Development and validation of the Brief-Satisfaction with Appearance Scale (Brief-SWAP) for systemic sclerosis (SSc)

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ABSTRACT

Objective: Body image concerns are understudied in systemic sclerosis (SSc). The objective was to develop and cross-validate a brief version of the Satisfaction with Appearance Scale (SWAP) in order to reduce item redundancy, increase SSc-relevancy, and improve feasibility of body image assessment in SSc.

Methods: Female SSc patients in a developmental sample (Johns Hopkins Scleroderma Center) and a validation sample (Canadian Scleroderma Research Group Registry) completed the 14-item SWAP. Items for the 6-item Brief-SWAP were selected based on theoretical considerations and psychometric data from the developmental sample. In both samples, internal consistency reliability, convergent validity, and the hypothesized two-factor structure (Perceived Social Impact and Subjective Dissatisfaction) were compared between the Brief-SWAP and SWAP.

Results: 217 women from the developmental sample and 654 women from the validation sample completed the SWAP. Cronbach's alpha for the Brief-SWAP was 0.82 in both samples compared to 0.90 and 0.91 for the full SWAP. Correlations between the Brief-SWAP and SWAP were 0.94 and 0.95 in the developmental and validation samples. All correlations of the Brief-SWAP and SWAP with measures of convergent validity were substantively equal with no statistically significant differences in either sample. Based on confirmatory factor analysis, model fit for the Brief-SWAP was good in the developmental ($\chi^2(4)=9.0$, CFI=0.99, TLI=0.99, RMSEA=0.07) and validation samples ($\chi^2(4)=19.5$, CFI=0.99, TLI=0.99, RMSEA=0.08) and better than for the SWAP.

Conclusion: The Brief-SWAP is a reliable and valid measure of body image dissatisfaction and social discomfort in SSc that is shorter and more feasibly implemented than the SWAP.

Systemic sclerosis, or scleroderma (SSc), is a chronic autoimmune connective tissue disease characterized by abnormal fibrotic processes and excessive production of collagen, which manifests itself in thickening of the skin and fibrosis of internal organs, including the lungs, heart, and gastrointestinal tract [1]. The rate of disease onset is highest between 30-50 years of age with risk for women 4-5 times that for men [2-3]. Median survival time from diagnosis is approximately 11 years, and patients are 3.7 times more likely to die within 10 years of diagnosis (44.9% mortality) than age, sex, and race-matched individuals without SSc (12.0% mortality) [3].

SSc often results in disfiguring physical changes that commonly occur in visible and socially relevant areas of the body, including the face, mouth, and hands [1, 4-7]. Patients with acquired disfigurement from disease or injury often struggle with concerns about appearance, and body image, with many experiencing difficulty maintaining healthy social interactions [8]. Body image is a multifaceted construct that comprises body image satisfaction, social comfort related to appearance, investment in appearance, and behavioral tendencies associated with body image concerns, among other dimensions [9]. Most measurement tools of body image constructs focus on eating disorders and weight and size-related distress, including measures of body image avoidance (the Body Image Avoidance Questionnaire [10]) and importance of appearance (e.g., the Appearance Schemas Inventory [11]). The only validated measure of body image designed for individuals with disfigurements from injury or illness is the Satisfaction with Appearance Scale (SWAP) [12]. This tool measures social discomfort and dissatisfaction with body parts that are not necessarily related to weight and size issues.

Studies that have investigated body image in SSc have found that patients with more severe SSc (e.g., more significant skin changes in the hands) reported higher levels of body image dissatisfaction and low appearance self-esteem, which were in turn associated with depressive symptoms and reduced psychosocial functioning [13]. Two studies on body image in

patients with SSc [5-6] used the appearance subscale of the State Self-Esteem Scale [14], which provides an overall estimate of self-esteem related to appearance, but is a general measure that is not validated in acquired disfigurement. A third study [13] employed the 14-item Satisfaction with Appearance Scale (SWAP; [12]), which was developed to assess body image concerns related to disfigurement from burn injury. A 15-item version of the SWAP, the Adapted SWAP (ASWAP; [15]) was validated for SSc, and items loaded on two factors, Perceived Social Impact and Subjective Dissatisfaction.

A concern with the SWAP and ASWAP is that many items are highly redundant. Eight items make the same inquiry about satisfaction with different body parts (e.g., *I am satisfied with the appearance of my arms; I am satisfied with the appearance of my chest*)**,** only some of which are focal for patients with SSc. Several other items repeat the same question about social comfort in different social settings (e.g., among family, friends, or strangers). A shorter version of the SWAP that performs as well as the original SWAP, but with less redundancy and with a focus on body parts of particular relevance to SSc (e.g., face, hands), would increase the feasibility of body image assessment in SSc and reduce unnecessary patient burden. The objective of this study was to develop a 6-item Brief-SWAP, with 3 items on each of two factors, Perceived Social Impact and Subjective Dissatisfaction. To do this, we selected items for the Brief-SWAP from the original SWAP using a developmental sample of 217 women with SSc from the United States. We then tested the reliability and validity of the Brief-SWAP compared to the original SWAP in a validation sample of 654 female SSc patients from Canada.

PATIENTS AND METHODS

Developmental and Validation Samples

The developmental sample consisted of patients treated for SSc at the Johns Hopkins Scleroderma Center who enrolled in a longitudinal study examining psychosocial adjustment to SSc that took place between 1997 and 2002 [13]. Patients had a diagnosis of SSc based on

American College of Rheumatology criteria [16] . The study was approved by the Johns Hopkins University School of Medicine Internal Review Board, and informed consent was obtained from all participants.

The validation sample consisted of patients enrolled in the Canadian Scleroderma Research Group's 15-center Registry between 2004 and 2009. To be eligible for the Registry, patients must have a diagnosis of SSc made by a Registry rheumatologist, be $\geq$18 years of age, and be fluent in English or French. Specific diagnostic criteria were not required for enrollment. American College of Rheumatology (ACR) criteria [17], published in 1980, have been shown to be outdated. Subsequent classification systems have been proposed, but none has gained universal approval [18]. As such, an objective of the Registry is to improve upon existing diagnostic systems. All Registry patients provided informed consent, and the research ethics board of each study site approved the data collection protocol.

Only female patients were included in this study due to the relatively small number of male patients. In some instances, there were patients in both samples who had completed study measures more than once, but for the purposes of the present study, only data from the first administration were analyzed.

Self-Report Questionnaires

The SWAP [12] and McGill Pain Questionnaire-Short Form (MPQ-SF; [19]) were administered in both the developmental and validation samples; the Beck Depression Inventory (BDI; [20]) in only the developmental sample; and the Patient Health Questionnaire-9 (PHQ-9; [21]), Center for Epidemiologic Studies Depression Scale (CES-D; [22]), and the Short-Form 36 Health Survey Questionnaire (SF-36; [23]) only in the validation sample. Self-report questionnaires were administered in English in the developmental sample and in English or French in the validation sample.

The Satisfaction with Appearance Scale (SWAP). The 14-item SWAP [12] was developed to measure non-weight related body image dissatisfaction among burn survivors. The 15-item ASWAP, which was validated for SSc, contains 14 items from the original SWAP and one additional item. The SWAP was used in the current study because the ASWAP had not been published when data collection began in the validation sample. Respondents to the SWAP rate the degree to which they feel each item reflects their thoughts and feelings about their appearance on a 7-point scale ranging from 1 (*strongly disagree)* to 7 (*strongly agree)*. The SWAP has a two-factor structure, Perceived Social Impact, reflecting social discomfort, and Subjective Dissatisfaction, reflecting dissatisfaction with various body parts. High scores indicate greater body image dissatisfaction. The total SWAP score is calculated by subtracting 1 from each item in order to anchor items at 0 and then totaling item scores. A previous study with the developmental sample reported internal consistency reliability of the SWAP total score of α=0.90 [13].

Beck Depression Inventory (BDI). The 21-item BDI [20] has been widely used in studies of patients with chronic illness. Each item has four possible answers, scored 0-3, indicating increasing symptom severity. Respondents are instructed to describe the way they have been feeling during the past week. The authors of the BDI recommend a cutoff score of ≥10 for at least mild symptoms of depression [24]. The BDI had good internal consistency reliability (α=0.90) in the developmental sample [13].

Center for Epidemiologic Studies Depression Scale (CES-D). The 20-item CES-D assesses the frequency of depressive symptoms during the past week on a 0-3 Likert-type scale (*rarely or none of the time* to *most or all of the time*). Total scores range from 0-60. Standard cutoffs are ≥16 for "possible depression" and ≥23 for "probable depression." The CES-D has demonstrated good reliability and convergent validity with related self-report measures in a sample of 470 SSc patients from the Canadian Scleroderma Research Group Registry [22].

Patient Health Questionnaire-9 (PHQ-9). The 9-item PHQ-9 rates the frequency of depressive symptoms over the past 2 weeks on a 0-3 Likert-type scale (*not at all* to *nearly every day).* The total score ranges from 0-27 and the standard cutoff threshold for "moderate" depression severity is a score of ≥10 [25-28]. A previous study of 566 patients from the Canadian Scleroderma Research Group Registry found that the PHQ-9 had good internal consistency reliability (α=0.87) and similar convergent validity indices compared to the CES-D [29].

Short-Form 36 Health Survey Questionnaire (SF-36). The SF-36 [23, 30] is a widely used and evaluated health outcomes measure, with well-established validity and reliability in multiple populations [22]. It is made up of 8 self-report domains and can be summarized into Mental Component Summary (MCS) and Physical Component Summary (PCS) scores. These summaries are scored using norm-based scoring from a general population sample to produce T scores for each patient (mean of 50 and standard deviation of 10). Higher scores indicate better functioning.

McGill Pain Questionnaire–Short Form (MPQ-SF). The MPQ-SF [19] is a 15-item measure of sensory (11 items) and affective (4 items) dimensions of pain, where higher scores indicate greater pain. Each descriptor is ranked on a four-point intensity scale (0-3; *none* to *severe*), and total scores range from 0-45. The MPQ-SF has been used extensively and has excellent psychometric properties [31].

Data Analysis

Development of the Brief-SWAP. Items were selected for the Brief-SWAP based on theoretical and psychometric considerations. Three items were selected for each subscale because at least 3 items are needed to assess the factor validity of the subscales. Items on the 3-item Subjective Dissatisfaction subscale were chosen to reflect body parts most salient to disfigurement from SSc (face, hands, and arms). Items related to the scalp, neck, legs, chest, and

overall appearance were not included. For the Social Discomfort subscale, items were selected based on psychometric considerations, including variance of item responses, item-total correlations, the effect of removing an item on internal consistency reliability, as well as theoretical considerations. For instance, we chose only 1 of 3 items that assessed social comfort with the same question and 3 different social contexts (family, friends, strangers).

Assessment of Reliability and Validity of the 6-item Brief-SWAP Compared to the 14-item SWAP in Developmental and Validation Samples. In the developmental and validation samples, Cronbach's alpha was computed for both the Brief-SWAP and SWAP to measure internal consistency reliability. Pearson's correlations were computed to assess convergent validity with other outcome measures. It was predicted that the Brief-SWAP and SWAP would both correlate moderately with the measures of depressive symptoms (BDI, CES-D, and PHQ-9) and quality of life (SF-36 MCS and PCS scores), but less strongly with the measure of pain (MPQ-SF). To compare the psychometric characteristics of the Brief-SWAP and the full 14-item SWAP, 95% confidence intervals (CIs) were computed for the correlations of each with measures of convergent validity, as well as for the differences between Brief-SWAP and SWAP correlations with each of the other measures.

Confirmatory factor analysis (CFA) was conducted with Mplus [32] to assess the validity of the previously reported [15] two-factor structure (Subjective Dissatisfaction and Perceived Social Impact) for both the SWAP and Brief-SWAP in the developmental and validation samples. Item responses for the SWAP and Brief-SWAP were ordinal Likert data, so the weighted least squares estimator with a diagonal weight matrix, robust standard errors, and a mean-and variance-adjusted chi-square statistic was used with delta parameterization [32]. Modification indices were used to identify pairs of items within scales for which model fit would improve if error estimates were freed to covary and for which there appeared to be theoretically justifiable shared method effects [33]. A chi-square goodness-of-fit test and 3 fit indices were

used to assess model fit, including the Tucker-Lewis Index (TLI; [34]) the comparative fit index (CFI; [35] and the root mean square error of approximation (RMSEA; [36]. Since the chi-square test is highly sensitive to sample size and can lead to the rejection of well-fitting models, practical fit indices were emphasized [37]. Guidelines proposed by Hu & Bentler [38] suggest that models with TLI and CFI close to .95 or higher and the RMSEA close to .06 or lower are representative of good fitting models. A CFI of .90 or above [39] and a RMSEA of .08 or less [40] may also be considered to represent reasonably acceptable model fit.

RESULTS

Developmental and Validation Sample Characteristics

There were 217 women in the Johns Hopkins Scleroderma Center developmental sample and 654 women in the Canadian Scleroderma Research Group validation sample. Sociodemographic variables, medical variables, and self-report questionnaire scores for both samples are displayed in Table 1. The mean age of the developmental sample was 52.6 years (SD=13.0; range=27-78 years) and the mean age of the validation sample was 57.1 years (SD=11.3; range=18-84 years). Sociodemographic variables in the developmental and validation samples were similar with the exception of employment status. Only 22% of the validation sample was employed, whereas 40% of the developmental sample was employed. Approximately 70% of patients in both samples had limited SSc. The average time since diagnosis of SSc in the developmental sample was 7.5 years (SD=7.5) compared to 8.4 years (SD=9.2) in the validation sample.

Development of the Brief-SWAP

The three items that were selected for the Subjective Dissatisfaction subscale of the Brief-SWAP, based on relevance for SSc, included items related to dissatisfaction with the face, hands, and arms. For the Perceived Social Impact subscale, the three items that assessed discomfort in the presence of family, friends, and strangers correlated robustly with each other.

The item related to social discomfort in the presence of strangers was retained, and the other two were removed, as the items for friends and family had low endorsement rates and limited item variance. The item *Changes in my appearance have interfered with my relationships* (r=0.49) was removed as it had the lowest item-total correlation among the other 3 items on the factor in the original SWAP. Thus, the other two items that were retained for the Perceived Social Impact factor of the Brief-SWAP related to feeling unattractive and to believing that other people would "not want to touch me." In the developmental sample, all 6 items on the final version of the Brief-SWAP had item-total correlations from 0.53 to 0.62 (0.54 to 0.65 in validation sample). The correlation between the 3-item Subjective Dissatisfaction and Perceived Social Impact subscales for the Brief-SWAP was r=0.48 (95% CI 0.37 to 0.58) in the developmental sample and r=0.46 (95% CI 0.40 to 0.52) in the validation sample. The correlation between the 8-item Subjective Dissatisfaction subscale and the 6-item Perceived Social Impact subscale for the SWAP was r=0.46 (95% CI 0.35 to 56) in the developmental sample and r=0.45 (95% CI 0.39 to 0.51) in the validation sample.

Assessment of Reliability and Validity of 6-item Brief-SWAP Compared to 14-item SWAP

The correlation between the Brief-SWAP and SWAP was 0.94 in the developmental sample and 0.95 in the validation sample. Internal consistency reliability as measured by Cronbach's alpha was 0.82 for the Brief-SWAP in both the developmental and validation samples. Cronbach's alpha for the full SWAP was 0.90 in the developmental sample and 0.91 in the validation sample.

Table 2 shows Pearson's correlations calculated for both the Brief-SWAP and the SWAP with the BDI and MPQ-SF in the developmental sample, and the CES-D, PHQ-9, SF-36 MCS, SF-36 PCS, and MPQ-SF in the validation sample, as well as differences in Pearsons's correlations for the Brief-SWAP and SWAP compared to each measure. As hypothesized, the Brief-SWAP and SWAP correlated moderately with all measures of depressive symptoms and

quality of life and to a slightly lesser degree with a measure of pain. There were no significant or substantive differences between the correlations of the Brief-SWAP and SWAP with any of the measures in either the developmental or validation samples.

CFA was used to test the hypothesized two-factor (Subjective Dissatisfaction and Perceived Social Impact) structure for the Brief-SWAP and the SWAP in both the developmental and validation sample. In all analyses, two pairs of item error covariances were freed based on modification indices. In each case, both members of the pair demonstrated shared method or format features. Error variances were freed to covary for: (1) a pair of items referring to satisfaction with particular body parts *(I am satisfied with the appearance of my face* and *I am satisfied with the appearance of my hands*); (2) a pair of items referring to social discomfort in relation to other people (*I feel that my scleroderma is unattractive to others* and *I don't think that people would want to touch me*). In the developmental sample, model fit for the Brief-SWAP was good ($\chi^2(4)=9.0$, CFI=0.99, TLI=0.99, RMSEA=0.07) and somewhat better than for the SWAP ($\chi^2(25 =115.8$, CFI=0.95, TLI=0.98, RMSEA=0.13). In the validation sample, model fit for the Brief-SWAP was again good ($\chi^2(4) = 19.5$, CFI=0.99, TLI=0.99, RMSEA=0.08) and better than for the SWAP ($\chi^2(25)= 391.2$ CFI=0.95, TLI=0.98, RMSEA=0.15). Factor loadings for the Brief-SWAP and SWAP items in both the developmental and validation samples were similar, as were correlations between the Subjective Dissatisfaction and Perceived Social Impact factors (Table 3).

DISCUSSION

The 6-item Brief-SWAP, which was developed in a sample of 217 women with SSc from the United States and cross-validated in a sample of 654 women with SSc from Canada, performed similarly to the full 14-item SWAP in both samples. The correlations of the Brief-SWAP and full SWAP with convergent validity measures were substantively identical. Analysis with CFA found that the Brief-SWAP replicated the original two-factors of the full SWAP,

Subjective Dissatisfaction and Perceived Social Impact, and that the model fit the data somewhat better than for the full SWAP. The better fit of the two-factor CFA model for the Brief-SWAP compared to the full 14-item SWAP may have occurred because the Brief-SWAP focused on body parts of particular relevance to SSc and because it eliminated items from the full 14-item SWAP that were endorsed by small numbers of patients.

Cronbach's alpha was 0.82 for the Brief-SWAP in both the developmental and validation samples compared to 0.90-0.91 for the full SWAP. Ideally, Cronbach's alpha will be between 0.70 and 0.90; Cronbach's alpha results of approximately 0.90 or greater are considered to reflect a high level of item redundancy and indicate that items may be removed from a scale [41]. This is consistent with the findings from this study, which showed that the SWAP could be cut from 14 to 6 items without weakening convergent validity substantively. The development of the Brief-SWAP is an example of how an existing measure can be adapted and made more efficient and feasibly administered, reducing burden to researchers and patient respondents.

Research examining body image concerns in acquired disfigurement, specifically SSc, is limited. Existing studies of body image in SSc have largely relied on general measures developed for other populations, which assess general constructs such as self-esteem related to appearance [5-6]. Experts in research on body image, however, have emphasized the need for measures that assess specific dimensions of body image (e.g., dissatisfaction with appearance, social discomfort, investment in appearance, behavioral tendencies associated with body image disturbance), that are appropriately adapted for specific patient groups, and subsequently validated in these groups [9]. This study advances previous work validating the longer ASWAP [15] by validating the Brief-SWAP, which similarly assesses dissatisfaction with appearance and social discomfort. Another important area where research is needed in SSc relates to behavioral tendencies associated with body image distress, or body image avoidance [10]. Body image avoidance refers to the avoidance of objects and/or situations because they elicit body image

distress or concerns [42]. Among individuals with visible disfigurement from injury or illness, body image avoidance can often lead to an acute fear of negative evaluation and social anxiety [43-44], therefore this is an area which merits further investigation in the future.

There are limitations that should be considered when interpreting the results from this study. Both the developmental and validation samples were convenience samples of patients receiving treatment at the Johns Hopkins Scleroderma Center and from the Canadian Scleroderma Research Group centers, respectively. Therefore, limitations associated with this sampling strategy should be considered. The results reported here may depart to some degree from what might be found in other settings and for different patient groups. For instance, patients not being cared for by a rheumatologist and/or those too sick to participate were not included in the present study. It is therefore possible that the samples used in the current study may consist of an over-representation of healthier patients, and results may not be generalizable to the full spectrum of SSc patients. The current study only assessed female SSc patients due to the relatively small number of males who completed the study measures; therefore, results may not be generalizable to men with SSc. Similarly, the majority of the patients sampled had limited SSc, meaning that most individuals had less severe disfigurement.

In terms of the Brief-SWAP, it is possible that some of the excluded items, for instance, items related to dissatisfaction with the neck and chest, may be relevant to the disfigurement experienced by some SSc patients. Nonetheless, the Brief-SWAP's psychometric properties with the three selected items related to subjective dissatisfaction were quite robust. It was not possible to examine test-retest reliability for the Brief-SWAP because annual patient visits occurred a year apart, which is too long to determine whether changes in scores might have been due to body image changes versus test-retest variation. Furthermore, Brief-SWAP items were administered as part of the full 14-item SWAP, and it is possible, although unlikely in this case, that order effects could have influenced responses [45]. Possible differential item responses

based on French/English language or other patient characteristics were not examined. Similarly, demographic correlates of the Brief-SWAP and SWAP were not examined, but should be examined in future studies.

In sum, the Brief-SWAP is a reliable and valid measure of dissatisfaction with appearance and social discomfort related to disfigurement among patients with SSc. Compared to the full 14-item SWAP, the 6-item Brief-SWAP reduced item redundancy, increased relevance to the experience of SSc patients, and demonstrated good psychometric properties including reliability and validity, thus providing a less burdensome and more feasibly administered scale. The results from the current study constitute a significant step towards the improvement of measurement of important body image constructs for SSc. In the future, more research to identify other relevant dimensions of body image that are significant to patients is needed, in addition to a move towards developing and testing interventions that target these body image concerns.

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Table 1. Sociodemographic and Disease Variables for Female Scleroderma Patients

	Johns Hopkins Scleroderma Center (N=217)	Canadian Scleroderma Research Group (N=654)
Demographic Variables:		
Age *(mean years, SD)*	52.6 (13.0)	57.1 (11.3)
White *(n, %)*	165 (76.4)	190 (89.6)
College or higher *(n, %)*	136 (64.2)	307 (47.7)
Employed *(n, %)*	86 (40.6)	142 (22.0)
Married *(n, %)*	130 (60.2)	450 (69.6)
Medical Variables:		
Time Since Diagnosis of Scleroderma *(mean years, SD)*	7.5 (7.5)	8.4 (9.2)
Diffuse Scleroderma	65 (30.0)	182 (27.8)
Limited Scleroderma	152 (70.0)	472 (72.2)
Modified Rodnan Skin Score (0-51)	------	9.5 (8.6)
Self-Report Questionnaires:		
Brief-Satisfaction with Appearance Scale (*mean*, SD)	13.6 (8.4)	13.5 (8.8)
Satisfaction with Appearance Scale (*mean*, SD)	28.9 (17.4)	28.3 (18.5)
Beck Depression Inventory *(mean, SD)*	11.3 (8.4)	------
Patient Health Questionnaire-9 *(mean, SD)*	------	6.1 (5.5)
Center of Epidemiologic Studies – Depression Scale *(mean, SD)*	------	13.9 (10.8)
SF-36 Mental Component Summary score *(mean, SD)*	------	48.5 (11.7)
SF-36 Physical Component Summary score *(mean, SD)*	------	37.7 (10.9)
McGill Pain Questionnaire-Short Form *(mean, SD)*	9.2 (8.9)	6.0 (5.5)

Table 2. Convergent Validity for Brief-Satisfaction with Appearance Scale (Brief-SWAP) and Satisfaction with Appearance Scale (SWAP)

	Johns Hopkins Scleroderma Center (N=217)			Canadian Scleroderma Research Group (N=654)		
	Brief-SWAP	**SWAP**	**Difference**	**Brief-SWAP**	**SWAP**	**Difference**
	r (95% CI)	*r (95%* CI)	*r* (*95%* CI)	*r* (*95%* CI)	*r* (*95%* CI)	*r (95%* CI)
Beck Depression Inventory	.52 (.41 to .61)	.53 (.43 to .62)	-.01 (-.21 to .18)	------	------	------
Patient Health Questionnaire-9	------	------	------	.39 (.32 to .45)	.44 (.38 to .50)	-.06 (-.16 to.04)
Center for Epidemiologic Studies Depression Scale	------	------	------	.41 (.34 to .47)	.47 (.41 to .53)	-.07 (-.18 to .03)
SF-36 Mental Component Summary	------	------	------	-.33 (-.26 to -.40)	-.39 (-.32 to -.45)	.07 (-.04 to .17)
SF-36 Physical Component Summary	------	------	------	-.32 (-.25 to -.39)	-.35(-.28 to -.41)	.03 (-.07 to .14)
McGill Pain Questionnaire – Short Form	.34 (.21 to .46)	.32 (.19 to .44)	.02 (-.18 to .21)	.27 (.20 to .34)	.27 (.20 to .34)	.00 (-.10 to .10)

All correlations significant (P<.01). None of the differences in correlations between the Brief-SWAP and SWAP were statistically significant (P<.05).

Table 3. Factor Loadings of Brief-SWAP and SWAP

	Johns Hopkins Scleroderma Center (N=217)		Canadian Scleroderma Research Group (N=654)	
Items	**Brief-SWAP**	**SWAP**	**Brief-SWAP**	**SWAP**
Perceived Social Impact Factor:				
Because of changes in my appearance caused by my scleroderma, I am uncomfortable in the presence of my **family.**	------	0.86	------	0.92
Because of changes in my appearance caused by my scleroderma, I am uncomfortable in the presence of my **friends.**	------	0.96	------	0.99
Because of changes in my appearance caused by my scleroderma, I am uncomfortable in the presence of **strangers.**	0.80	0.87	0.90	0.91
Changes in my appearance have interfered with my relationships.	------	0.76	------	0.74
I feel that my scleroderma is unattractive to others.	0.90	0.79	0.75	0.73
I don't think people would want to touch me.	0.86	0.72	0.67	0.68
Subjective Dissatisfaction Factor:				
I am satisfied with my overall appearance.	------	0.82	------	0.86
I am satisfied with the appearance of my **scalp.**	------	0.58	------	0.68
I am satisfied with the appearance of my **face.**	0.99	0.89	0.95	0.90
I am satisfied with the appearance of my **neck.**	------	0.83	------	0.87
I am satisfied with the appearance of my **hands.**	0.85	0.61	0.86	0.69
I am satisfied with the appearance of my **arms.**	0.67	0.87	0.75	0.86
I am satisfied with the appearance of my **legs.**	------	0.61	------	0.79
I am satisfied with the appearance of my **chest.**	------	0.82	------	0.86
Correlation of Perceived Social Impact and Subjective Dissatisfaction Factors	0.54	0.56	0.62	0.55