Development and initial validation of the Self-Efficacy for Skin Self-Examination Scale in a Canadian sample of patients with melanoma

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ABSTRACT

Purpose: Melanoma is the deadliest type of skin cancer, although survival rates are high if detected early. Skin self-examination (SSE) is a health behaviour that can lead to early detection of melanoma and more positive health outcomes. Self-efficacy for SSE is a potential predictor of engaging in skin self-exams. However, no standardized measures of self-efficacy for SSE are currently available. The present study reports on the development and initial validation of a measure assessing self-efficacy for SSE.

Method: Based on a literature review, including previous studies assessing this construct, the research team developed 9 items capturing confidence in one's ability to conduct SSE. Items were subsequently revised by the research team and two dermatologists, resulting in the elimination of 4 items and modifications to the response options. The final 5-item Self-Efficacy for SSE scale was administered to a sample of 242 melanoma patients recruited from local hospitals. We assessed the scale's factor structure through exploratory factor analysis and the internal consistency with Cronbach's alpha. Scale scores were correlated with intentions to perform SSE, physician support for SSE, skin cancer-specific distress, general distress, and sociodemographic variables to assess convergent and divergent validity.

Results: The scale was found to be unifactorial with adequate model fit, have acceptable internal consistency (Cronbach alpha = 0.74), and initial evidence of convergent and divergent validity, as indicated by the scale correlating with physicians' support for SSE ($r = 0.30$, $p < 0.01$), intention to perform SSE ($r_s = 0.21$, $p < 0.01$) and a weak correlation with general distress ($r = 0.15$, $p < 0.05$).

Conclusions: Pending future research corroborating these findings, this measure has potential for use by nurses and other health professionals in follow-up care to identify individuals at risk for low self-efficacy for SSE requiring more targeted educational SSE interventions.

1. Introduction

Cutaneous melanoma is the fastest growing and most lethal type of skin cancer, with approximately 132,000 new melanoma cases reported globally each year (World Health Organisation, 2018). Over the last 10 years, new melanoma skin cancer cases have increased by an average of 1.5% each year (National Cancer Institute, 2018) and the World Health Organisation (2018) has predicted that this trend will continue as more UV radiation penetrates the ozone layer. Once melanoma skin cancer is identified, the stage of the melanoma at diagnosis has important consequences for survival and treatment: late stage metastatic disease (i.e.

stage III and IV) is extremely difficult to treat and currently available curative therapies are associated with side effects that have serious negative impacts on quality of life (Dunn et al., 2017; Girotti et al., 2014; Petrella et al., 2012; Reuter et al., 2014). However, melanoma is highly treatable using surgical methods when detected early (i.e. Stage I, II, resectable stage III with local lesion/local lymph node metastasis), with Stage I and II melanoma patients having 5 year survival rates of up to 95% (Koolen et al., 2017; Canadian Cancer Society's Advisory Committee on Cancer Statistics, 2017). Having a previous melanoma diagnosis is the strongest predictor for subsequent melanomas diagnoses (Jung et al., 2014), with melanoma patients being five to nine

times more likely to develop a new primary melanoma than the general population and reported 7-year post-diagnosis recurrence rates of approximately 11–12% (Bradford et al., 2010; Manganoni et al., 2007).

Given the impact of later stage melanoma treatments on quality of life and the vulnerable status of individuals with a personal history of melanoma, behavioural health strategies and interventions have been developed to facilitate early detection of the disease in high-risk groups. Skin self-examination (SSE) is one such behavioural strategy. Regular SSE (defined as once a month; American Cancer Society, 2016) is recommended by current clinical care guidelines as a component of follow-up care for individuals with a personal history of melanoma (Marciano et al., 2014; Watts et al., 2015). Regular SSE has been linked to earlier diagnosis of melanoma (i.e. thinner melanoma; Carli et al., 2003; Dessinioti et al., 2018; Markovic et al., 2007; Paddock et al., 2016; Pollitt et al., 2009) and lower melanoma-related mortality (Berwick et al., 1996; Paddock et al., 2016; Schneider et al., 2008). Importantly, early detection (i.e. thinner melanoma at diagnosis) is an important predictor of melanoma-related mortality (Balch et al., 2009; Dalal et al., 2008). This is especially noteworthy since most melanomas (upwards 75%) are discovered by patients themselves or individuals close to them like friends or family members (Avilés-Izquierdo et al., 2016; Brady et al., 2000; Carli et al., 2003; Körner et al., 2013a). However, despite findings pointing to SSE as an important component of melanoma follow-up care (NICE, 2015), only a minority of at-risk individuals practice regular SSE (Geller et al., 2007; Glenn et al., 2016; Loescher et al., 2010; Manne and Lessin, 2006; Pollitt et al., 2009). More specifically, SSE adherence rates among individuals with a previous melanoma diagnosis were found to be as low as 14–33% (Körner et al., 2013a; Nahar et al., 2016; Manne and Lessin, 2006; Loescher et al., 2006; Mujumdar et al., 2009). Given that SSE is only practiced by a small segment of at-risk individuals despite its importance as a secondary prevention method, numerous studies have attempted to identify predictors of this behaviour that can be targeted by behavioural health interventions.

One important predictor of SSE adherence is self-efficacy for SSE (Hultgren et al., 2016; Mujumdar et al., 2009; Geller et al., 2006; Robinson et al., 2007). Self-efficacy refers to an individual's confidence in their ability to effectively perform specific behaviours (Bandura, 1986a). Social-cognitive models of health behaviour posit that individuals are increasingly likely to perform a health behaviour if they believe that they can perform the behaviour effectively (i.e. if they have high self-efficacy for the behaviour; Conner and Norman, 1998; Bandura, 1986b). Secondary analyses of data from randomised controlled trials (RCT) conducted with melanoma patients found that self-efficacy for SSE mediated the relationship between the intervention group (education about SSE with whole body photographs versus education about SSE without whole body photographs) and SSE adherence (Hay et al., 2006); and a dyadic learning intervention (but not a solo learning intervention) enhanced both self-efficacy for SSE and SSE adherence (Robinson et al., 2007). Correlational studies conducted among melanoma patients found that self-efficacy for SSE was positively associated with regular SSE (defined as bi-montly SSE by the study authors; Mujumdar et al., 2009) and thorough SSE (defined as the deliberate and systematic examination of the skin in 15 key areas; Coups et al., 2016). These findings support our argument that self-efficacy is an important predictor of SSE adherence which can be facilitated via educational interventions.

Previous studies examining self-efficacy for SSE have used a variety of different items with unknown psychometric properties. For instance, one study used a single item (i.e., *I am confident I could find something suspicious on my skin*; Aitken et al., 2004) to assess self-efficacy for SSE while other studies used a combination of 2–16 items ranging from inquiring about self-confidence in one's ability to detect suspicious skin lesions to one's ability to find a partner to assist with SSE (Coups et al., 2016; Hultgren et al., 2016; Robinson et al., 2007, 2011; Mujumdar et al., 2009; Orlow, 2007; Hay et al., 2006). None of the measures used

in the previously mentioned studies have been validated and often have limitations such as being too brief, too lengthy, or containing unclear and complicated wording (e.g., referring to "effective SSE" without defining "effective"; including items inquiring about multiple aspects of SSE within the same item). Finally, some validated instruments assessing SSE-related constructs have been published and include some items related to self-efficacy for SSE. For instance, Dyson and Cowdell (2014) published the validation of a measure assessing barriers and facilitators to SSE which included a 4-item subscale measuring self-efficacy for SSE. However, this scale has only been used in the literature once since publication (in Cowdell and Dyson, 2014). Further, Djaja et al. (2014) published a scale on SSE attitudes that included 2 items addressing self-efficacy for SSE.

Despite self-efficacy for SSE being a relevant and important predictor of SSE adherence, no valid and reliable measure focusing uniquely on the assessment of this construct is currently available. The availability of a tool with good psychometric properties specifically assessing self-efficacy for SSE is essential in order to evaluate and improve the quality of future interventions addressing SSE adherence. Given previous findings that patients who received a nurse-led SSE intervention were more likely to conduct SSE (Mickler et al., 1999; Oliveria et al., 2004), the important role of nurses in delivering educational SSE interventions to patients cannot be understated. As such, providing nurses with a tool to facilitate the identification of individuals with low self-efficacy for SSE (i.e. at risk for SSE non-adherence) has the potential to help them identify individuals who require more targeted attention in clinical settings. In order to address this gap in the literature, our team developed the Self-Efficacy for SSE Scale as a brief measure to assess self-efficacy for SSE. In the current study, self-efficacy for SSE was defined as an individual's confidence in their ability to a) regularly examine their whole body and b) correctly identify abnormalities or suspicious lesions.

Study Objective. The purpose of the current study is to present the development and initial validation of the Self-Efficacy for SSE Scale in a sample of patients with a history of melanoma. This study will report on the factorial structure, validity, and reliability of this new measure. Based on previous findings from the literature on predictors of self-efficacy for SSE, we hypothesise that self-efficacy for SSE will be associated with constructs that are also related to SSE behaviours. More specifically, we hypothesise that self-efficacy for SSE will be positively associated with physician support for SSE and intentions to perform SSE, providing support for the convergent validity of the scale. We further hypothesise that self-efficacy for SSE will have negative or non-significant associations with general distress (i.e. depression and anxiety), skin cancer-specific distress, and sociodemographic variables such as language, education, gender, age, and household income, providing support for the divergent validity of the scale.

2. Method

2.1. Participants and procedures

English and French-speaking patients with a previous melanoma diagnosis were recruited from two hospitals in Montréal, Canada, between 2012 and 2016 to participate in a longitudinal study assessing facilitators and barriers to SSE (Körner et al., 2013b). Eligibility for the study included a confirmed melanoma diagnosis, being 18 years of age or older, and possessing the ability to understand, read, and write in English or French. Consenting participants completed a battery of self-report questionnaires at five different time points and received a brief educational intervention on how to perform SSE at time point 2. This report used data collected at enrollment (time point 1) which included socio-demographic characteristics (e.g., age, gender, language, education level, income) and measures of self-efficacy for SSE, physician support of SSE intentions to perform SSE, general distress, and skin cancer-specific distress. The Institutional Review Board of the Faculty

of Medicine at McGill University and the recruiting hospitals granted ethics approval for the study.

2.2. Scale development

The Self-Efficacy for SSE Scale was developed to assess patients' confidence in their ability to conduct regular, thorough, and effective SSE to detect suspicious lesions. The development of the Self-Efficacy for SSE Scale began with a thorough review of empirical research related to early detection of melanoma (published in or prior to 2011, when the scale was designed) with special attention to studies assessing self-efficacy for SSE (Hay et al., 2006; Robinson et al., 2004, 2007; Weinstock et al., 2007). Clinical care guidelines for melanoma were also thoroughly reviewed, with a focus on recommendations regarding frequency and instructions about SSE (American Academy of Dermatology, 2008; American Cancer Society, 2016; Wang et al., 2007).

Based on this review, two authors generated a pool of 9 items addressing patient confidence in their ability to: perform regular, thorough, and effective SSE, recognise alarming spots or changes on their skin, and overcome potential barriers to SSE (e.g., not having partner assistance or not having enough time). These original items had five response options, ranging from 0 (*not at all confident*) to 4 (*extremely confident*), with higher total scores reflecting higher self-efficacy for SSE. The 9-item draft was then reviewed for clarity and relevance by five lab members (MA and PhD students) and two dermatologists. The 9 English item were translated into French using a strict forward-backward translation protocol (Dominique et al., 2000) before administering the items to English and French-speaking patients with melanoma skin cancer as part of a small pilot study. Based on results of this pilot study and group feedback form the study team, items assessing barriers to SSE were removed, as well as items that were overloaded (i.e. asked multiple questions in one item), resulting in a final 5-item scale. The wording of some items was also modified in order to improve general clarity and conciseness of items and the five response options were reduced to four response options ranging from 0 (*strongly disagree*) to 3 (*strongly agree*), in order to remove the neutral and extreme response options that were poorly endorsed by pilot study participants. Finally, items were updated to reflect the latest clinical care guideline recommendations on the frequency of SSE (i.e. inquiring about monthly SSE rather than SSE in general).

The final 5-item scale, originally developed in English, was translated into Canadian French to reflect the language needs of Québécois patients using a strict forward-backward translation protocol (Dominique et al., 2000). A licenced, bilingual translator, who identified as a native French speaker, translated the English items into French (forward translation). A bilingual research assistant who identified as a native English speaker translated the French items back into English (backward translation). Two bilingual members of our research group compared the forward and backward translations and suggested changes. These were discussed with the licenced French translator, who adapted the final French version. Subsequently, two independent bilingual reviewers with psychosocial oncology research experience and one bilingual community member examined the items for clarity and relevance and approved the final English and French versions of the scale.

2.3. Measures

2.3.1. Self-Efficacy for SSE Scale

This newly developed scale was used to assess self-efficacy for SSE using 5 items with response options ranging from 0 (*strongly disagree*) to 3 (*strongly agree*). Item 3 (*There are so many moles and freckles on my body that performing skin self-exams would be difficult*) was reverse coded. The average score across the 5 items was used for the final self-efficacy for SSE score, with higher mean scores indicating higher levels of self-efficacy for SSE.

2.3.2. Physician Support for SSE Scale

The Physician Support for SSE Scale (Coroiu et al., 2018) measures physician endorsement of SSE by assessing melanoma patients' perceptions of their physician's support of SSE practice with items such as "*My physician has recommended that I examine my skin regularly*". It consists of 9 items with response options ranging from 0 (*not at all true*) to 3 (*true*), with higher scores indicating higher perceived physician support for SSE. An average score of all items in this unidimensional scale was used for analyses. In the current sample, the internal consistency reliability of the scale was high ($\alpha = 0.96$).

2.3.3. Intentions to perform SSE

Following Marcus and Lewis (2003), one item (*How likely are you to self-examine your skin once a month on a regular basis in the coming year?*) was used to assess intentions to perform SSE. Response options ranged from 1 (*very unlikely*) to 5 (*very likely*), with higher scores indicating higher intentions to perform SSE.

2.3.4. Patient Health Questionnaire 4 (PHQ-4)

The short form of the PHQ-4 (Kroenke et al., 2009) was used to capture signs of general distress. The scale consists of 4 items inquiring about the presence of symptoms of depression and anxiety over the last two weeks. Response options range from 0 (*not at all*) to 3 (*nearly every day*), with higher scores reflecting higher levels of general distress. The average score of all 4 scale items was used as the final general distress measure. In the current sample, internal consistency reliability was high ($\alpha = 0.85$).

2.3.5. Skin Cancer Index (SCI)

The emotional subscale of the SCI (Rhee et al., 2006) was used to assess skin cancer-specific distress. The subscale is composed of 7 items inquiring about skin cancer-specific worries and recurrence fears. Response options range from 1 (*very much*) to 5 (*not at all*), with the average score used as the final skin cancer-specific distress score. For the purposes of the current study, all items were reverse coded so higher scores would indicate higher levels of skin cancer-specific distress. In the current sample, internal consistency reliability was high ($\alpha = 0.91$).

2.4. Data analysis plan

An exploratory factor analysis with oblique rotation using the weighted least squares parameter estimation (MLSMV) procedure was performed using the Self-Efficacy for SSE Scale scores collected at the enrollment (time point 1) using MPlus 7 software (Muthén and Muthén, 2007). Missing data were screened using listwise deletion. The factor structure of the Self-Efficacy for SSE Scale was determined based on inspection of the screeplot and the Kaiser-Guttman rule of eigenvalues > 1 indicating the number of factors (Kaiser, 1960). Model fit was further evaluated using a combination of fit indices including the Tucker-Lewis Index (TLI; Tucker and Lewis, 1973), Comparative Fit Index (CFI; Bentler, 1990), and Root Mean Square Error of Approximation (RMSEA; Steiger, 1990). Good fitting models are characterised by TLI and CFI ≥ 0.95, and an RMSEA ≤ 0.06 (Hu and Bentler, 1999). However, a CFI and TLI greater than 0.90 (Kline, 2005) and RMSEA less than 0.08 (Browne and Cudeck, 1993) can be regarded as indicators of adequate fit. As sensitivity analysis, separate EFAs with the English and French subsamples were conducted. Comrey and Lee (1992) guidelines were used to interpret factor loadings, with 0.70 being excellent, 0.63 as very good, 0.55 as good, and 0.45 as fair. A factor loading of 0.32 was the minimum to be determined as acceptable (Tabachnick and Fidell, 2001). Descriptive statistics (i.e. means, standard deviations, Pearson's and Spearman's correlations) and Cronbach's alpha were calculated using SPSS IBM 20. The magnitude of correlations computed to evaluate convergent and divergent validity were interpreted adhering to Cohen's (1988) effect size descriptors ($r \leq 0.10$ small, $r = 0.30$ moderate, $r = 0.50$ large differences).

Table 1

Sample characteristics (N = 232).

Variable	M (SD), Range	N (%)
Age	59.41 (13.80), 26-92	
Gender, Female		112 (48.28)
Language		
French		113 (48.92)
English		118 (51.08)
Education, in years	14.88 (3.47), 5-26	
Highest level of education completed		
Primary (Grade 1–6)		4 (1.72)
Secondary (Grades 7–11)		51 (21.98)
CEGEP/Vocational training		51 (21.98)
Undergraduate Degree		72 (31.03)
Graduate Degree		51 (21.98)
Missing		3 (1.29)
Household gross income (yearly, before taxes)		
≤ 19,999		10 (4.30)
20–39,999		27 (11.6)
40–59,999		22 (9.50)
60–79,999		51 (22.0)
80,000 and more		76 (32.8)
Not applicable or missing		46 (19.8)
Melanoma stage at diagnosis		
Stage 0, in situ		37 (15.95)
Stage I		116 (50.00)
Stage II		50 (21.55)
Stage III		15 (6.47)
Stage IV		8 (3.45)
Missing		6 (2.59)
Melanoma depth at diagnosis		
≤1,0 mm		79 (34.05)
1.01–2 mm		53 (22.85)
2.01–4 mm		36 (15.52)
≥4.0 mm		18 (7.76)
Not applicable (in situ diagnosis)		36 (15.52)
Missing		10 (4.31)
Who discovered melanoma		
Patient		107 (38.40)
Dermatologist		49 (17.60)
Another physician		24 (8.60)
Another person		47 (16.80)
Missing		5 (1.80)
Physician support of SSE Scale	1.58 (1.12), 0-3	
Intentions to perform SSE	1.03 (0.23), 0-2	
PHQ-4	0.69 (0.79), 0-3	
Skin Cancer Index	3.14 (1.14), 1-5	

Note. SSE = Skin self-examination; PHQ-4 = Patient Health Questionnaire-4.

3. Results

3.1. Sample characteristics

The study sample included 242 patients previously diagnosed with melanoma. A total of 10 participants were excluded from the study due to leaving one or more items on the Self-Efficacy for SSE Scale blank, resulting in a final sample of 232 participants. As the scale is composed of 5 items, this sample size respected the general rule of thumb of 10 participants per scale item for exploratory analyses (Tabachnick and Fidell, 2013). Sample characteristics are summarised in Table 1.

3.2. Factor structure

An EFA revealed one Eigenvalue > 1 (2.78), with the next value being 0.88, suggesting a one-factor structure of the scale within the total sample. The respective Eigenvalues for the English subsample were 2.7 and 0.89 and for the French subsample 2.4 and 0.90. The one-factor solution for the overall sample showed a less than ideal fit ($\chi^2(N = 232, df = 5) = 26.74$, p < .001, RMSEA = 0.14, 90% CI [0.09, 0.19], CFI = 0.98, TLI = 0.97. EFAs conducted with the English ($\chi^2(N = 118, df = 5) = 22.53$, p < .001, RMSEA = 0.17, 90% CI [0.10, 0.25], CFI = 0.97, TLI = 0.95) and French ($\chi^2(N = 113, df = 5) = 8.48$, p = .13, RMSEA = 0.08, 90% CI [0.00, 0.17], CFI = 0.99, TLI = 0.98) subsamples revealed a comparable model fit. Factor-level statistics with the one-factor model revealed excellent factor loadings for items 1 and 4, a very good factor loading for item 5, and a good factor loading for item 2. Item 3 had a factor loading of 0.32, which is the minimal acceptable value. Item-specific endorsement, means, and inter-item correlations for the total sample of the Self-Efficacy for SSE Scale are presented in Table 2. Factor loadings and confidence intervals can be also be found in Table 2.

3.3. Validity and reliability

Cronbach's alpha for the Self-Efficacy for SSE Scale was 0.74 for the overall sample ($M = 1.48$, $SD = 0.59$, range = 0 to 3). The summed score of this scale showed a small positive correlation with intentions to perform SSE ($r_s = 0.21$, p < .01), a moderate positive correlation with physician support of SSE ($r = 0.30$, p < .01), and a small negative association with general distress ($r = -0.15$, p < .05). Finally, self-efficacy for SSE scores had no significant associations with

Table 2

Self-efficacy for SSE scale: Item-level statistics (N = 232).

Item*	M (SD)	1	2	3	4	Endorsement of response categories (%)				Factor loadings [95% CI]	Corrected item-total correlation
						Strongly Disagree	Disagree	Agree	Strongly Agree		
1. I know what to look for when doing a skin self-exam. *[Je sais quoi chercher lorsque je fais un auto-examen de la peau.]*	1.46 (0.83)	-				13.8	34.9	43.1	8.2	.85 [.81, .90]	.60
2. I am confident that I can do one skin self-exam every month. *[Je suis convaincu que je peux faire un auto-examen de la peau tous les mois.]*	1.83 (0.83)	.35	-			8.2	19.8	53.0	19.0	.54 [.45, .63]	.47
3. There are so many moles and freckles on my body that performing skin self-exams would be difficult. *[Il y a tellement de grains de beauté et de taches de rousseur sur mon corps qu'il me serait difficile de faire un auto-examen de la peau.]*	1.41 (0.91)	.20	.23	-		18.1	34.1	37.1	10.8	.32 [.20, .44]	.28
4. I can recognize suspicious changes on my skin. *[Je peux reconnaître les changements suspects sur ma peau.]*	1.54 (0.78)	.72	.37	.25	-	11.6	28.9	53.4	6.0	.93 [.89, .97]	.66
5. I can carefully examine the skin on my entire body. *[Je peux examiner attentivement ma peau sur mon corps en entier.]*	1.17 (0.83)	.47	.42	.20	.51	21.1	46.6	26.3	6.0	.69 [.61, .77]	.55

Note. M = mean; SD = standard deviation. French items are provided in italics.

sociodemographic variables such as age ($r = -0.062$, p > .05), gender ($r = 0.01$, p > .05), language ($r = 0.12$, p > .05), years of education ($r = -0.12$, p > .05), and household income ($r = 0.00$, p > .05), nor with skin cancer-specific distress ($r = -0.07$, p > .05). See Table 3 for more information on the validity of the scale.

4. Discussion

The purpose of the present study was to report on the development and initial validation of the Self-Efficacy for SSE Scale in a sample of patients with a personal history of melanoma. An initial pool of 9 items was generated following a review of the literature and subsequently reduced to 5 items. A forward-backward translation protocol was used to create the French version of the scale. The initial English and French version of the scale were further revised based on pilot data and on recent clinical care guidelines recommending *monthly* self-exams. An EFA revealed a unidimensional structure of the Self-Efficacy for SSE Scale across the entire sample, as well as within the English and French subsamples. However, while the TLI and CFI values for the one-factor model indicated a good model fit for the data, the high RMSEA (i.e. ≥ 0.8) value suggests a less than ideal model fit. The high RMSEA value obtained in our analyses may be partially explained by the small number of items in this scale. Some studies have suggested that RMSEA values may be artificially high in EFA models with fewer degrees of freedom (Kenny et al., 2015) and in measures with few items (Breivik and Olsson, 2001; Kenny and McCoach, 2003). As such, given that the TLI and CFI values in the unifactorial model indicated good fit, we concluded that the one-factor model was acceptable in the current sample.

Factor-level statistics revealed that item 3 (*There are so many moles and freckles on my body that performing skin self-exams would be difficult*) loaded less strongly onto the one factor than other items of the scale and was bordering the 0.32 cut off for item acceptability. This might be due to method bias as this is the only negatively worded item in the scale (Podsakoff et al., 2003). Another potential explanation is that item 3 measures slightly different content than the other items as it refers to physical features (i.e. moles) as a barrier to feeling confident in SSE ability rather than perceived ability to perform SSE more broadly. However, best-practice guidelines on EFA reporting suggest that studies examining the psychometric properties of new scales should not exclude items based on factor loadings alone, as this may pose a threat to the content validity of the measure without guaranteeing improved fit in other samples (Flora and Flake, 2017). Therefore, we do not recommend omitting item 3 from the scale based on the current study alone and conclude that this requires further investigation.

Consistent with our hypotheses, the Self-Efficacy for SSE Scale demonstrated acceptable internal consistency and construct validity (assessed with convergent and divergent analyses). More specifically, scale scores were associated with physician support for SSE, intentions to perform SSE, and general distress. Given that self-efficacy depends on an individual's beliefs about the benefits of engaging in a behaviour in addition to their intention to actually perform the behaviour (Armitage and Conner, 2000), these associations converge with the self-efficacy for SSE construct. No significant correlations between the Self-Efficacy for SSE Scale scores and demographic variables were found, suggesting that the scale captures a construct that is independent from these participant characteristics. These findings are consistent with those of previous studies demonstrating the impact of educational SSE interventions on both self-efficacy for SSE and barriers and facilitators of SSE. For instance, one RCT found that an educational SSE intervention was associated with increases in both intentions to perform SSE and self-efficacy for SSE (Robinson et al., 2007) whereas a randomised trial also found that self-efficacy for SSE and primary care providers' support of SSE were positively associated with SSE adherence (Martin et al., 2007). Importantly, a longitudinal study using the same sample as the one described in the current study (Körner et al., 2013b) also provided support for the scale's sensitivity to change: self-efficacy for SSE scores increased by 23% following a psychoeducational intervention aimed at teaching melanoma patients how to perform effective SSE with their partners (Czajkowska et al., 2017). Therefore, we conclude that the construct of self-efficacy for SSE is captured by the scale.

Given these results, the Self-Efficacy for SSE Scale has potential for use in both research and clinical care settings to identify individuals at-risk for SSE non-adherence. This will have important implications for melanoma follow-up care delivered by nurses and other healthcare professionals. More specifically, the Self-Efficacy for SSE Scale has potential as a tool for nurses delivering personalised SSE education interventions and materials to identify melanoma patients at increased risk for SSE non-adherence. This information could help nurses decide which patients would benefit from more focused interventions and, as such, make their interventions more effective at facilitating and promoting regular SSE among individuals at risk for melanoma recurrence.

4.1. Limitations

The current study had some limitations. The sample was homogeneous with little sociodemographic diversity, which may affect the generalizability of the results to other populations of melanoma survivors. Also, the development of the Self-Efficacy for SSE Scale did not include a qualitative phase (e.g., using formal focus groups with patients and/or experts to develop item content) as is best-practice in scale development and patient-oriented research. Further, while it would have been ideal to test a larger item pool, the brevity of our measure was a conscious decision to minimise participant burden within the context of a longitudinal study assessing several psychosocial constructs with a myriad of measures.

Table 3
Self-efficacy for SSE scale: Convergent and divergent validity (N = 232).

Variable	M (SD)	Cronbach's alpha	Self-Efficacy for SSE Scale
			Pearson Correlation
1. Self-Efficacy for SSE Scale	1.48 (0.59)	0.74	1
2. Physician Support for SSE Scale	1.58 (1.12)	0.96	.30**
3. Patient Health Questionnaire 4 (PHQ-4)	0.69 (0.79)	0.85	−0.15*
4. Skin Cancer Index (SCI)	3.14 (1.14)	0.91	−0.07
5. Intentions to Perform SSE	4.75 (0.64)	-	.21**[a]
6. Age	59.41 (13.80)	-	−0.062
7. Gender	-	-	0.01
8. Language	-	-	0.12
9. Years of Education	14.88 (3.47)	-	−0.12
10. Household Income	-	-	0.00

Note. M = mean; SD = standard deviation; [a] Indicates Spearman Correlation; * p < .05; ** p < .01.

4.2. Future directions and conclusions

Our results indicate that further work is needed to confirm the factor structure and construct validity of the Self-Efficacy for SSE Scale, ideally within larger and more diverse samples to improve the generalizability of this measure. Based on the current results and our overall work in melanoma prevention in high risk populations, we have developed recommendations on how to improve this scale. First, given the problematic factor loading of item 3 (the only reverse-coded item in the scale), future investigations may consider wording this item in a positive direction as reverse-coded items can confuse participants without guaranteeing a reduced response bias (Van Sonderen, Sanderman and Coyne, 2013). Further, a systematic review of guidelines for the secondary prevention of melanoma concluded that there is no consensus on the recommended frequency of SSE for patients with a history of melanoma, with different guidelines either recommending frequencies ranging from monthly SSE to every 6 months, or not recommending a specific SSE frequency at all (Watts et al., 2015). As such, we recommend adapting the time frame indicated in item 2 (*I am confident that I can do one skin-self-exam every month*) according to the most up-to-date evidence-based understanding of melanoma prevention guidelines.

In conclusion, the Self-Efficacy for SSE scale appears to be a valid and reliable tool for measuring self-efficacy for SSE among individuals at-risk for melanoma. As such, it has the potential to aid nurses in delivering effective SSE interventions to at-risk patients with the aim of promoting melanoma early detection.

Conflicts of interests

The authors have no competing financial and/or non-financial conflicts of interest.

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