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# A twelve-country psychometric validation study of the Arabic version of the social pain Questionnaire (SPQ)

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**ABSTRACT**

The concept of social pain refers to the affective response (that is, painful feelings) triggered by social exclusion, rejection or loss. To our knowledge, there is currently no valid instrument available in the Arabic language to measure the social pain construct. The present study aims to examine the psychometric properties of an Arabic translation of the Social Pain Questionnaire (SPQ) in Arabic-speaking adults from the general population of different Arab countries. A cross-sectional web-based study was carried-out from February to April 2024 in 8408 adults from 12 Arab countries. Our findings showed that all 10 items of the Arabic version loaded on one factor and provided a good fit to the data in the present sample. Cronbach's alpha of 0.94 indicated excellent internal reliability. Multi-level CFA showed that the Arabic version of the SPQ was invariant between adult sex-groups and across countries. Convergent and divergent validity of the scale were evidenced through significant positive correlations between social pain and measures of anxiety, depression, and psychotic experiences severity. In addition, SPQ scores negatively correlated with self-esteem levels. The Arabic translated version of the SPQ was found to be valid, reliable and suitable for use to assess social pain as an important emotional experience among Arabic-speaking adults from the general population.

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## Introduction

Social connectedness is fundamentally important for human development, health and survival (Gilbert, 2016). Common experience in everyday life shows how events such as losing close relationships (e.g. breakup), and being devalued by, or excluded from desired relationships can trigger distressing and challenging emotional responses. Universally, such negative social experiences, or socially disconnecting events, are often described as being "painful" and as resulting in "emotional scars", "hurt feelings", "broken hearts" and "injury" (Eisenberger, 2015; MacDonald & Leary, 2005). These subjective descriptions were confirmed by accumulating evidence showing that when social connectedness is threatened, a pain-like experience may occur, which is designated as social pain. The concept of social pain refers to the affective response (that is, painful feelings) triggered by social exclusion, rejection or loss; it has therefore been often used to characterize the reactions to threats for the need to belong (Baumeister & Leary, 1995). On the other hand, the social-physical pain overlap theory (Eisenberger et al., 2003) stipulates that being socially rejected or excluded poses similar serious threats to survival as being physically injured. This theory has found empirical support in several neuroscientific studies, which showed that the same biological systems and neural circuits that process physical pain also underlies the distressing experience of social pain (Eisenberger, 2012b, 2015; Rotge et al., 2015).

Social disconnection and subsequent pain can have profound repercussions on human health and behaviour throughout the lifespan (DeWall & Baumeister, 2006). Indeed, a body of evidence has shown that experiences of social pain could lead to physiological dysregulations, including alterations in the functioning of the immune system and heightened levels of hypothalamic-pituitary-adrenal axis activation; this, in turn, could lead to adverse health outcomes (Dickerson, 2011). In particular, social pain is linked to elevated rates of physical and mental health problems (DeWall & Baumeister, 2006), as well as increased money spending (Baumeister et al., 2008). Social pain was also found to increase sensitivity to physical pain (Eisenberger et al., 2006). The pain that comes with the actuality or possibility of losing social bonds and relationships seems to increase the likelihood of depression in adolescents (Slavich et al., 2014), and to precipitate the onset of major depression (Slavich et al., 2009) and social anxiety (Fung & Alden, 2017) in adults. Additionally, socially rejected or excluded individuals display a decrease in self-regulatory ability and overall cognitive functioning, an increase in aggressive and self-destructive behaviours (such as procrastination and risk-taking) (DeWall & Baumeister, 2006; Mendes & Jamieson, 2012), and lower levels of self-esteem (Sepehrinia et al., 2024; Yanagisawa et al., 2011). Finally, previous research indicated that social rejection/exclusion is significantly associated with a greater increase in paranoid beliefs and psychotic-like symptoms in both clinical and non-clinical populations (Lincoln et al., 2018; Pillny & Lincoln, 2020; Sundag et al., 2018). In light of these findings, it can be assumed that investigating social pain may aid in the detection and management of its multiple closely related clinical conditions. It is therefore crucial to measure the social pain construct using robust tools that enable mental health professionals and researchers to better identify and understand them.

Studies on the relationship between social pain and psychopathology have mostly adopted either the experimental cyberball paradigm or self-report measures. The cyberball task assesses social pain based on the needs-threat model (Williams et al., 2000; Zadro et al., 2004), which proposes that social exclusion is a threat to four fundamental needs, i.e. meaningful existence, control, self-esteem, and belonging. However, this approach has methodological problems that limit the validity of its findings, including a questionable construct validity and inconsistent correlations with other measures evaluating diverging needs (Gerber et al., 2017). Besides, the need-threat scale reflects a short-term emotional response to experiencing exclusion in the cyberball game, which is a particular situation that does not necessarily mirror a consistent response tendency to feel social pain in various situations. As for self-report measures, they encompass the Interpersonal Sensitivity Measure (IPSM; (Boyce & Parker, 1989)), the Adult Rejection Sensitivity Questionnaire (ARSQ; (Berenson et al., 2009)), and the Hurt Feelings Scale (HFS; (Leary et al., 1998)). The IPSM does not focus specifically on emotional reactions to social rejection, but also covers a wide range of other interpersonal situations, including dependency, shyness, anxiety, self-criticism, and susceptibility to critique (Boyce & Parker, 1989). The ARSQ reflects negative emotional reactions towards anticipated, rather than actually experienced, social rejection situations (Berenson et al., 2009). In addition to these limitations, the theoretical relationship

of the IPSM or the ARSQ to social pain has proven to be unclear, and their original dimensional structure was not supported in later studies (Harb et al., 2002; Innamorati et al., 2014). Unlike the IPSM and the ARSQ, HFS's items were designed to specifically cover emotional components of social pain; however, its psychometric characteristics have not been systematically tested and remain unknown (Stangier et al., 2021).

To bridge these gaps, Stangier et al. (Stangier et al., 2021) have recently developed and validated a self-report instrument, i.e. the Social Pain Questionnaire (SPQ), to specifically assess the construct of perceived social pain. The scale's items were created based on the background of both the belongingness theory (Baumeister & Leary, 1995) and the social-physical pain overlap theory (Eisenberger et al., 2003). The SPQ is composed of 10 items loading on a single factor, and scored on a five-point Likert type scale ranging from 0 ("Applies not at all to me") to 4 ("Applies exactly to me"). A sample item is "It hurts my feelings if somebody denies a request of me". In the original validation study, the SPQ demonstrated solid psychometric properties in German outpatients seeking psychotherapy and healthy individuals, including good factorial structure and excellent reliability (Stangier et al., 2021). Convergent validity was supported by significant positive moderate correlations with interpersonal sensitivity, ambivalent-worry attachment, depression, general psychopathological symptoms and paranoid ideation. The SPQ also showed good discriminant validity as evidenced by higher levels of social pain exhibited by patients with depression, social anxiety disorder and personality disorders as compared to patients with other diagnoses (other anxiety disorders and trauma-related disorders) (Stangier et al., 2021). More recently, the SPQ was translated to the Persian language and validated in a sample of Iranian adults from the general population, where it showed a one-dimensional construct, excellent internal consistency, divergent and convergent validity as revealed through correlations between the SPQ and measures of self-esteem, perceived social support, and interpersonal sensitivity (Sepehrinia et al., 2024). The psychometric properties of the SPQ have also been examined in German adolescents aged 14 to 20 years, where it showed a unidimensional factor structure and high internal consistency (Schwarz et al., 2021). To date, there is no validated version of the SPQ suitable for use in Arabic-speaking populations.

### *Rationale*

To our knowledge, there is currently no valid instrument available in the Arabic language to measure the social pain construct. In addition, we could find no previous studies that evaluated social pain in Arabic-speaking individuals of Arab origin. This is a clear gap, especially given the evidence that emotional responses to social rejection vary across cultures, with people from individualistic societies (i.e. UK) being more capable of regulating the negative emotional reactions elicited by social exclusion than those from collectivistic, group-oriented cultural backgrounds (i.e. China) (He et al., 2021). One plausible explanation is that collectivistic cultures value groups over individuals, and put more emphasis on the relationships and social connection in the group (Cho & Yoon, 2001). In such cultural contexts, social exclusion may be experienced with greater difficulty and distress to the individual (Kanetsuna et al., 2006). Therefore, it is of utmost importance to consider the role of culture in how people react emotionally to social exclusion when developing prevention and intervention strategies across diverse populations. To this end, the use of culturally tailored measurement tools is essential. Making available the SPQ for use among Arabic-speakers will help shed light on the fact that the emotional experience of social pain should be ascribed the same degree of relevance as physical pain. The scale could unveil how social pain manifests in a new cultural and societal background, thereby advancing our understanding of the triggers and impacts of this experience on the individual in Arab contexts, and ultimately informing tailored prevention and intervention strategies.

The present study proposes to examine the psychometric properties of an Arabic translation of the SPQ in Arabic-speaking adults from the general population of different Arab countries. By exploring the validity, reliability, and factor structure of the SPQ in Arab countries from the Middle East-North Africa (MENA) region, it is possible to determine whether any changes are required to enhance the scale's psychometric properties before it can be used in these different cultural contexts. It is expected that the Arabic version of the SPQ will replicate the originally proposed single-factor structure in both sexes and

all countries, and will have good internal consistency reliability as well as adequate convergent and divergent validity. Depression, anxiety, psychotic experiences, and self-esteem were chosen for the establishment of convergent and divergent validity on the basis of their close theoretical relationship to social pain.

## Methods

### Participants and procedure

This study is part of a large-scale multi-country research project, i.e. the Multinational Autism Project ("MAP") of the Arab world, aimed at providing an epidemiological description of the prevalence and correlates of autistic traits in adults from the general population across the Arab countries in the Middle-east and North Africa (MENA) region.

A cross-sectional web-based study was carried-out from February to April 2024 in 12 Arab countries: Algeria, Bahrain, Egypt, Iraq, Jordan, Kingdom of Saudi Arabia, Kuwait, Lebanon, Morocco, Oman, Palestine, Tunisia. The target population was Arab-speaking adults from the general population who were aged over 18 years, originating from and residing in one of these Arab countries at the time of the survey, who were willing and gave their consent to participate. Data was gathered using an online anonymous questionnaire in the Arabic language, disseminated via Google Forms and multiple social media platforms. The recruitment was performed using a combined convenience and snowball sampling strategy. In all sites, researchers started by recruiting easily accessible participants (convenience) from their professional network and personal contacts. To expand the sample beyond immediate reach, a chain-referral process was created by encouraging those who participated to share the survey within their personal and professional networks (snowball), enabling broader dissemination.

The first section of the questionnaire covered informed consent for participation in the study; only participants ticking 'Yes' to the statement "I actively consent to take part in this study of my own free will" were redirected to the rest of the questionnaire. No financial rewards were offered. The present study was performed according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines [48]. The protocol was approved by the home institutions of the study's principal investigators, namely the ethics committee of Razi Psychiatric Hospital, Manouba, Tunisia (ECRPH-2024-032) and the Lebanese International University's School of Pharmacy ethics committee (2024ERC-025-LIUSOP). All methods were performed in accordance with the relevant guidelines and regulations (in accordance with the Declaration of Helsinki).

### Measures

#### Sociodemographic information

Information about age, sex (male, female), level of education (elementary, middle, secondary, university), household crowding index (i.e. the number of persons divided by the number of rooms in the house except the kitchen and bathrooms; with higher scores reflecting worse socioeconomic status) was collected from participants.

#### The social pain Questionnaire (SPQ)

The SPQ is a self-report scale consisting of 10 items and a single factor (Stangier et al., 2021). Each item involves a statement about perceived social pain (e.g. "It hurts my feelings if somebody denies a request of me"). Items are scored from ("not applicable") to ("fully applicable"). After obtaining permission from the original author, Professor Ulrich Stangier, the SPQ was rigorously translated and culturally adapted for the Arabic environment and language. The translation and adaptation processes ensured that the meaning of all 10 items remained consistent with that of the original version according to the international norms (Van Widenfelt et al., 2005). The forward translation and backward translation of the SPQ was performed. Initially, the SPQ was translated from English to Arabic by a translator who was not involved in the research. Then, the backward translation was completed by a health professional who is

fluent in English and familiar with the terminology of the area covered by the instrument. This approach was adopted to ensure the conceptual equivalence of each item. Afterwards, both the original and the back-translated English versions were compared by a panel of experts composed of the translators, the research team, two psychiatrists, and one psychologist, in order to resolve any inconsistencies and confirm the accuracy of the translation (Fenn et al., 2020). A pilot study was then conducted to ensure that items are clear and easily interpreted. No further adjustments were required.

### *The generalized anxiety disorder 7-item scale (GAD-7)*

The GAD-7 is a self-administered scale that assesses the severity of anxiety symptoms over the past two weeks through seven items (e.g. "Not being able to stop or control worrying") (Spitzer et al., 2006). Each item is rated from 0 (not at all) to 3 (nearly every day). Higher scores reflect more severe anxiety. The Arabic validated version of the GAD-7 was used (Khoury-Malhame et al., 2025; Sawaya et al., 2016). The Cronbach α of the GAD-7 total score was of .92 in this sample.

### *The patient health Questionnaire-9 (PHQ-9)*

The PHQ-9 is a self-administered scale containing 9 items (e.g. "Little interest or pleasure in doing things") to measure the severity of depressive symptoms (Kroenke et al., 2001). Items are scored on a 4-point Likert scale ranging between 0 (not at all) and 3 (nearly every day), with total scores varying from 0 to 27. Greater scores reflect more severe depression. The Arabic validated version was utilized (Dagher et al., 2023), and had good internal consistency in this study (Cronbach α = .91).

### *The prodromal Questionnaire-Brief (PQ-B)*

The PQ-B contains 2 items rated as yes or no, which serve to measure subthreshold psychotic symptoms, or psychotic experiences (Loewy et al., 2005; 2011). When respondents answer "yes" to an item, they are then asked to rate the degree of distress experienced in relation to each statement from 1 (strongly disagree) to 5 (strongly agree). The Arabic validated version of the PQ-B was used (Fekih-Romdhane et al., 2024), with a Cronbach α of .94 in this study.

### *The Arabic single-item self-esteem scale (A-SISE)*

This is a single item measure (i.e. "I have high self-esteem"). Respondents are asked to answer the item on a 5-point Likert scale ranging from 1 ("not at all true of me") to 5 ("very true of me") (Brailovskaia & Margraf, 2020). The Arabic validated version was adopted in this study (Fekih-Romdhane et al., 2023).

## *Analytic strategy*

There were no missing responses in the dataset. To examine the factor structure of the SPQ, we used data from the entire sample to perform a confirmatory factor analysis (CFA) using RStudio, "lavaan" and "SemTools" programs (Jorgensen et al., 2022; Rosseel et al., 2023). We used Weighted Least Squares with Mean and Variance (WLSMV) estimation method, which is more appropriate for ordinal data (Li, 2016). A minimum sample varying between 30-200 participants was deemed necessary to conduct a confirmatory factor analysis following a recommendation between 3-20 times the number of the scale's variables (Mundfrom et al., 2005). Calculated fit indices were the root mean square error of approximation (RMSEA), the Tucker-Lewis Index (TLI) and the comparative fit index (CFI). Values ≤ .08 for RMSEA, and .95 for CFI and TLI indicate good fit of the model to the data (Byrne, 2013). In addition, supplementary split-sample analyses were conducted to further examine the latent structure of the Arabic SPQ. The total sample was randomly divided into two approximately equal subsamples. Exploratory factor analysis (EFA) based on polychoric correlations was performed in the first subsample to explore the underlying factor structure without imposing a priori constraints. In the second subsample, CFA was conducted to compare the fit of the hypothesized one-factor model with an alternative factor structure suggested by the EFA results. Convergent validity was assessed through the calculation of the Average Variance Extracted, with values

> .50 reflecting adequate convergent validity. Multivariate normality was not verified as verified by the Mardia's test skewness (= 3851.96; $p < 0.001$) and kurtosis (= 182.96; $p < 0.001$) values.

To examine sex and country invariance of SPQ scores, we conducted multi-group CFA (Chen, 2007) using the total sample. Measurement invariance was assessed at the configural, metric, scalar and strict levels (Vadenberg & Lance, 2000). We accepted ΔCFI ≤ .010 and ΔRMSEA ≤ .015 or ΔSRMR ≤ .010 as evidence of invariance (Chen, 2007), Comparison between males and females was done using the Student *t*-test only if scalar or partial scalar invariance. The ANOVA test was used to compare scores between countries.

Composite reliability in both subsamples was assessed using McDonald's ω and Cronbach's alpha, with values greater than .70 reflecting adequate composite reliability. Convergent and discriminant validity were examined through correlations between SPQ scores and theoretically relevant psychological constructs. Convergent validity was evaluated using measures of depression, anxiety, and psychotic experiences, which are conceptually related to heightened sensitivity to social rejection and distress. Positive correlations of small-to-moderate magnitude were expected. Discriminant validity was assessed through associations with self-esteem, a construct theoretically distinct but inversely related to perceived social rejection according to sociometer theory. A negative correlation of small-to-moderate magnitude was therefore anticipated. Pearson correlation coefficients were computed to examine these relationships.

## Results

A total of 8408 participants filled the survey, with a mean age of 24.70 ± 8.44 years and 74.5% females. The description by country can be found in Table 1.

### *Confirmatory factor analysis of the SPQ scale*

CFA provided partial support for the hypothesized one-factor model of SPQ scores. Standardized factor loadings were all high (Table 2), indicating that the items were strongly related to the latent construct. Incremental fit indices suggested acceptable model fit (CFI = 0.993, TLI = 0.991; SRMR = 0.05), whereas the RMSEA indicated poorer absolute fit (RMSEA = 0.128, 90% CI 0.125, 0.132). These results suggest that, although a dominant general factor underlies the scale, the latent structure may be more complex. Convergent validity was supported by an adequate AVE value (= 0.67) and internal reliability was excellent (ω = .94; α = .94).

In supplementary split-sample analyses, EFA conducted in the first random half-sample suggested that the SPQ was characterized by a strong general factor, although parallel analysis indicated that more than one factor may underlie the item set. The one-factor EFA solution showed high loadings but suboptimal fit, whereas the two-factor solution demonstrated substantially improved fit. In the second half-sample, CFA showed that the two-factor model fit the data better than the one-factor model. However, the correlation between the two latent factors was high (r = .86), supporting the presence of a strong common social pain dimension.

### *Measurement invariance by sex and countries*

For invariance by sex, although the $X^2$ tests are significant (expected with large samples), all ΔCFI, ΔRMSEA and ΔSRMR values are within accepted thresholds. Therefore, full invariance across sex (configural, metric, scalar and strict) is supported (Table 3). A significantly higher mean SPQ score was found in females ($M = 21.48$, $SD = 9.87$) compared to males ($M = 20.50$, $SD = 10.21$) in the total sample, $t(8406) = -3.95$, $p < .001$. The magnitude of this difference was small (Cohen's d = 0.10; 95% CI [0.05, 0.15]. For invariance by countries, ΔCFI and ΔSRMR values are acceptable. Only ΔRMSEA = 0.025 between the metric and scalar models slightly exceeds the 0.015 cut-off, a small deviation that, when considered alongside non-significant $X^2$ ($p = 0.330$), is not practically meaningful (Table 3). Thus, full invariance across countries is also supported, with minor caution regarding RMSEA sensitivity. A significant difference in terms of SPQ scores was found between countries, F(11, 8396) = 19.58, $p < .001$ (Table 1). Bonferroni

**Table 1.** Sociodemographic characteristics of the participants.

| | Oman (n = 433) | Iraq (n = 488) | Saudi Arabia (n = 342) | Jordan (n = 452) | Palestine (n = 455) | Egypt (n = 1177) | Algeria (n = 534) | Lebanon (n = 1076) | Morocco (n = 456) | Bahrain (n = 419) | Tunisia (n = 1119) | Kuwait (n = 1448) | Total (n = 8408) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Age (years)** | 26.31 ± 7.98 | 20.23 ± 3.10 | 27.23 ± 9.45 | 26.85 ± 8.58 | 21.90 ± 5.68 | 20.74 ± 3.81 | 26.79 ± 8.51 | 27.90 ± 11.81 | 23.48 ± 11.47 | 23.50 ± 6.47 | 27.03 ± 7.38 | 24.34 ± 7.70 | 24.70 ± 8.44 |
| **Sex** | | | | | | | | | | | | | |
| Male | 108 (24.9%) | 148 (30.3%) | 75 (21.9%) | 160 (35.4%) | 82 (18.0%) | 146 (12.4%) | 135 (25.3%) | 389 (36.2%) | 119 (25.6%) | 102 (24.3%) | 324 (29.0%) | 357 (24.7%) | 2145 (25.5%) |
| Female | 325 (75.1%) | 340 (69.7%) | 267 (78.1%) | 292 (64.6%) | 373 (82.0%) | 1031 (87.6%) | 399 (74.7%) | 687 (63.8%) | 346 (74.4%) | 317 (75.7%) | 795 (71.0%) | 1091 (75.3%) | 6263 (74.5%) |
| **Education** | | | | | | | | | | | | | |
| Secondary or less | 42 (9.7%) | 7 (1.4%) | 56 (16.4%) | 31 (6.9%) | 20 (4.4%) | 17 (1.4%) | 123 (23.0%) | 190 (17.7%) | 60 (12.9%) | 68 (16.2%) | 80 (7.1%) | 154 (10.6%) | 848 (10.1%) |
| University | 391 (90.3%) | 481 (98.6%) | 286 (83.6%) | 421 (93.1%) | 435 (95.6%) | 1160 (98.6%) | 411 (77.0%) | 886 (82.3%) | 405 (87.1%) | 351 (83.8%) | 1039 (92.9%) | 1294 (89.4%) | 7560 (89.9%) |
| HCI | 1.63 ± 1.17 | 1.76 ± 1.05 | 1.01 ± .62 | 1.28 ± .62 | 1.65 ± .94 | 1.77 ± .82 | 1.54 ± .77 | 1.15 ± .94 | 1.75 ± 1.02 | 1.45 ± .74 | 1.15 ± .68 | 1.22 ± .84 | 1.41 ± .90 |
| SPQ | 24.09 ± 8.85$^{a}$ | 20.84 ± 10.60$^{bcde}$ | 21.86 ± 9.88$^{abcd}$ | 22.50 ± 10.18$^{ab}$ | 19.89 ± 9.94$^{cdef}$ | 22.98 ± 9.48$^{a}$ | 19.73 ± 9.96$^{cef}$ | 20.24 ± 9.7$^{cdef}$ | 19.49 ± 10.05$^{ef}$ | 21.99 ± 10.16$^{abd}$ | 18.89 ± 8.93$^{f}$ | 22.39 ± 10.57$^{ab}$ | 21.23 ± 9.97 |

*HCI = Household Crowding Index; SPQ = Social Pain Questionnaire. Different superscript letters indicate statistically significantly differences between countries based on Bonferroni post-hoc comparisons (p <. 05).*

**Table 2.** Standardised estimates of factor loadings of the Social Pain Questionnaire obtained from the confirmatory factor analysis.

| Items label | Loading factor |
|---|---|
| 1. It hurts my feelings if somebody denies a request of me. | 0.70 |
| 2. I feel very humiliated when I am excluded from a group. | 0.79 |
| 3. I feel insulted when being ignored at a party. | 0.83 |
| 4. It hurts me when somebody ignores me. | 0.81 |
| 5. When I feel rejected, I experience inner tension. | 0.81 |
| 6. When an acquaintance does not respond to me when I say hello, I feel rejected. | 0.85 |
| 7. When a friend distances himself/herself from me, I feel repulsed. | 0.87 |
| 8. When I get the impression that a colleague withdraws from me, I feel rejected. | 0.88 |
| 9. When somebody declines my request or suggestion, I feel snubbed. | 0.81 |
| 10. If somebody cancels an appointment without a good reason, I feel repulsed. | 0.82 |

**Table 3.** Measurement invariance across sex and countries in the total sample.

| Model | $X^2$ | df | CFI | RMSEA | SRMR | Model comparison | $\Delta X^2$ | Δdf | *p* | ΔCFI | ΔRMSEA | ΔSRMR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Model 1: Sex** | | | | | | | | | | | | |
| Configural | 4918.48 | 70 | 0.993 | 0.131 | 0.057 | | | | | | | |
| Metric | 5080.34 | 79 | 0.992 | 0.123 | 0.058 | Configural vs metric | 161.86 | 9 | <0.001 | 0.001 | 0.008 | 0.001 |
| Scalar | 5046.97 | 99 | 0.993 | 0.112 | 0.057 | Metric vs scalar | 33.37 | 20 | 0.036 | 0.001 | 0.011 | 0.001 |
| Strict | 5169.73 | 109 | 0.992 | 0.105 | 0.058 | Scalar vs strict | 122.76 | 10 | <0.001 | 0.001 | 0.007 | 0.001 |
| **Model 2: Countries** | | | | | | | | | | | | |
| Configural | 5210.41 | 420 | 0.993 | 0.128 | 0.059 | | | | | | | |
| Metric | 5977.70 | 519 | 0.992 | 0.123 | 0.063 | Configural vs metric | 767.29 | 99 | <0.001 | 0.001 | 0.005 | 0.004 |
| Scalar | 5749.29 | 739 | 0.993 | 0.098 | 0.059 | Metric vs scalar | 228.41 | 220 | 0.330 | 0.001 | 0.025 | 0.004 |
| Strict | 7358.56 | 849 | 0.991 | 0.105 | 0.064 | Strict vs scalar | 1609.27 | 110 | <0.001 | 0.002 | 0.007 | 0.005 |

*Note.* CFI = Comparative fit index; RMSEA = root mean square error of approximation; SRMR = Standardised root mean square residual.

post-hoc comparisons revealed multiple significant differences in SPQ scores across countries. These differences are presented in Table 1 using superscript grouping symbols for clarity.

### *Convergent and divergent validity*

Higher self-esteem (r = -.25; $p < .001$) was significantly associated with lower social pain, whereas higher psychotic experiences (r = .06; $p < 001$), depression (r = .17; $p < .001$) and anxiety (r = .21; $p < .001$) were significantly associated with higher social pain.

## Discussion

The SPQ is a short and economic 10-item self-report measure with robust psychometric qualities that allows to assess emotional reactions to social rejection, exclusion and relational devaluation in both clinical and non-clinical individuals (Stangier et al., 2021). The SPQ is primarily created for use by counsellors and other health professionals to screen for social pain in both clinical and nonclinical populations, explore the persons/triggers related to this emotional experience, and intervene in an individualized way for those at-risk. This study describes an effort to validate, for the first time, the Arabic-language version of the SPQ in a large cross-national convenience sample of Arabic-speaking adults from twelve different Arab countries. As hypothesized, findings showed that the Arabic version of the SPQ yielded a unidimensional factor structure, with excellent internal consistency and measurement invariance across sex and country groups. Moreover, the scale exhibited good convergent and divergent validity, as quantified by appropriate patterns of associations with other external correlates (i.e. depression, anxiety, psychotic experiences, and self-esteem).

The SPQ was initially intended as a unidimensional measure of social pain (Stangier et al., 2021). Investigating its factorial structure in our sample as an essential component of construct validity is an

important step towards properly assessing the usefulness and accuracy of the inferences made from SPQ scores. Our findings showed that all 10 items of the Arabic version loaded on one factor and provided a good fit to the data in the present sample, further supporting to the SPQ as a unitary construct that can be used to compute a social pain composite score. The unidimensional factor structure was also retained for the Persian version in the Iranian adult sample (Sepehrinia et al., 2024). This means that the social pain construct is measured on a continuum, and respondents can be somewhere in the middle or near an extreme end of the continuum for each social pain emotional experience. Although the standardized factor loadings and incremental fit indices (CFI and TLI) supported the adequacy of the one-factor solution, the RMSEA value was higher than conventionally recommended thresholds, suggesting potential model misfit (Hu & Bentler, 1999). To better understand this discrepancy, additional exploratory and competing-model analyses were conducted using a split-sample approach. These analyses indicated that, while the SPQ items were primarily characterized by a strong general factor, alternative multidimensional solutions – particularly a two-factor model – demonstrated improved statistical fit. However, the correlation between the two latent factors was high, indicating substantial overlap and supporting the interpretation of social pain as a largely unified construct. Given the strong theoretical basis for the unidimensional conceptualization of the SPQ, the high item loadings, excellent internal reliability, and meaningful validity correlations observed in the present study, the use of a total composite score remains psychometrically and theoretically justified. These findings highlight the importance of considering multiple fit indices and theoretical coherence when evaluating latent structure, especially in very large cross-national samples where minor sources of model misfit may inflate absolute fit statistics (Kenny et al., 2015; Marsh et al., 2004). Furthermore, both the Cronbach's alpha and McDonald's Omega were greater than 0.9, indicating excellent internal reliability, which was in line with previous validation studies of the SPQ (German samples: Cronbach's α=.94 (Schwarz et al., 2021; Stangier et al., 2021); Persian sample: Cronbach's α = 0.91 (Sepehrinia et al., 2024)).

Multi-level CFA showed that the Arabic version of the SPQ was invariant between adult sex-groups and across countries. This finding suggests that respondents of both sexes and those from different countries respond to the items and interpret them in a similar manner, which in turn implies that their SPQ latent mean scores can be directly and meaningfully compared. Comparison of scores revealed that females reported significantly higher mean SPQ scores than males. This concurs with the strong evidence that females have a lower threshold for, and more frequently report pain than males, which could be due to a range of biological, hormonal, psychological, and sociocultural factors (Gutiérrez Lombana & Gutiérrez Vidal, 2012). Specifically, significant sex differences in social pain sensitivity were observed in different adult samples (Umeda & Park, 2024). However, the magnitude of this difference was small, indicating that sex accounts for only a limited proportion of variability in social pain sensitivity. In addition to biological mechanisms, psychosocial factors such as gender socialization processes, norms governing emotional expression, and potential response style differences may also contribute to the observed pattern (Else-Quest et al., 2012; Fischer & LaFrance, 2015). Moreover, physiological research found that females have more emotional responses, and are less capable of regulating emotional reactions following social feedback than males (Vanderhasselt et al., 2018). As for cross-country comparisons, Omani adults exhibited the highest SPQ scores, while Tunisians had the lowest scores. Although social pain seems to be a universal human experience, its perception, and manifestation seem to be closely influenced by cultural backgrounds (He et al., 2021). Even though Arab countries share apparently the same language, geographical location and culture, previous research has shown that large differences also exist, including in the way how people emotionally react to stressful situations (Abu-Hamda et al., 2017).

In order to further confirm the SPQ's validity, its scores were examined in relation to five external correlates, i.e. depression, anxiety, psychotic experiences and self-esteem. As anticipated, findings showed significant positive correlations between social pain and measures of anxiety (Gao et al., 2017; Reinhard et al., 2020), depression (Gao et al., 2017; Reinhard et al., 2020; Slavich et al., 2009) and psychotic symptoms (Lincoln et al., 2018; Pillny & Lincoln, 2020; Sundag et al., 2018). These associations are theoretically expected, as social pain has been conceptualized as an emotional response to perceived social threat that overlaps with broader emotional distress processes (Eisenberger, 2012a; Slavich & Irwin, 2014). However, the magnitude of these correlations was generally weak-to-moderate, suggesting that although related, social pain represents a distinct psychological construct rather than a redundant measure of

general psychopathology (MacDonald & Leary, 2005). In line with the Persian validation of the scale (Sepehrinia et al., 2024) and with other studies (Yanagisawa et al., 2011), SPQ scores negatively correlated with self-esteem. Rather than reflecting divergent validity per se, this inverse is theoretically coherent within the nomological network of social pain, as individuals who experience greater perceived rejection or relational devaluation are likely to report lower perceived social worth (Leary et al., 1995; Onoda et al., 2009). This provides additional support to the sociometer theory which proposes that self-esteem reflects the way how an individual perceives themself to be accepted and valued by other people in the near future (Leary & Terry, 2013). Consistently, earlier research observed decreases in self-esteem following exclusion or rejection in interpersonal relationships (Leary et al., 1995; Lemay Jr & Ashmore, 2006). In addition, individuals with low trait self-esteem experienced greater levels of social pain after being socially excluded by others (Onoda et al., 2010). In contrast, high self-esteemed people tend to report rich and high-quality social interactions with others (Cameron & Granger, 2019). Overall, the pattern of weak-to-moderate associations observed in the present study is consistent with theoretical models conceptualizing social pain as a transdiagnostic affective experience that overlaps with emotional distress constructs while remaining empirically distinguishable from them (Eisenberger, 2012a; Slavich & Irwin, 2014). Taken together, the pattern of weak-to-moderate supports the convergent validity of the SPQ through meaningful associations with emotional distress indicators, while the modest magnitude of correlations suggests that social pain remains empirically distinguishable from related constructs. These observations lend support to the clinical utility of the SPQ among the adult populations. It is of note that the correlation with psychotic experiences, although statistically significant, was weak in magnitude and may reflect the influence of the large sample size rather than a substantive relationship. Accordingly, this finding should be interpreted cautiously.

### *Study limitations*

This study has limitations to be acknowledged and addressed in future research. First, the samples included were recruited online through convenience and snowball techniques. Although this approach allows to easily reach out to a large cross-national population of adults within a large geographic area (Vasantha Raju & Harinarayana, 2016), and helped to create sufficiently large subsamples from each Arab country, it also have major drawbacks. This non-probability sampling strategy may introduce selection biases, leading to an overrepresentation of females, younger and highly educated individuals, those who are more interested in mental health and those with higher digital literacy. This lack of diversity in our population may have limited variability in key constructs, and influenced the psychometric performance of the scale, including the estimation of factor structure, reliability indices, and construct validity. This means that the SPQ may perform differently in populations of older age or those with lower literacy. Overall, this study's findings can be of limited generalizability, and the psychometric properties of the Arabic SPQ observed in this study may not fully extend to the broader Arabic-speaking general population. Therefore, our conclusions should be considered as an initial step in the validation process, preliminarily supporting the psychometric properties of the Arabic SPQ, and future research should aim to replicate these results in more representative and diverse populations. Second, future studies should consider testing convergent validity of the Arabic version of the SPQ using experimental social pain measurements, such as cyberball experiments, or alternative validated self-report measures of social pain, such as the Hurt Feelings Scale (HFS; (Leary et al., 1998)). Third, because this study's design was cross-sectional and data were collected at a one-time point, test–retest reliability of the SPQ was not assessed. Fourth, only adults from the general population were included, and the robustness of the scale still needs to be confirmed in clinical populations, such as patients with depression or social anxiety disorders.

### *Implications and future perspectives*

The Arabic version of the SPQ holds promise as a simple, easy-to-use, valid and reliable self-report measure for examining social pain in future clinical practice and research. Investigating social pain among Arab adults within the Arab culture may improve our understanding of how being rejected in different

Arab societies impacts social pain, thereby leading to a more comprehensive cross-cultural understanding of this emerging concept.

As both sex and culture may impact social pain perception, investigating sex and cultural influences on social pain using an invariant measure, such as the Arabic SPQ, should help in enhancing knowledge of this under-researched construct. This study was the first attempt to investigate measurement invariance of the SPQ across sex and country. The finding is an important strength, as this psychometric property is a prerequisite to accurate comparisons of mean SPQ scores across male/female respondents and between those from different countries and cultural backgrounds.

Many pressing questions and issues facing the emerging field of social pain have been outlined and still need to be addressed (Borsook & MacDonald, 2013). A potential research direction could be to investigate the prediction of emotional responses to social exclusion in clinical samples of socially anxious and depressed patients (Hudd & Moscovitch, 2020). In addition, due to the major impact of social pain on health, practitioners and researchers should work together and make the effort to develop, implement and evaluate tailored interventions that respond to the needs of individuals who are most vulnerable to social rejection, such as acceptance and commitment therapy, cognitive restructuring or behavioural experiments (Ducasse et al., 2018). Thus, we hope that the new validated measurement instrument of social pain in the Arabic language will serve as a starting point for new research directions in the field among Arabic-speaking populations.

## Conclusion

The Arabic translated version of the SPQ was found to be valid, reliable and suitable for use among Arabic-speaking adults from the general population. In particular, CFA supported the presence of a strong general and unidimensional social pain factor underlying the data. Measurement invariance was established between sexes and between countries at the configural, metric and scalar levels. Construct validity was established by correlating SPQ scores with those of related constructs. Overall, this study provides practitioners and researchers with a valuable tool to aid in identifying individuals who experience social pain. The Arabic validated SPQ can help shed light on social pain as an important emotional experience that can "hurt" and have serious health effects just as much as physical pain.

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## Author contributions

CRediT: **Feten Fekih-Romdhane**: Conceptualization, Investigation, Methodology, Project administration, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing; **Amthal Alhuwailah**: Data curation, Investigation, Writing – review & editing; **Fouad Sakr**: Data curation, Investigation, Writing – review & editing; **Leila Sarra Chaibi**: Data curation, Investigation, Writing – review & editing; **Mai Helmy**: Data curation, Investigation, Writing – review & editing; **Hanaa Ahmed Mohamed Shuwiekh**: Data curation, Investigation, Writing – review & editing; **Nedjem Eddine Boudouda**: Data curation, Investigation, Writing – review & editing; **Btissame Zarrouq**: Data curation, Investigation, Writing – review & editing; **Abdallah Y. Naser**: Data curation, Investigation, Writing – review & editing; **Kamel Jebreen**: Data curation, Investigation, Writing – review & editing; **Mohammed Lakhdar Roubi**: Data curation, Investigation, Writing – review & editing; **Bassam Abdul Rasool Hassan**: Data curation, Investigation, Writing – review & editing; **Nisma Merdad**: Data curation, Investigation, Writing – review & editing; **Rizwana Amin**: Data curation, Investigation, Writing – review & editing; **Inad Nawajah**: Data curation, Investigation, Writing – review & editing; **Ali Haider Mohammed**: Data curation, Investigation, Writing – review & editing; **Sinan Subhi Farhan**: Data curation, Investigation, Writing – review & editing; **Omar Abdulwahid AlAni**: Data curation, Investigation, Writing – review & editing; **Majda Cheour**: Data curation, Methodology, Writing – review & editing; **Mariam Dabbous**: Data curation, Investigation, Writing – review & editing; **Diana Malaeb**: Data curation, Investigation, Writing – review & editing; **Sahar Obeid**: Conceptualization, Investigation, Methodology, Project administration, Supervision, Validation, Writing – review & editing; **Souheil Hallit**: Conceptualization, Formal analysis, Investigation, Methodology, Project administration, Supervision, Validation, Writing – original draft, Writing – review & editing.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

## Ethical approval and consent to participate

The protocol was approved by the home institutions of the study's principal investigators (FFR and SH), namely the ethics committee of Razi Psychiatric Hospital, Manouba, Tunisia (ECRPH-2024-032) and the Lebanese International University's School of Pharmacy ethics committee (2024ERC-025-LIUSOP). When filling out the online form, each participant provided written informed consent. All methods were performed in accordance with the relevant guidelines and regulations (in accordance with the Declaration of Helsinki).

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## Data availability statement

Because of ethical committee constraints, none of the data collected or analyzed during this study are publicly available. However, the corresponding author (SH) may make the data available upon reasonable request.

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