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# Reliability and structural validity of the Dutch version of Perceived Stigmatization Questionnaire in adults with burns

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## ABSTRACT

**Objective:** Burn scars can attract attention from others which can be perceived as stigmatizing behavior with negative psychological consequences. The Perceived Stigmatization Questionnaire (PSQ) is a validated instrument measuring the perception of stigmatization in burn survivors. The objective of this study was to examine the psychometric properties of the Dutch version of the PSQ, specifically its factor structure, reliability, and associations with other relevant constructs.

**Method:** Patients (N = 220) completed the PSQ at 3 months after burn. The factor structure was examined with explorative (EFA) and confirmatory (CFA) factor analyses at 3 and 12 months after burn, and reliability was examined using Cronbach's alpha. Three months measurements were used to examine associations of the PSQ with 'depressive mood' (Beck Depression Inventory, BDI-II), 'interpersonal relations' and 'body image' (Burn Specific Health Scale-Brief, BSHS-B), and two scales of the Illness Invalidation Inventory (3\*1).

**Results:** A four factor model showed the best fit to the data. Two factors, 'confused/staring behavior' and 'hostile behavior', were identical to the original PSQ. The third original factor, 'absence of friendly behavior', was now divided into two factors separating absence of friendly behavior of strangers and other people. Internal consistency ranged from .60 to .88. Especially the 'confused/staring behavior' factor was related to the other questionnaire scores.

**Conclusion:** The current study shows acceptable reliability and structural validity of the Dutch version of the PSQ in a 4-factor solution. Further research into measurement invariance across languages is recommended to establish a uniform multicultural instrument.

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## 1. Introduction

Having a satisfying social life can be challenging after a burn injury. Scars resulting from burns may attract unwanted attention of others that may be perceived as stigmatizing.

The word stigmatization has been defined as negative views attributed toward persons who are different compared to societal norms [1]. Examples of stigmatizing behavior toward burn survivors include being startled, teased, and stared at, receiving rude comments, and experiencing whispering with heads being turned away [2,3]. Experiences with stigmatization

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can lead to low self-esteem, body image problems, depression, and reduced health-related quality of life (HRQoL) [2,4–6]. Therefore, being aware of stigmatization behaviors toward burn survivors and, if indicated, help them to build resilience against these behaviors, may improve psychological health. To achieve these goals, valid and reliable measures are required.

The Perceived Stigmatization Questionnaire (PSQ) is the only psychometrically validated instrument measuring the perception of stigmatization among burn survivors [7]. The 21-item questionnaire showed good validity in both adult and pediatric burn survivors [7,8]. The questionnaire has an overall scale score and three subscale scores that measure ‘absence of friendly behavior’, ‘hostile behavior’, and ‘confused/staring behavior’ [7]. The original English version has been adapted and validated into Portuguese-Brazilian [9] and German [10] in which the 3-factor structure was replicated.

The primary objective of the present study was to examine the validity, factor structure and reliability of the PSQ in a Dutch and Belgian sample of burn survivors. It was hypothesized that a similar 3-factor structure as the original questionnaire would be found. Furthermore, based on previously observed relations of perceived stigmatization with the possible consequences of stigmatizing behaviors [2,5,6], it was hypothesized that higher scores on the PSQ (sub)scale(s) would be at least moderately related to more depressive symptoms, and poorer body image and interpersonal relations. These hypotheses are in line with the previous PSQ validation studies [7,9,10]. In addition, a related construct, invalidation, which is defined as a constellation of perceived non-acceptance by others, including misunderstanding, stigmatization, and outright rejection [11], was expected to have a moderate to high positive relation with the PSQ (sub)scale(s). Lastly, the relationships between the PSQ (sub)scale(s) and respectively facial burns, burn severity, and gender were examined.

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## 2. Method

### 2.1. Participant recruitment and procedure

The current study is part of a prospective longitudinal multicenter study with the aim to examine the social impact of burn injuries. Patients were included between October 2013 and October 2015. A local researcher informed and invited the participants to participate in the study during their stay in the hospital. Informed consent was given by the participants after oral and written information. The inclusion criteria were 18 years or older and having acute burns as the primary diagnosis. Exclusion criteria were: poor Dutch proficiency and problems that interfere with the comprehension of questionnaires (e.g., cognitive problems). The current study used data collected at 3 and 12 months after burn. The study was approved by ethics committees in the Netherlands and Belgium (NL44682.094.13 and B670201420373).

### 2.2. Measures

The *Perceived Stigmatization Questionnaire* (PSQ) is a 21-items, 3-factor measure of perceived stigmatization [7]. The three factors include ‘absence of friendly behavior’ (items 1, 5, 7, 9,

12, 15, 17, 20), ‘confused/staring behavior’ (items 3, 4, 6, 10, 13, 14, 19, 21), and ‘hostile behavior’ (items 2, 8, 11, 16, 18). The items are scored on a 5-point Likert scale, ranging from 1 (never) to 5 (always) with a recall period of 3 months. The positively worded items of the first subscale are reverse coded so that higher scores present more perceived stigmatization [7]. The questionnaire demonstrated good discriminant and convergent validity, and Cronbach’s alpha of .93 for the total score indicated good internal consistency [7]. For the current study, the questionnaire was translated into Dutch by two researchers and back-translated by a native English speaker. The two researchers reached consensus on the final translation.

The *Beck Depression Inventory* (BDI-II) is a 21-item questionnaire used to assess depressive symptoms [12]. The inventory uses a 4-point Likert scale ranging from 0 to 3 to measure the severity of each symptom. Higher scores indicate more severe depressive symptoms. Total scores can range from 0 to 63 [12]. The Dutch validated version showed good reliability and content validity [13]. The 3 months after burn assessment was used in the current study. Cronbach’s alpha was .94, indicating high internal consistency.

The *Burn Specific Health Scale – Brief* (BSHS-B) is a 40-item questionnaire that measures burn specific health related quality of life (HRQL). Answers are scored on a 5-point Likert scale ranging from 0 (extremely) to 4 (not at all). The BSHS-B comprises nine domains: heat sensitivity, affect, hand function, treatment regimens, work, sexuality, interpersonal relationships, simple abilities, and body image. Each domain is calculated by totaling the items divided by the number of items. A lower score indicates lower HRQL [14]. The scale showed to have good reliability and validity [15] and measured the same construct across different languages [16]. In accordance with the validation of the PSQ in Portuguese-Brazilian [9], the association of the domains ‘interpersonal relationships’ (IR) and ‘body image’ (BI) with stigmatization were examined in the current study; the 3 month assessment was used. Cronbach’s alpha’s for the respective subscales IR and BI were .81 and .87, indicating good internal consistency.

The *Illness Invalidation Inventory* (3\*I) measures patient’s perceptions of invalidation on two domains: ‘discounting’ (5 items) and ‘lack of understanding’ (3 items) in 5 potential sources of invalidation (partner, family members, medical professionals, work colleagues, and social services). Lack of understanding represents a lack of positive responses such as not emotionally supporting and not recognizing the person. Discounting stands for social rejection and negative social responses [17]. Each of the 5 sources includes 8 identical items which are scored on a 5-point Likert scale, ranging from 1 (never) to 5 (very often). Each scale is calculated with a mean score. Higher scores indicate more invalidation [17]. The questionnaire demonstrated good internal consistency in other populations [18]. In the current study, the 3 months after burn 3\*I data of the source family was used. Cronbach’s alpha’s for the subscales discounting and lack of understanding were .78 and .73 respectively, indicating acceptable internal consistency.

*Patient and burn characteristics.* Characteristics of the patient (i.e., gender and age) and the burn (i.e., percentage total body

surface area (TBSA) burned and facial involvement) were extracted from the medical file.

### 2.3. Statistical analyses

To examine the factor structure of the Dutch version, we applied a 3-step approach. First, confirmatory factor analyses (CFA) was conducted to examine the original 3-factor structure of the English version [7], using Mplus version 7.4 [19]. Because item scores were categorical, a Weighted Least Squares Means and Variances Adjusted (WLSMV) estimator was used. Goodness-of-fit was evaluated using the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), the Root Mean Square Estimate of Approximation (RMSEA), and the Weighted Root Mean Square Residual (WRMR) [20–23]. Conventional guidelines indicate adequate model fit if CFI and TLI > .90, RMSEA < .08, and WRMR ≤ 1.0. A model with CFI and TLI values around .95 indicate excellent model fit [24]. Second, exploratory factor analyses (EFA) with promax rotation, using SPSS version 25, was conducted to explore the factor structure because the 3-factor model did not reach thresholds for adequate fit. Promax rotation was also used in the original construction of the scale. Cattell’s scree test and the pattern matrix was examined to determine the number of factors [25,26]. Third, the EFA outcome was re-evaluated using CFA to test model adequacy using the aforementioned model indices. The relative fit of the models was tested using the Satorra-Bentler Chi<sup>2</sup> difference test [27].

To study the robustness of the factor solution, a replication of the CFA was performed with data of the same participants 9 months later, i.e., the 12 months assessment. Additionally, to examine whether the construct perceived stigmatization was

well represented by the factors, a second-order CFA was conducted to assess their validity and reliability.

Internal consistency was examined by calculating Cronbach’s alpha coefficients. Results were regarded as acceptable above the .70 threshold [28]. Spearman correlations were calculated to examine relations of the PSQ with the BDI-II, the 3\*I, and two subscales of the BSHS-B. To explore between-group differences of facial burns (yes vs no) and gender, independent sample t-tests were used.

## 3. Results

### 3.1. Participants and descriptive statistics

Of the 266 patients included in this study, 46 patients (18%) were excluded from the analyses because they did not complete the PSQ at 3 months, leaving a final sample of 220 burn patients of which 171 were Dutch and 49 were Belgian. The 46 dropouts were on average younger ( $M = 38.11$  vs  $M = 45.10$  yrs.;  $p = .006$ ) and had smaller burns in terms of percentage total body surface area (TBSA) burned ( $M = 6.70$  vs  $M = 10.32$ ;  $p = .04$ ), but there was no difference regarding gender ( $p = .51$ ).

Mean age of the 220 participants at time of the injury was 45.10 ( $SD = 15.52$ , range: 18–82). Of those participants, 157 were men (71.4%). Mean percentage total body surface area (TBSA) burned was 10.32 ( $SD = 11.63$ , range: 0.40–75), and facial burns were reported in 116 persons (52.7%). At the 12 month after burn assessment, 174 participants filled out the PSQ. Mean age at time of the injury was 46.50 ( $SD = 15.50$ , range: 19–82). Of those participants 120 were

**Table 1 – Mean, Standard Deviation, Median and % Item endorsement of the PSQ items according to the 3-factor structure.**

Item	Subscale / item	M (SD)	Mdn	% Endorsement >1
	<b>Absence of friendly behavior</b>	<b>2.14 (0.57)</b>	<b>2.1</b>	
1.	People are friendly with me (R)	1.52 (0.67)	1	45.7
5.	People are nice to me (R)	1.81 (0.92)	2	61.0
7.	People I don’t know say ‘Hi’ to me (R)	3.11 (1.27)	3	89.9
9.	People are relaxed around me (R)	2.00 (1.09)	2	65.3
12.	People I don’t know smile at me in a friendly way (R)	3.00 (1.22)	3	88.0
15.	People are kind to me (R)	1.63 (0.61)	2	56.9
17.	Strangers are polite to me (R)	2.38 (1.28)	2	75.1
20.	People treat me with respect (R)	1.74 (0.87)	2	57.4
	<b>Confused/Staring behavior</b>	<b>1.69 (0.67)</b>	<b>1.5</b>	
3.	People avoid looking at me	1.34 (0.70)	1	22.9
4.	People I don’t know act surprised or startled when they see me	1.78 (1.01)	1	44.5
6.	People don’t know what to say to me	1.89 (1.08)	1	43.3
10.	People feel sorry for me	2.30 (1.17)	2	63.6
13.	People don’t know how to act around me	1.62 (0.88)	1	39.9
14.	People do ‘double takes’ or turn around to look at me	1.53 (0.87)	1	33.6
19.	People I don’t know stare at me	1.53 (0.82)	1	34.6
21.	People seem embarrassed by my looks	1.46 (0.79)	1	30.0
	<b>Hostile behavior</b>	<b>1.10 (0.26)</b>	<b>1.0</b>	
2.	People call me names	1.06 (0.26)	1	5.5
8.	People laugh at me	1.14 (0.60)	1	7.8
11.	People pick on me	1.12 (0.54)	1	7.9
16.	People bully me	1.10 (0.33)	1	9.2
18.	People make fun of me	1.08 (0.31)	1	7.4

Note. (R) = reversed scored; % endorsement is the percentage of item response greater than one (‘never’; ‘always’ in cases of reversed items).

men (69.0 %). Mean TBSA burned was 10.03 (SD = 10.65, range: 0.40–75), and facial burns were reported in 89 persons (51.1%).

Descriptive statistics of items are presented in Table 1. It shows that ‘absence of friendly behavior’ was relatively common. Three items (item 7: ‘People I don’t know say Hi to me’, item 12: ‘People I don’t know smile to me in a friendly way’, and item 17: ‘Strangers are polite to me’) had a relatively high endorsement compared to the other items in this subscale. With regard to ‘confused/staring behavior’, items ranged from 22.9% endorsement of at least occasional occurrence for item 2 (‘People avoid looking at me’) to 63.3% for item 10 (‘People feel sorry for me’). ‘Hostile behavior’ was relatively uncommon with endorsements ranging from 5.5% to 9.2%.

### 3.2. Structural validity: confirmatory factor analysis and exploratory factor analyses

In step 1, CFA was performed testing the original 3-factor structure. Model fit indices of the 3-factor structure showed an inadequate model fit with CFI = .90, TLI = .88, RMSEA = .09, WRMR = 1.59. In appendix 1, the factor loadings are presented. In step 2, EFA with promax rotation was performed to examine the underlying factor structures in the current data. The pattern matrix and the scree plot indicated a 4-factor solution (the inflection point was at the fifth eigenvalue): ‘absence of friendly behavior in general’, ‘absence of friendly behavior in strangers’, ‘confused/staring behavior’ and ‘hostile behavior’. The four factors explained 53.1% of the variance (23.2%, 11.9%, 10.5%, and 7.5%, respectively). Factor loadings were all >.50 and cross-loadings were always smaller than 0.20. The factors ‘confused/staring behavior’ and ‘hostile behavior’ included the same items as the original PSQ subscales. The third original subscale, ‘absence of friendly behavior’, was divided into two separate factors, separating strangers’ behavior from other people’s behavior. In step 3, the model fit of the 4-factor structure was evaluated with CFA, which showed that the 4-factor model fitted the data well: CFI = .95, TLI = .95, RMSEA = .07, but WRMR was 1.16, slightly higher than 1. Table 2 presents model fit statistics for the 3 and 4-factor model. Model fit indices and the Satorra-Bentler  $\chi^2$  difference test indicated that the 4-factor model fitted the data significantly better. Model results of the 4-factor model are presented in Fig. 1. To evaluate the robustness of the 4-factor solution, CFA was performed using the PSQ assessment at 12 months after burn, which replicated the adequacy of the 4-factor structure, CFI = .97, TLI = .97, RMSEA = .06, WRMR = 0.93.

To test whether the PSQ was well represented by the 4 factors, a second-order CFA was performed (Fig. 2). The results revealed that the 4 factors loaded on one higher-order dimension (PSQ) with acceptable CFI and TLI values (.93 and .92 respectively) and an acceptable RMSEA of 0.078, but WRMR was higher than 1 (value 1.32). The factor ‘absence of friendly behavior in strangers’ showed the lowest contribution to the total PSQ.

### 3.3. Internal consistency

The PSQ was assessed at 3 and 12 months after burn with Cronbach’s alpha’s ( $r_a$ ) of .77 and .85 respectively for the total score, indicating acceptable to good internal consistency. For the factor ‘confused/staring behavior’ the internal consistency was high ( $r_a = .87$  and  $.88$  at 3 and 12 months after burn, respectively). The factor ‘absence of friendly behavior in general’ showed low to acceptable internal consistency ( $r_a = .66$  and  $.78$ ). ‘Absence of friendly behavior in strangers’ showed acceptable to good internal consistency ( $r_a = .71$  and  $.80$ ). The factor ‘hostile behavior’ had a low internal consistency ( $r_a = .60$ ) at 3 months and an acceptable internal consistency at 12 months ( $r_a = .72$ ). Deleting items did not improve internal consistency of the subscales.

### 3.4. Relations with depressive symptoms, invalidation, interpersonal relations and body image

Table 3 presents the Spearman correlations coefficients between the PSQ (sub)scale(s) and depressive symptoms, invalidation, interpersonal relations and body image. The total PSQ was significantly related to all measures with fair to moderate correlations. With regard to the subscales, especially ‘confused/staring behavior’ was related to the measured psychological variables. ‘Absence of friendly behavior in strangers’ was not significantly related to any of the measured variables, excluding a small correlation with depressive symptoms, and the other two subscales showed small correlations.

### 3.5. Associations with facial burns, gender, and burn severity

Burn severity, gender and facial burn were related to higher scores on the factor ‘confused/staring behavior’, but not to the other subscales. Persons with facial burns ( $n = 116$ ,  $M = 1.79$ ,  $SD = 0.74$ ) scored higher compared to those with burns at other locations ( $n = 104$ ,  $M = 1.57$ ,  $SD = 0.55$ ), ( $t(211) = 2.47$ ,  $p = .014$ ).

**Table 2 – Fit indices of Confirmatory Factor Analysis of the Perceived Stigmatization Questionnaire (PSQ).**

Model	Months after burn	$\chi^2$	df	CFI	TLI	RMSEA	WRMR	Model comparison	df diff.	$\chi^2$ diff.
1. PSQ 3 subscales	3	564.00	186	0.90	0.88	0.10	1.59			
2. PSQ 4 subscales	3	355.37	183	0.95	0.95	0.06	1.16	1 vs 2	3	101.65*
3. PSQ 4 subscales	12	300.41	183	0.97	0.97	0.06	0.93			

Note. CFI = Comparative Fit Index, TLI = Tucker -Lewis Index (TLI), RMSEA = Root Mean Square Estimate of Approximation, WRMR = Weighted Root Mean Square Residual.

\*  $p < .01$ .

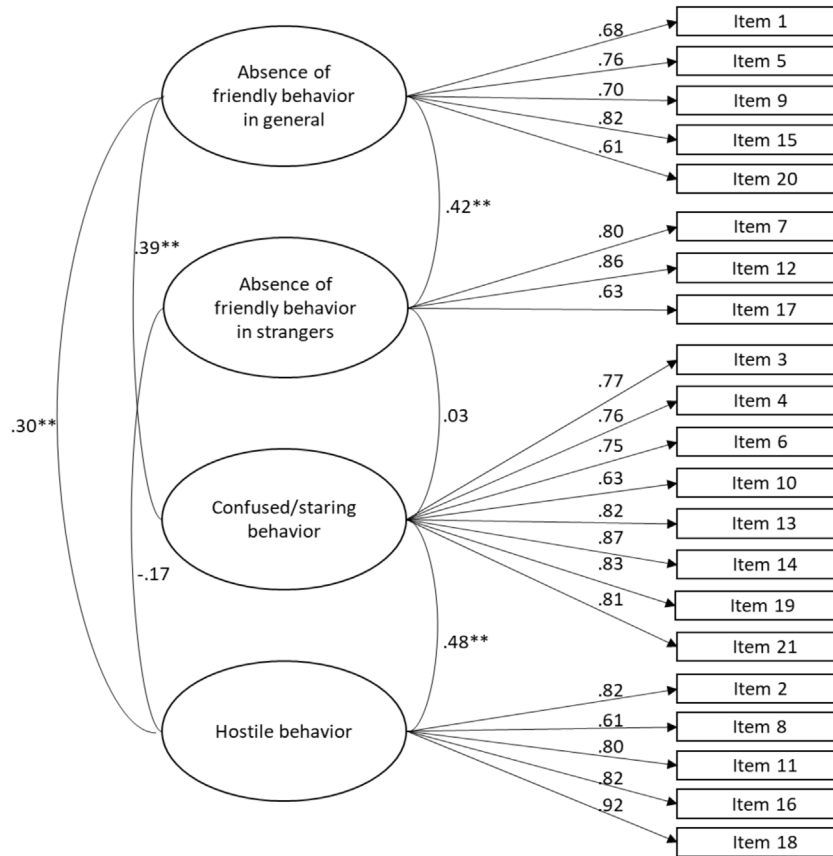


Fig. 1 – Confirmatory factor analysis of the Perceived Stigmatization Questionnaire (PSQ). Values in the curved arrows indicate the correlations among factors. Standardized parameter estimates of the model are shown in the directional arrows. \* =  $p < .05$ ; \*\* =  $p < .01$ .

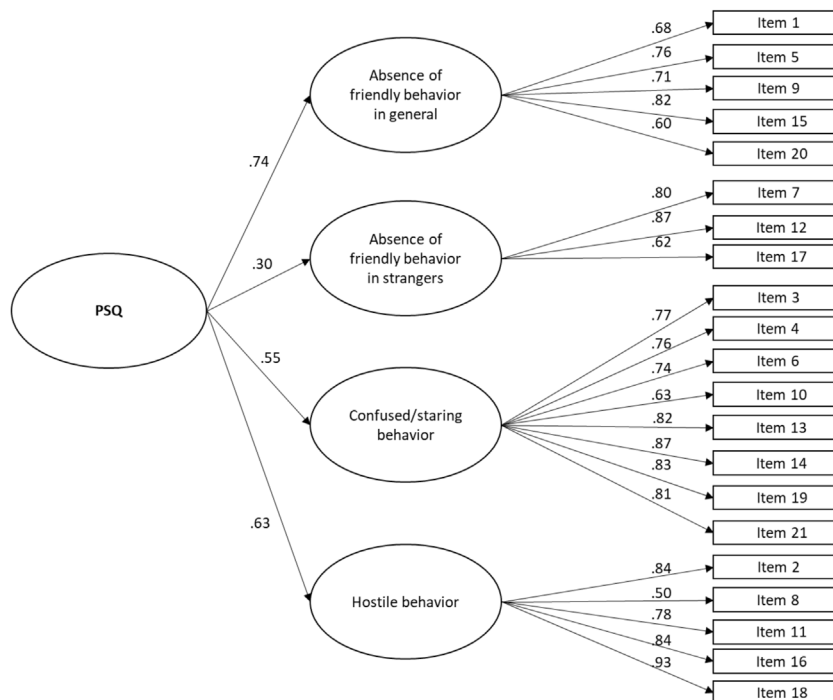


Fig. 2 – Results of the second-order confirmatory factor analysis.



**Table 3 – PSQ correlations with depression, invalidation, interpersonal relations and body image.**

	PSQ total	Absence friendly behavior in general	Absence friendly behavior in strangers	Confused/staring behavior	Hostile behavior
BDI	.46**	.11	.15*	.51**	.16*
3*I: lack of understanding F	.19**	.18**	.03	.19**	.20**
3*I: discounting F	.40**	.19**	.09	.44**	.21**
BSHS: interpersonal relations	-.37**	-.26**	-.05	-.34**	-.25**
BSHS: body image	-.46**	-.14*	-.09	-.53**	-.13*
TBSA burned	.20**	-.03	.05	.29**	.14*

Note. BDI = Beck Depression Inventory; 3\*I = Illness Invalidation Inventory, F = family; BSHS = Burn Specific Health Scale.  
\*  $p < .05$ .  
\*\*  $p < .01$ .

Also women ( $n = 62$ ,  $M = 1.84$ ,  $SD = 0.69$ ) reported more perceived stigmatization compared to men ( $n = 157$ ,  $M = 1.63$ ,  $SD = 0.65$ ), ( $t(218) = -2.21$ ,  $p = .028$ ), and those with higher TBSA burned reported more perceived stigmatization compared to those with lower TBSA burns ( $r = .29$ ).

#### 4. Discussion

The psychometric evaluation of the Dutch PSQ demonstrated acceptable reliability and structural validity. While the original 3-factor structure could not be replicated, the 4-factor solution showed good fit to the data both at 3 and 12 months after burn, and the four first-order factors loaded on a single second-order factor.

The main difference between our study and previous studies is the 4-factor structure with 'absence of friendly behavior' being divided into two factors, separating behavior of strangers and other people. The three items (7, 12, 17) in this factor showed a higher endorsement indicating that absence of friendly behavior was more often reported to occur always in encounters with strangers compared to other people. This factor did hardly correlate with any of the other variables indicating it may not necessarily be perceived as stigmatizing or otherwise negative when strangers do not behave friendly. The low contribution of this factor to the second-order CFA indicated a low added value of these 3 items to the total score of perceived stigmatization in this Dutch-Belgian sample. Also previous equivalence studies showed problems in the subscale 'absence of friendly behavior'. In the German study, items 7 and 12 showed low factor loadings and in the Brazilian study the items 1, 12 and 17 were dropped. This shows that the structural validity problems with this specific subscale are not an isolated finding of the Dutch version but do also occur in other countries.

The factor 'hostile behavior' could be replicated [7,9,10]. The internal consistency of this factor was rather low (.60 and .71 at the two occasions), in line with other studies (.73 and .78) [9,10]. The lower correlation with depressive symptoms, body image and interpersonal relationship contrasts the previous studies [7,9,10], while mean scores, the low percentage endorsement, and floor effects are comparable across the studies. It is, therefore, unclear why associations of the hostile

behavior with other questionnaires were low in the Dutch sample.

The factor 'confused/staring behavior' was also replicated and it showed, in concert with previous studies, good internal consistency. Correlations with depressive symptoms, body image and discounting were moderately high, indicating this subscale was most strongly related to psychosocial status. The subscale also correlated with burn severity, presence of facial burns and female gender. In accordance with the German study [10], only this factor significantly correlated with TBSA burned. A study that compared PSQ outcomes of Brazilian burn survivors with the general Brazilian population, found that burn survivors reported more 'confused/staring behaviors', but did not differ with regard to 'hostile behavior' and 'absence of friendly behavior' [29]. This subscribes the relevance of this particular subscale to burn survivors and suggests that the factor 'confused/staring behavior' is the most salient subscale for burn survivors.

The hypotheses on the associations of the PSQ subscales with depressive symptoms, body image, interpersonal relations and invalidation were only partially confirmed with solely the 'confused/staring behaviors' subscale showing moderate to high associations. However, in accordance with the Brazilian study [9], the total PSQ showed moderate to high associations with depressive symptoms, body image and interpersonal relations. In addition, as hypothesized, a moderate association between the discounting subscale of invalidation and the total PSQ was found, indicating a link between social rejection and negative social responses with perceived stigmatization. The lack of understanding subscale only showed a low association with the total PSQ, indicating that absence of social responses were not strongly linked to perceived stigmatization. Overall, correlations with other constructs were more or less similar to findings in previous studies [9,10], showing both overlap with and differentiation from other aspects of psychosocial functioning.

The results of this study have some research implications. First, the 4-factor structure in the Dutch and Belgian population included all 21 items which is in line with the original scale. Internal consistency of the total PSQ score was good, and the four factors loaded on a single higher-order factor, with the restriction that one of the fit indices was too high. However, the total PSQ showed to be reasonably represented by the second-

order factor analysis. Future studies may examine the added value of items that were previously dropped or had low factor loadings, in this study presenting as a separate factor, notably by investigating measurement invariance across the different languages. The relevance of the four separate factors should be investigated more thoroughly. The current study indicated that the factor ‘confused/staring behavior’ has a larger psychosocial significance than the other scales.

The current results should be interpreted given certain limitations. Although TBSA burned and gender distribution in this sample is comparable to the Brazilian [9] and the German [10] studies, it deviates from the US study in which more women and persons with larger TBSA burned were included which may complicate the comparison. Also, facial burns in the current sample indicated the presence of facial burns indexed at admission to the hospital which does not necessarily result in facial scarring. Strengths of the current study include the relatively large sample size with participants from the Netherlands and Belgium.

## 5. Conclusion

In conclusion, the current results show acceptable reliability and structural validity of the Dutch version of the PSQ in a 4-factor solution. To establish a uniform cross-cultural instrument, measurement invariance across the different languages is warranted.

## Conflict of interest statement

There is no conflict of interest to report by any of the authors.

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