3.9			31	7.0		
Native Hawaiian or Pacific Islander	0	0			0	0		
White or European American	225	75.9			289	65.1		
Multiethnic	22	6.5			28	6.3		

**Table I.**  
Sample characteristics  
in Step 2 and Step 3

Dimensions	Scale items	Step 2 ( <i>n</i> = 336)		Step 3 ( <i>n</i> = 444)	
		Item loadings	<i>t</i> -value	Item loadings	<i>t</i> -value
Based on my previous experience with clothing fit, I often have had problems in finding clothing that					
Physical (P)	P1. Is tailored to my body	0.68	18.16	0.77	32.80
	P2. Is not too tight or not too loose	0.86	38.27	0.82	40.17
	P3. Is not too short (long enough) or not too long	0.54	11.85	0.71	25.76
	P4. Is not too small or not too large	0.87	39.58	0.81	39.57
Aesthetic (A)	A1. Shows my body shape without exposing too much of myself	0.71	21.04	0.74	30.58
	A2. Shows off my body parts in a good way	0.81	31.67	0.81	41.46
	A3. Does not show my body flaws such as stomach or belly	0.81	31.50	0.72	28.44
	A5. Looks good on me	0.78	28.25	0.83	46.77
	A8. Changes how my weight looks in a positive way	0.72	21.81	0.82	44.21
Functional (F)	F1. I can move and sit down in easily	0.80	34.56	0.89	74.01
	F2. I can move around in comfortably in every direction	0.90	68.65	0.93	103.46
	F3. Does not restrict my movement	0.96	122.74	0.86	60.83
	F4. Allows me to move my arms when I reach for something	0.89	64.65	0.82	46.83
	F6. Makes me feel comfortable while wearing it	0.62	20.53	0.82	47.08
	Factor covariance/correlations	P with A: 0.74		P with A: 0.82	
	A with F: 48		A with F: 0.57		
	P with F: 0.36		P with F: 0.68		

**Table II.**  
Results of CFAs for the three dimensions of problems in finding a good fit

**Notes:** P = physical dimension of PFGF; A = aesthetic dimension of PFGF; F = functional dimension of PFGF

Nomological validity of the scale was confirmed based on SEM results. Preacher and Hayes' (2008) bootstrap procedure was conducted in Mplus to examine the hypothesized relationships for testing nomological validity. The hypothesized relationships included the second-order factor (i.e. PFGF) of the three subdimensions of PFGF and three manifest variables (i.e. internal causal attribution, body esteem-physical appearance and body esteem-weight) created based on average values. The results of CFA showed that the measurement model fit the data well ( $\chi^2 = 331.35$ ,  $df = 111$ ,  $p < 0.0001$ , RMSEA = 0.07, CFI = 0.96, TLI = 0.95 and SRMR = 0.04).

As shown in the SEM analysis in Figure 1, the model fit the data well ( $\chi^2 = 309.17$ ,  $df = 111$ , RMSEA = 0.06, CFI = 0.96, TLI = 0.95 and SRMR = 0.04). The mediation effects of internal causal attribution of fit problems on the relationship between PFGF and body esteem were significant: Body esteem of physical appearance ( $b = -0.16$ ,  $SE = 0.08$ ,  $p < 0.05$ ) and weight ( $b = -0.26$ ,  $SE = 0.08$ ,  $p < 0.01$ ) was lower when consumers had more fit problems mediated by internal causal attribution to fit problems. Thus, both parts of the hypothesis (H1a and H1b) were supported, congruent with previous studies which found that consumers' body satisfaction was positively related to their fit perception, such as fit satisfaction (e.g. LaBat and DeLong, 1990) and fit preference (e.g. Chattaraman and Rudd, 2006).

## Discussion and conclusions

The primary contribution of this study is to develop a scale for measuring perceived PFGF that incorporates three dimensions (i.e. physical, aesthetic and functional fit). Results of the present study confirm that the new PFGF scale is reliable and has face, content,

Dimension pair	One-factor model	Two-factor model	Three-factor model	$\chi^2_{diff}$	A Scale to measure PFGF
<hr/>					
P and A					
$\chi^2$	539.74***	79.40***		460.34***	
df	27	26		1	
RMSEA	0.24	0.08			
CFI	0.77	0.98			
TLI	0.69	0.97			
SRMR	0.15	0.04			
A and F					
$\chi^2$	126.78***	51.03***		75.75***	
df	27	26		1	
RMSEA	0.20	0.10			
CFI	0.81	0.95			
TLI	0.74	0.93			
SRMR	0.09	0.05			
P and F					
$\chi^2$	186.23***	57.51***		128.72***	
df	35	34		1	
RMSEA	0.21	0.09			
CFI	0.76	0.96			
TLI	0.70	0.95			
SRMR	0.13	0.05			
P, A and F					
$\chi^2$	1,207.50***		215.56***	991.94***	
df	77		74	3	
RMSEA	0.23		0.08		
CFI	0.58		0.95		
TLI	0.50		0.94		
SRMR	0.13		0.06		

**Table III.**  
Results of discriminant validity text between three pairs of latent variables in Step 2

**Notes:** P = physical dimension of PFGF; A = aesthetic dimension of PFGF; F = functional dimension of PFGF; \*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001

discriminant and nomological validities. PFGF-P refers to a consumer's perceived relationship between clothing and the body, particularly tightness and length. CFA showed that the factor (PFGF-P) containing four items appeared to explain substantial variance in the scale across gender groups and a wide range of ages. The scale of PFGF-P regarding tightness relates to the existing scale of fit problems (Alexander *et al.*, 2005; Goldsberry *et al.*, 1996; Makhanya *et al.*, 2014), parts of the wearer acceptability scale (Huck *et al.*, 1997), the fit preference scale (Alexander *et al.*, 2005; Anderson *et al.*, 2000) and Chattaraman and Rudd's (2006) aesthetic attribute preference scale. The scale of PFGF-P regarding length was consistent with Chattaraman and Rudd's (2006) scale of aesthetic attribute preference. It is important to note that the main uniqueness of PFGF compared to the existing scales is that it measures consumers' perceived global fit problems and not consumer assessment of fit to specific body parts.

PFGF-A relate to the extent to which consumers have had difficulties in finding clothing that gives them a good appearance. The factor (PFGF-A) explained substantial variance in the scale across gender groups in Step 2 and across a wide range of ages among the female sample of Step 3. The scale of PFGF-A showed consistency with the existing scale of concerns with the body image and overall appearance (Kim and Damhorst, 2013).

Dimension pair	One-factor model	Two-factor model	Three-factor model	$\chi^2_{diff}$
P and A				
$\chi^2$	261.29***	111.76***		149.63***
df	27	26		1
RMSEA	0.14	0.09		
CFI	0.90	0.96		
TLI	0.87	0.96		
SRMR	0.05	0.03		
A and F				
$\chi^2$	589.92***	80.85***		509.07***
df	27	26		1
RMSEA	0.22	0.07		
CFI	0.80	0.98		
TLI	0.74	0.97		
SRMR	0.12	0.02		
P and F				
$\chi^2$	695.45***	122.38***		573.07***
df	35	34		
RMSEA	0.21	0.08		
CFI	0.80	0.97		
TLI	0.75	0.97		
SRMR	0.10	0.03		
P, A and F				
$\chi^2$	1,264.48***		225.99***	1,038.49***
df	77		74	1
RMSEA	0.19		0.07	
CFI	0.74		0.97	
TLI	0.69		0.96	
SRMR	0.10		0.03	

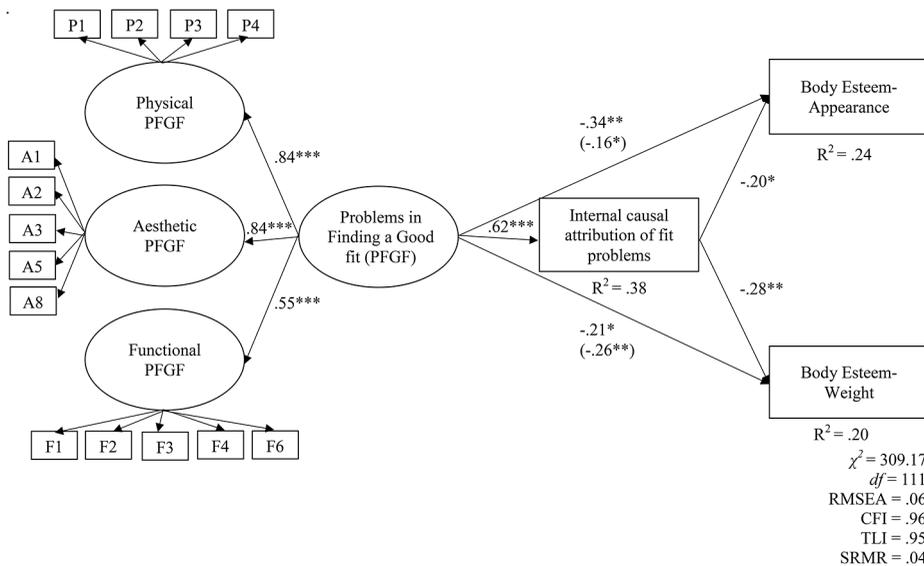
**Notes:** \*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001

**Table IV.**  
Results of the discriminant validity test between three pairs of latent variables in Step 3

PFGF-F refers to the extent to which consumers have had difficulties in finding clothing that enables them to move comfortably and effectively based on their prior shopping experience. Of the eight scale items generated, only five were validated through two separate CFAs in Step 2 and Step 3. The five items of the scale were valid for both gender groups and across a range of ages. The scale of PFGF-P aligned with the scale of wearer acceptability by [Huck et al. \(1997\)](#) in terms of including ease of movement and feelings while wearing clothing (e.g. comfortable). However, because the authors focused on clothing in general, this subscale did not measure protective aspects of clothing of concern for functional clothing that is used to protect from environmental, biological, chemical and radiation hazards and injury.

Factor loadings in each dimension of the PFGF scale were not significantly different between gender groups, implying that both female and male consumers had experienced PFGF in all three dimensions (physical, aesthetic and functional). The results were consistent with [Shin and Damhorst's \(2018\)](#) qualitative study which found that female and male young adults mentioned problems with all three dimensions of fit.

The second contribution of this study is empirical support for attribution theory ([Folkes, 1984](#)). Among female participants, internal causal attribution to fit problems mediated the relationship between PFGF and two subdimensions of body esteem, physical appearance and weight. Through the internal causal attribution process, individuals had lower body esteem toward their appearance and weight when they had more fit problems, thereby



## A Scale to measure PFGF

**Figure 1.** Second-order factor model of PFGF and its effect on body esteem through internal causal attribution of fit problems

**Notes:** The results of indirect effects of PFGF on body esteem are shown in parentheses, \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

attributing fit problems to their bodies rather than to the apparel industry. The results supported attribution theory; female consumers' fit problems were related to decreased body esteem of physical appearance and weight, which were mediated by internal causal attribution.

This study has managerial implications that apparel companies should consider when assessing consumers' fit problems to understand their experiences with fit. Using the developed scale from this study, product developers and designers may be able to figure out whether their customers have had physical, aesthetic and/or functional fit problems with specific products or lines. Then, they can use the results as guidance to develop new lines of products to better deliver satisfaction to customers. PFGF in apparel may be a key factor influencing multiple apparel shopping behaviors such as returning unsatisfactory products and online shopping avoidance. Thus, advanced understanding of consumer issues with apparel fit may ultimately help fashion retailers reduce consumer problems with fit and enhance consumer satisfaction with apparel purchases.

### Limitations and future studies

The results of this study should be interpreted with caution due to possible sample bias in the data acquired through AMT. The respondents were paid to participate through a unique internet system (AMT) in which participants are incentivized to look for surveys to complete; the sample possibly may include consumers who are not similar in many ways to the general population of USA. This study did not include adolescents and had very limited representation of the younger older population; the sample excluded much older individuals. Although participants' residency was restricted to USA, the sample might have included people with different levels of English proficiency. The wording and dimensions in the scale may not be generalizable to consumers outside of USA.

This study did not specifically examine associations between the developed scale and diverse body shapes. Body shape is a significant factor in efforts to minimize fit problems for ready-to-wear apparel (Pisut and Connell, 2007). In addition, different ethnic groups tend on average to have different body shapes, sizes and proportions; these differences present an important consideration in efforts to enhance consumers' fit satisfaction with current sizing systems (Lee *et al.*, 2007). Thus, future studies should explore differences in PFGF across various ethnic groups. Considering that Hispanic or Latino and Black or African American consumers were under-represented in the samples, the results should be generalized to the US population with caution.

Finally, the random sample for Step 2 was female, as was the entire sample for scale validation in Step 3. Even though their dimensional structure of concepts was similar (Step 2), men may attribute responsibility of their bodies in having problems with clothing fit differently than do women. Further study of men is important.

The present study focused on developing a scale to measure US consumers' PFGF. Although the scale is designed to be applicable to experiences with previous apparel shopping in general, its applicability for specific apparel product categories is unknown. Future research could be conducted to determine whether the developed scale is applicable for consumers' prior experience with PFGF in specific apparel categories (e.g. pants, jackets and swimsuits). Given appropriate pretesting, it is possible that the present scale could be adapted for studies in which specific categories of clothing are evaluated. The capture of the three dimensions of fit in one scale will make it useful for a variety of future adaptations.

Overall, a useful scale of problems with clothing fit was developed in a series of studies. Concept structure was consistent across three different samples. The authors established reliability and multiple types of validities of the scale. Future development is always appropriate, but the series of studies contributes a scale that will help in understanding consumer problems with clothing fit.

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