Preferred Self-Administered Questionnaires to Assess Resilience, Optimism, Pain Acceptance, and Social Support in People with Pain: A Modified Delphi Study

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Abstract

Objectives. The plethora of self-administered questionnaires to assess positive psychosocial factors complicates questionnaire selection. This study aimed to identify and reach consensus on the most suitable self-administered questionnaires to assess resilience, optimism, pain acceptance and/or social support in people with pain. Design. A three-round modified Delphi study. Participants. Forty international experts. Methods. In Round 1, the experts suggested questionnaires deemed appropriate to assess resilience, optimism, pain acceptance and/or social support. In Round 2, experts indicated whether they considered the suggested questionnaires to be suitable (Yes/No/Don’t know) to assess these psychosocial factors, taking into consideration content, feasibility, personal experience and the measurement properties which we provided for each questionnaire. Questionnaires that were considered suitable by the majority of experts (≥60%) were retained for Round 3. In Round 3, the suitability of each questionnaire was rated on a 0–10 Likert scale. Consensus was reached if ≥75% of experts rated the questionnaire ≥7. Results. From the 67 questionnaires suggested in Round 1, one questionnaire could be recommended per domain. For resilience: Pain Resilience Scale; for optimism: Revised Version of the Life Orientation Test; for pain acceptance: 8-item and Revised Versions of the Chronic Pain Acceptance Questionnaire; for social support: Emotional Support Item Bank of the PROMIS tool. Consensus for these questionnaires was also reached in a sensitivity analysis which excluded the ratings of experts involved in the development, translation and/or validation of relevant questionnaires. Conclusion. We advocate the use of these recommended questionnaires so data can be compared and pooled more easily.

Key Words: Patient Reported Outcome Measures; Outcome Assessment; Health Care; Surveys and Questionnaires; Mental Health; Psychology; Pain

Introduction

Pain and mental health disorders are among the conditions associated with the highest burden of disease [1]. They often coexist [2, 3], and may enhance and perpetuate each other in a bidirectional relation [4, 5]. Furthermore, psychological factors are important in the
development and recovery from chronic pain [5–8]. Historically, the focus has been on the impact of negative psychological factors on pain, such as depression, anxiety, and catastrophizing [9–11]. More recently, interest has grown in the impact of positive psychosocial factors on pain, such as resilience, optimism, pain acceptance, social support, self-efficacy, coping, and positive affect [12, 13].

Resilience involves the process of recovery from stressors and sustainability of meaningful activities [12–14]. When a person is confronted with a stressor, their coping response and resilience is influenced by multiple aspects, including positive and negative psychosocial factors [15–18]. During episodes of pain, people who maintain homeostasis may do so by conserving and employing positive psychosocial factors [13]. Therapeutic interventions which aim to improve positive psychosocial factors may also result in improvements in coping strategies on a daily basis when faced with pain [13].

Higher optimism increases the likelihood of engagement and/or re-engagement in activities [14, 19, 20]. Additionally, optimism may improve the experience of acute and chronic pain [21, 22]. Optimism may also moderate the impact of negative psychosocial factors [21, 22]. Similarly, pain acceptance increases willingness to participate in activities by directing attention to controllable aspects [23–26]. Pain acceptance also reduced the impact of negative psychosocial factors while reinforcing positive psychosocial factors [23, 27, 28]. Higher social support has been suggested to reduce pain intensity [29, 30]. Similar to optimism and pain acceptance, increased social support has also been found to mediate the effects of negative psychosocial factors and promote positive psychosocial factors [13, 22, 29, 31]. Literature suggests that social support serves as a protective factor for a person’s health and informal social support is highly valued by people with chronic pain [32].

Given the potential beneficial impact of positive psychosocial factors on people with pain, self-administered questionnaires were developed to assess these psychosocial factors [33, 34]. However, the plethora of self-administered questionnaires makes it difficult to establish which are the best to use. Delphi studies use an iterative process aimed to reach consensus among experts about a certain topic [35]. Previous Delphi studies were able to make recommendations for the selection of self-administered questionnaires to assess psychosocial factors for people in pain [36, 37]. However, apart from self-efficacy and coping [36, 37], these studies focused on negative psychosocial factors, such as depression, anxiety, somatization, kinesiophobia, and catastrophizing. Equivalent studies to establish the most appropriate questionnaires to assess resilience, optimism, pain acceptance and social support in people with pain are not available. Yet there are multiple questionnaires suggested to assess each of these factors. To increase the congruence in clinical practice and research to allow accurate comparison and data pooling, evidence-based recommendations regarding the selection of appropriate questionnaires to assess positive psychosocial factors would be beneficial.

Consistent with the biopsychosocial model, measures were selected that assessed both psychological and social constructs. Resilience was chosen as an overarching construct; optimism and pain acceptance were chosen within the psychological dimension and social support was chosen within the social dimension. We therefore conducted a modified Delphi study that aimed to identify and reach consensus on the most suitable self-administered questionnaires to assess resilience, optimism, pain acceptance, and social support in people with pain.

Methods

Experimental Design

A modified Delphi study was conducted to identify self-administered questionnaires and establish consensus on the most suitable questionnaires to assess resilience, optimism, pain acceptance and social support in people with pain. A Delphi study is designed to transform the opinions of individual experts into a group consensus, using an iterative multi-stage process. It allows reflection among experts, who can nuance and reconsider their opinion based on the anonymized opinions of others, which they receive in various rounds [38].

Eligibility criteria for the experts and questionnaires, criteria to reach consensus and methods of analyses, including a sensitivity analysis, were predetermined, and comparable to previous studies [36, 37]. As in these other Delphi studies [36, 37], our method can be considered a modified Delphi method as the number of rounds was predetermined, experts did not receive individualized feedback between rounds, and all experts who completed Round 1 were invited to participate in Round 3, regardless of whether they completed Round 2 [35, 39]. Ethical approval was granted by Griffith University’s Human Research Ethics Committee (ID number: 2020/525). All participating experts provided consent electronically at the start of the Delphi study.

Expert Panel

Previous experiences from our recent Delphi studies revealed that 15% [40] to 30% [36, 37] of invited experts accept the invitation to join the expert panel and that there is up to 30% drop-out between Round 1 and Round 3 [36, 37, 40]. As we aimed to have 25 experts respond in Round 3, and assuming a 25% acceptance rate and a 30% drop-out rate across all rounds, 143 experts had to be invited \(143 \times 25\% \text{ acceptance rate} = 36\) experts in Round 1; \(36 \times 30\% \text{ drop-out} = 11\) experts; \(36 - 11 = 25\) experts in Round 3). Consensus based on 25 experts is considered stable and representative [41].

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Delphi study of this size also ensures data can be analyzed in a timely manner between rounds to reduce participant fatigue and non-response. Furthermore, we aimed to have approximately an equal number of experts for resilience, optimism, pain acceptance and social support.

Experts were identified using PubReMiner. PubReMiner is a PubMed resource that allows identification of authors who published the most on specific topics. Search strings used to identify experts are outlined in Supplementary Data File 1. To be eligible to participate in the study, experts needed to meet the following criteria: (1) To have (co)authored at least two relevant articles in international peer-reviewed journals. Articles were considered relevant if at least one self-administered questionnaire was used or evaluated that measured at least one of the four factors (resilience, optimism, pain acceptance and social support) in people with pain. The number of papers required per expert was based on the need to have at least ~143 authors meet that criterion. (2) To be available and willing to participate in the three rounds of the Delphi study.

Eligible experts were invited to join the expert panel via email. Panel member anonymity was maintained for the duration of the Delphi study to ensure that panel members were not influenced by the more vocal or reputed members.

Procedure

The Delphi study was conducted using REDCap electronic data capture tools (Version 10.6, Vanderbilt University) [42, 43] and was predetermined to consist of three rounds. REDCap is a secure, web-based software platform designed to support data capture for research studies. An initial invitation to participate in the study was emailed to experts outlining the study and containing a link to the first survey.

Due to the impact of the global coronavirus disease 2019 (COVID-19) pandemic on the capacity of experts to participate in Round 1, surveys remained open until an adequate number of responses had been received which was a deviation from our original plan. Subsequent survey rounds remained open for four weeks (as planned). Experts received up to two electronic reminders per round. In line with previous Delphi studies [36, 37, 40], all experts who completed Round 1 were asked to complete subsequent rounds, including Round 3, regardless of whether they completed Round 2. Time between rounds allowed for data analysis and administration for the subsequent round. Using an online platform enabled experts to provide rapid feedback. Furthermore, electronic reminders and adequate time between rounds aimed to promote a high response rate. Questionnaires were considered eligible if they were self-administered, assessed resilience, optimism, pain acceptance and/or social support in an adult population, were published in English and could be retrieved, and at least some measurement properties (e.g., internal consistency, test-retest reliability, responsiveness, or construct validity) were reported.

Round 1

In Round 1, open-ended questions were used to identify self-administered questionnaires recommended by experts to assess resilience, optimism, pain acceptance and social support in people with pain. Available measurement properties of each suggested questionnaire in a pain population were collated and summarized by the investigators in preparation for Round 2. When measurement properties were not available for a pain population, measurement properties were provided for the cohort in which the questionnaire was evaluated.

Round 2

In Round 2, experts received the questionnaires suggested in Round 1 for each factor, together with the measurement properties of the proposed questionnaires (Supplementary Data File 2) and a link to view each questionnaire. Experts were asked to indicate each questionnaire’s suitability to assess the corresponding factor via “Yes/No/Don’t know” responses. They were asked to consider aspects including content, feasibility, personal experience and the provided measurement properties of the questionnaires. To be maintained for Round 3, at least 60% of experts who responded needed to have indicated “Yes” for the suitability of the questionnaire (“Don’t know” responses were not considered in the calculation of the percentages).

Round 3

In Round 3, experts received the questionnaires for each factor that received at least a 60% “Yes” response. Experts then rated the suitability of each questionnaire to assess its respective psychosocial factor on an 11-point Likert scale, ranging from 0 (“not at all suitable”) to 10 (“completely suitable”). A “Don’t know” category could be selected for questionnaires they were not familiar with. A link to view each questionnaire and the measurement properties presented in Round 2 were again provided for experts to view as desired. Experts also had the option to provide feedback or comments about positive and/or negative experiences with using the questionnaires.

Consensus among experts was considered achieved if at least 75% of the experts deemed the questionnaire suitable (i.e., score ≥7 on the 0–10 Likert scale) when at least 50% of the experts had rated that questionnaire. If less than 50% of the experts had rated the questionnaire, we considered the score not representative. As in Round 2, “Don’t know” responses were not considered in the calculation of the percentages.

Data Analysis

Responses from Round 3 were analyzed using percentage frequency distributions. Questionnaires were ranked for each factor based on the percentage of experts who...
deemed the questionnaire suitable and the most appropriate questionnaires were identified. A sensitivity analysis was conducted to establish whether the findings were impacted by responses from experts who were involved with the development, translation and/or validation of relevant questionnaires for a specific factor. In the sensitivity analysis, their ratings were not considered for any of the questionnaires proposed for the respective psychosocial factor. A thematic content analysis was performed by two independent reviewers (A.C.S. and M.W.C.) on the comments from experts regarding positive and/or negative experiences with the questionnaires [36, 37].

Results

Expert Panel

Using PubReMiner, 139 experts were identified who met the selection criterion of having (co)authored at least two relevant papers. Forty experts qualified to be considered an expert for more than one factor (See Figure 1). All 139 identified experts were invited to participate in Round 1.

Forty experts completed Round 1, corresponding with a 29% acceptance rate. The expert panel had collectively published 268 relevant papers in international peer reviewed journals (after removal of duplicates). Seven experts declined to participate due to reduced capacity for research participation due to increased teaching and clinical demands due to the COVID-19 pandemic and three experts indicated they were on extended leave of absence. The remaining 89 experts did not respond (Figure 1).

Demographic characteristics of the expert panel are outlined in Table 1. The expert panel was reasonably gender balanced (40/60%). All experts had a PhD, and the majority had a professional background in Psychology and worked in a university or research institute. They had a substantial research and clinical experience. Experts predominantly worked in North America and Europe. Approximately two-thirds of the expert panel had participated in either the development, translation, and/or validation of a relevant self-administered questionnaire assessing one of the psychosocial factors.

Round 1

In Round 1, the expert panel proposed 37 questionnaires to assess resilience in people with pain. Four suggested questionnaires were not retained for Round 2 as they were questionnaires for pediatric clients (N = 2) or an English version was unavailable (N = 2). For optimism, 6 questionnaires were proposed and one was not retained for Round 2 as an English version was not available. All 14 questionnaires proposed for pain acceptance were retained for Round 2. For social support, 24 questionnaires were suggested, with eight not retained for Round 2. The social support questionnaires excluded from Round 2 were either questionnaires for pediatric clients (N = 2), an English version was not available (N = 3), was unpublished (N = 1), or no measurement properties could be retrieved (N = 2). Overall, 67 different questionnaires were proposed, with several questionnaires suggested for more than one factor. The number of questionnaires retained for Round 2 for resilience, optimism, pain acceptance and social support were 33, 5, 14, and 16, respectively. Questionnaires proposed for each psychosocial factor are listed in Tables 2A–2D.

Round 2

In Round 2, experts indicated whether they considered questionnaires suitable to assess a psychosocial factor via “Yes/No/Don’t know” responses. Twenty-seven experts completed Round 2 (response rate of 68%). Questionnaires considered appropriate by at least 60% of the experts were retained for Round 3. The number of questionnaires retained for Round 3 for resilience, optimism, pain acceptance and social support were 8, 2, 6, and 12, respectively. The percentage of experts who considered each questionnaire appropriate is presented in Tables 2A–2D.

Round 3

Twenty-seven experts completed Round 3 (response rate of 68% from Round 1). All questionnaires for resilience, optimism, pain acceptance and social support were rated by at least 50% of the experts.

In Round 3, experts reached consensus to recommend the Pain Resilience Scale (PRS) (80%) for resilience, the Revised Life Orientation Test (LOT-R) (81%) for optimism, the Revised Chronic Pain Acceptance Questionnaire (CPAQ-R) (79%), and the eight-item Chronic Pain Acceptance Questionnaire (CPAQ-8) (88%) for pain acceptance, and the Emotional Support item bank of the

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**Table 1.** Demographic characteristics of the expert panel

| Characteristic          | Number   |
|-------------------------|----------|
| Gender                  |          |
| Male                    | 80       |
| Female                  | 59       |
| Total                   | 139      |
| Education level         |          |
| PhD only                | 139      |
| PhD and above           | 0        |
| Total                   | 139      |
| Professional background |          |
| Psychology              | 139      |
| University/Research     | 0        |
| Total                   | 139      |

**Table 2A.** Questionnaires considered appropriate by at least 60% of the experts

| Psychosocial Factor | Questionnaire | Number   |
|---------------------|--------------|----------|
| Resilience          | CPAQ-R       | 100      |
|                     | LOT-R        | 100      |
|                     | PRS          | 100      |
|                     | CPAQ-8       | 100      |
| Optimism            | CPAQ-R       | 100      |
|                     | LOT-R        | 100      |
|                     | PRS          | 100      |
|                     | CPAQ-8       | 100      |
| Pain acceptance     | CPAQ-R       | 100      |
|                     | LOT-R        | 100      |
|                     | PRS          | 100      |
|                     | CPAQ-8       | 100      |
| Social support      | CPAQ-R       | 100      |
|                     | LOT-R        | 100      |
|                     | PRS          | 100      |
|                     | CPAQ-8       | 100      |

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**Figure 1.** Flowchart of the Delphi study. * Forty experts were identified as experts across several domains (two domains: N = 20; three domains: N = 20).
The qualitative analysis revealed a possible definitional problem for resilience. Three of the experts stated that there continues to be ambiguity around how resilience is defined in the literature and how its definition influences the suitability of questionnaires. For example: “I think there are definition problems with resilience, and these transfer to measures” [Expert 21]. This expert also commented: “whether this is [a] good [questionnaire] to measure resilience will depend on how you define resilience.”

Furthermore, three themes (“Content validity,” “Too general/Too specific,” “Not pain-specific”) were identified from the comments provided by the experts about their positive and negative experiences using the questionnaires. The themes are briefly discussed below.

**Content Validity**

The content validity of resilience questionnaires was questioned by some experts. About the PRS, Expert 21 commented “too much of it [is] not resilience per se, more like behavior patterns that might be correlated to lead to resilience”. Another expert suggested the CAQ-8 measures “goal commitment rather than resilience” (Expert 16). Similarly, experts questioned the content validity of pain acceptance questionnaires suggesting they measure overlapping constructs. For example: “There is a bit of conceptual overlap between the subscales, which makes it difficult to interpret the different subscales (...) but that is not specific to the CPAQ” (Expert 25). Other experts (e.g., Experts 10 and 25) suggested the AAQ-II-P assesses interference and the AIS-P assesses resignation rather than pain acceptance.

**Too General/Too Specific**

Experts expressed a preference for shorter uniform questionnaires. Multiple resilience questionnaires were considered “too general” or “heterogenous” by some experts. In contrast, some social support questionnaires were considered too specific. Both the FSSADI_PAIN and the PFSSADI were described as “very focused on one type of support” (Expert 15). Likewise, the WHYMPI “only assesses two very specific pain-related social support responses” (Expert 11).

**Not Pain-Specific**

Another identified theme was that various resilience and social support questionnaires were not specific enough for pain. The BRS was reported to be “good when assessing global resilience, but not so good when assessing pain-specific resilience” (Expert 06). Similarly, the

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**Table 1. Characteristics of the expert panel (N = 40)**

| Characteristic                          | N (%)     |
|-----------------------------------------|-----------|
| Age (mean (SD))                         | 49.3 (14.5) |
| Female                                  | 16 (40.0%) |
| Highest education*                      |           |
| PhD                                     | 40 (100.0%) |
| Professional background*                |           |
| Psychology                              | 35 (87.5%) |
| Medicine                                | 6 (10.0%)  |
| Other                                   | 2 (5.0%)   |
| (Primary) place of work*                |           |
| University or non-university research institute | 37 (92.5%) |
| Hospital                                | 10 (25.0%) |
| Years of research experience (mean (SD))| 21.6 (11.0) |
| Years of clinical practice experience (mean (SD)) | 13.6 (12.3) |
| Country of work (alphabetically)        |           |
| Australia                               | 1 (2.5%)   |
| Belgium                                 | 2 (5.0%)   |
| Brazil                                  | 1 (2.5%)   |
| Canada                                  | 1 (2.5%)   |
| Denmark                                 | 1 (2.5%)   |
| Germany                                 | 2 (5.0%)   |
| Hong Kong                               | 1 (2.5%)   |
| Ireland                                 | 1 (2.5%)   |
| Italy                                   | 1 (2.5%)   |
| The Netherlands                         | 3 (5.0%)   |
| Norway                                  | 1 (2.5%)   |
| Portugal                                | 2 (5.0%)   |
| Spain                                   | 5 (12.5%)  |
| Sweden                                  | 4 (10.0%)  |
| United Kingdom                          | 3 (7.5%)   |
| United States of America                | 12 (30.0%) |
| Previous participation in development, translation, and/or validation of a questionnaire in a relevant domain? (yes) | 27 (67.5%) |

*Multiple options could be selected.

PROMIS tool (75%) for social support. Results for each psychosocial factor are illustrated in Figure 2.

**Sensitivity Analysis**

To determine whether the scores of experts who were involved in the development, translation, and/or validation of a suggested questionnaire affected the results, a sensitivity analysis was conducted in which the scores of these experts were excluded from the analysis of that entire factor. Six experts were excluded from the analysis for resilience, 13 experts were excluded for pain acceptance, four experts were excluded for social support, and no experts had to be excluded for optimism.

Results for resilience did not differ in the sensitivity analysis with only the PRS considered suitable by more than 75% of the experts. For pain acceptance, the CPAQ-R and CPAQ-8 were also considered suitable in the sensitivity analysis. In the sensitivity analysis, the PaSol was also considered suitable, whereas in the whole group analysis only 53% of experts considered it suitable.

For social support, the Emotional Support item bank of the PROMIS tool was considered suitable by 88% of experts in agreement with the whole group analysis. Furthermore, the SPQ and Informational Support item bank of the PROMIS tool were also considered suitable by 77% and 75% of experts, respectively. Results of the sensitivity analysis are summarized in Table 3.
MSPSS, SSQ, SSQ6 and PROMIS Emotional Support and Informational Support item banks were reported to “assess overall perceived social support in pain patients but does not tap into pain-specific social support” (Expert 11).

Discussion

In Round 1, the expert panel proposed 37 questionnaires to assess resilience, six questionnaires for optimism, 14 questionnaires for pain acceptance and 24 questionnaires for social support in people with pain. This high number of questionnaires suggested as being suitable questionnaires highlights the plethora of self-administered questionnaires and underpins the need for this Delphi study. The number of questionnaires was reduced to eight for resilience, two for optimism, six for pain acceptance, and 12 for social support in Round 2. In Round 3, the expert panel reached consensus on one questionnaire for each factor.

Table 2A. Round 1 and Round 2 results for resilience

| Questionnaire                                      | Round 1 count* | Round 2 % Yes scores† | Retained for Round 3 |
|----------------------------------------------------|----------------|-----------------------|----------------------|
| – Brief Resilience Scale (BRS)                     | 9              | 95.2                  | Yes                  |
| – Pain Resilience Scale (PRS)                      | 12             | 94.7                  | Yes                  |
| – Positive and Negative Affect Schedule (PANAS)     | 2              | 31.8                  | No                   |
| – Adult Hope Scale (HS)                            | 1              | 31.6                  | No                   |
| – Resilience Scale for Adults (RSA)                | 3              | 73.3                  | Yes                  |
| – Connor-Davidson Resilience Scale (CD-RISC)       | 4              | 71.4                  | Yes                  |
| – Connor-Davidson Resilience Scale–10 (CD-RISC-10) | 1              | 80.0                  | Yes                  |
| – Connor-Davidson Resilience Scale–2 (CD-RISC-2)   | 1              | 78.6                  | Yes                  |
| – Resilience Scale (RS-25)                         | 3              | 83.3                  | Yes                  |
| – Mental Health Continuum—Short Form (MHC-SF)      | 1              | 14.3                  | No                   |
| – Chronic Pain Acceptance Questionnaire–Revised (CPAQ-R) | 3          | 45.5                  | No                   |
| – Chronic Pain Acceptance Questionnaire–8 (CPAQ-8)  | 1              | 45.5                  | No                   |
| – Committed Action Questionnaire (CAQ)              | 2              | 52.9                  | No                   |
| – Committed Action Questionnaire (CAQ-8)           | 1              | 62.5                  | Yes                  |
| – Acceptance and Action Questionnaire (AAQ)        | 2              | 27.8                  | No                   |
| – Acceptance and Action Questionnaire II–Pain (AAQ-II-P) | 1          | 39.9                  | No                   |
| – Multidimensional Scale of Perceived Social Support (MSPSS) | 1          | 15.8                  | No                   |
| – Life Orientation Test (LOT)                      | 1              | 20.0                  | No                   |
| – Life Orientation Test–Revised (LOT-R)            | 1              | 28.6                  | No                   |
| – Pain Solutions Questionnaire (PaSol)              | 1              | 40.0                  | No                   |
| – Arthritis Impact Measurement Scale (AIMS2)       | 1              | 5.3                   | No                   |
| – Arthritis Impact Measurement Scale–short form (AIMS2-SF) | 1          | 5.3                   | No                   |
| – Illness Cognition Questionnaire (ICQ)            | 1              | 29.4                  | No                   |
| – Humor Style Questionnaire (HSQ)                  | 1              | 13.3                  | No                   |
| – PROMIS Self-efficacy for Managing Chronic Conditions—Daily Activities | 1          | 26.3                  | No                   |
| – PROMIS Self-efficacy for Managing Chronic Conditions—Emotion | 1          | 44.4                  | No                   |
| – PROMIS Self-efficacy for Managing Chronic Conditions—Treatment | 1          | 22.2                  | No                   |
| – PROMIS Self-efficacy for Managing Chronic Conditions—Social Interaction | 1          | 26.3                  | No                   |
| – PROMIS Self-efficacy for Managing Chronic Conditions—Symptoms | 1          | 26.3                  | No                   |
| – Multidimensional Psychological Flexibility Inventory (MPFI) | 1          | 52.9                  | No                   |
| – Psychological Inflexibility in Pain Scale (PIPS)  | 1              | 42.1                  | No                   |
| – Valuing Questionnaire (VQ)                       | 1              | 30.8                  | No                   |

*Number of experts who suggested the questionnaire.
†Percentage (%) of “Yes” responses, excluding “Don’t know” responses.

Table 2B. Round 1 and Round 2 results for optimism

| Questionnaire                                      | Round 1 count* | Round 2 % Yes scores† | Retained for Round 3 |
|----------------------------------------------------|----------------|-----------------------|----------------------|
| – Life Orientation Test (LOT)                      | 9              | 86.4                  | Yes                  |
| – Life Orientation Test–Revised (LOT-R)            | 12             | 95.5                  | Yes                  |
| – Neuroticism, Extraversion, Openness Personality Inventory (NEO-PI) | 2          | 16.7                  | No                   |
| – Pain Catastrophizing Scale (PCS)                 | 1              | 20.0                  | No                   |
| – Pain Coping Strategies Questionnaire (CSQ)       | 1              | 10.0                  | No                   |

*Number of experts who suggested the questionnaire.
†Percentage (%) of “Yes” responses, excluding “Don’t know” responses.
The preferred questionnaire to assess resilience in people with pain was the Pain Resilience Scale (PRS) \[37\]. For optimism, the preferred questionnaire was the Revised Life Orientation Test (LOT-R) \[44, 45\]. The revised version and the eight-item versions of the Chronic Pain Acceptance Questionnaire (CPAQ) \[46, 47\] were the preferred questionnaires to assess pain acceptance. The Emotional Support item bank of the PROMIS tool \[48, 49\] was the preferred questionnaire to assess social support in people with pain. These five questionnaires were also recommended in the sensitivity analysis (i.e., when experts who had been involved with the development, translation and/or validation of a questionnaire were excluded from the analysis). However, consensus was reached for three additional questionnaires in the sensitivity analysis: the PaSol for pain acceptance, and the SPQ and MOS-SSS for social support. These latter two questionnaires just failed to reach the threshold for consensus in the analysis containing the complete expert panel (whole group analysis; 73% and 70%, respectively).

The questionnaires for which consensus was reached all demonstrated acceptable internal consistency (Cronbach’s alpha $\geq 0.7$) \[44, 46, 47, 49, 50\]. Good test-retest reliability was reported in chronic pain populations for the PRS (ICC = 0.80) \[51\] and the CPAQ-8 (ICC = 0.81) \[47\]. The reliability of the LOT-R (0.60–0.68 (44)) and Emotional Support item bank of the

### Table 2C. Round 1 and Round 2 results for pain acceptance

| Questionnaire                                      | Round 1 count* | Round 2 % Yes scores† | Retained for Round 3 |
|----------------------------------------------------|----------------|-----------------------|----------------------|
| – Pain Solutions Questionnaire (PaSol)              | 2              | 88.2                  | Yes                  |
| – Chronic Pain Acceptance Questionnaire–Revised (CPAQ-R) | 27             | 95.8                  | Yes                  |
| – Chronic Pain Acceptance Questionnaire–8 (CPAQ-8)  | 6              | 95.8                  | Yes                  |
| – Acceptance and Action Questionnaire (AAQ)         | 3              | 36.8                  | No                   |
| – Acceptance and Action Questionnaire–II (AAQ-II)   | 1              | 33.3                  | No                   |
| – Acceptance and Action Questionnaire II–Pain (AAQ-II-P) | 1              | 70.0                  | Yes                  |
| – Illness Cognition Questionnaire (ICQ)             | 5              | 44.4                  | No                   |
| – Psychological Inflexibility in Pain Scale (PIPS)  | 2              | 60.0                  | No                   |
| – Brief Pain Coping Inventory (BPCI)                | 2              | 21.4                  | No                   |
| – Brief Pain Response Inventory (BPRI)              | 1              | 69.2                  | Yes                  |
| – Pain Self-efficacy Questionnaire (PSEQ)           | 1              | 26.1                  | No                   |
| – PROMIS—Pain Interference (PROMIS-PI)             | 1              | 4.3                   | No                   |
| – Acceptance of Illness Scale–Pain (AIS-P)          | 1              | 64.3                  | Yes                  |
| – Medical Coping Modes Questionnaire (MCMQ)         | 1              | 7.7                   | No                   |

*Number of experts who suggested the questionnaire.
†Percentage (%) of “Yes” responses, excluding “Don’t know” responses.

### Table 2D. Round 1 and Round 2 results for social support

| Questionnaire                                          | Round 1 count* | Round 2 % Yes scores† | Retained for Round 3 |
|--------------------------------------------------------|----------------|-----------------------|----------------------|
| – West Haven-Yale Multidimensional Pain Inventory (WHYMPI) | 3              | 84.2                  | Yes                  |
| – Multidimensional Scale of Perceived Social Support (MSPSS) | 8              | 95.0                  | Yes                  |
| – Social Support Questionnaire (SSQ)                   | 8              | 85.7                  | Yes                  |
| – Social Support Questionnaire–6 (SSQ6)                | 1              | 100.0                 | Yes                  |
| – PROMIS Social Support Items–Emotional Support        | 2              | 88.9                  | Yes                  |
| – PROMIS Social Support Items–Informational Support    | 2              | 88.9                  | Yes                  |
| – Medical Outcomes Study–Social Support Survey (MOS-SSS) | 2              | 94.7                  | Yes                  |
| – Berlin Social Support Scales (BSSS)                  | 1              | 88.2                  | Yes                  |
| – Social Support and Pain Questionnaire (SPQ)          | 3              | 100.0                 | Yes                  |
| – Spouse Response Inventory (SRI)                      | 1              | 36.3                  | No                   |
| – Survey of Pain Attitudes–35 (SOPA-35)                | 1              | 10.5                  | No                   |
| – Pain Response Preference Questionnaire (PRPQ)        | 2              | 50.0                  | No                   |
| – Formal Social Support for Autonomy and Dependence in Pain Inventory–revised version (FSSADLPAIN) | 3              | 75.0                  | Yes                  |
| – Preference for Formal Social Support of Autonomy and Dependence in Pain Inventory (FSSADI) | 1              | 71.4                  | Yes                  |
| – Duke-UNC Functional Social Support Questionnaire (FSSQ) | 2              | 76.9                  | Yes                  |
| – Chronic Pain Coping Inventory (CPCI)                 | 1              | 31.6                  | No                   |

*Number of experts who suggested the questionnaire.
†Percentage (%) of “Yes” responses, excluding “Don’t know” responses.
PROMIS tool (0.63–0.79 [49]) has not yet been assessed in chronic pain populations. Recommended questionnaires for two domains have been validated in people in pain, namely the PRS for resilience, and CPAQ-R and CPAQ-8 for pain acceptance [46, 47, 50]. The PRS is positively correlated with questionnaires for resilience (CD-RISC), pain acceptance (CPAQ) and self-efficacy (PSEQ) [50]. The CPAQ-R and CPAQ-8 are negatively correlated with psychological inflexibility, depression, anxiety, and catastrophizing, while being positively correlated with self-efficacy [47, 52]. Further validation of the recommended questionnaires in pain populations should be a research priority. Whereas pain-specific questionnaires were recommended for resilience and pain acceptance, more generic questionnaires were suggested for optimism and social support. Feedback from experts indicated the need for questionnaires to be more pain-specific.

The qualitative analysis highlighted some experts’ concerns about the definition of resilience. Ambiguity in the definition may have influenced the questionnaires proposed in Round 1 to measure resilience and also how these were rated in subsequent rounds. Resilience is currently conceptualized as not only recovery from stressors but also sustainability of activities despite the stressor and growth to enable better response to future stressors [12, 53]. Emphasis on these three aspects of resilience may differ depending on the type of stressor. It is suggested that in a chronic pain population for example, more emphasis may be placed on sustainability due to the chronic nature of the stressor [12]. It is important to establish a clear definition of resilience. Similarly, confirmatory factor analyses have shown that some questionnaires previously thought to assess one psychosocial factor are now understood to load on various factors [47, 54–58]. Although the PRS correlates strongly with other measures of resilience, it does not correlate significantly with the LOT-R [51] and has been found to explain a difference in quality of life when pain acceptance is controlled for [50]. This supports the recommendation of the PRS as a measure for resilience.

A possible limitation of our study relates to the a priori formulated eligibility criteria for the questionnaires. For example, only self-administered questionnaires published in English were considered. Other methods for measuring positive psychosocial factors, such as ecological momentary assessments [59] and daily diaries [60], were not considered for this study. Therefore, there may be questionnaires in other languages or other methods that are also suitable to measure resilience, optimism, pain acceptance and social support.

The size of the expert panel was comparable to other Delphi studies [36, 37]. To achieve an adequate expert panel size, the selection criterion of having (co)authored at least two relevant papers was required. Although relatively low, this criterion is comparable to another Delphi...
Table 3. Sensitivity analysis results excluding experts who had been involved in the development, translation and/or validation of a relevant questionnaire

| Questionnaire        | Total group analysis | Sensitivity analysis |
|----------------------|----------------------|----------------------|
|                      | At least 50% of experts made a judgement (0–10) | % score ≥ 7 | Consensus to recommend |
|                      | N* = 27               |                       |                       |
| Resilience           | 80%                  | Yes                  | 79%                  | Yes                  |
| – PRS                | Yes (N = 25)          |                       | Yes                  | N† = 21              |
| – BRS                | Yes (N = 25)          | 68%                  | No                   | N† = 14              |
| – CD-RISC-10         | Yes (N = 25)          | 60%                  | No                   | N† = 27              |
| – RS-25              | Yes (N = 23)          | 57%                  | No                   |                       |
| – CD-RISC-2          | Yes (N = 24)          | 46%                  | No                   |                       |
| – RSA                | Yes (N = 24)          | 42%                  | No                   |                       |
| – CD-RISC            | Yes (N = 25)          | 40%                  | No                   |                       |
| – CAQ-8              | Yes (N = 23)          | 39%                  | No                   |                       |
| Optimism             | 81%                  | Yes                  | 81%                  | Yes                  |
| – LOT-R              | Yes (N = 21)          |                       | Yes                  |                       |
| – LOT                | Yes (N = 23)          | 65%                  | No                   |                       |
| Pain acceptance      | N* = 27               |                       |                       |                       |
| – CPAQ-8             | 88%                  | Yes                  | 92%                  | Yes                  |
| – CPAQ-R             | Yes (N = 24)          | 79%                  | Yes                  |                       |
| – PaSol              | Yes (N = 19)          | 53%                  | No                   |                       |
| – AAQ-II-P           | Yes (N = 21)          | 48%                  | No                   |                       |
| – BPRI               | Yes (N = 15)          | 47%                  | No                   |                       |
| – AIS-P              | Yes (N = 15)          | 40%                  | No                   |                       |
| Social support       | N* = 27               |                       |                       |                       |
| – PROMIS–ES          | 75%                  | Yes                  | 88%                  | Yes                  |
| – SPQ                | Yes (N = 20)          | 73%                  | No                   |                       |
| – MOS-SSS            | Yes (N = 20)          | 70%                  | No                   |                       |
| – PROMIS–IS          | Yes (N = 20)          | 55%                  | No                   |                       |
| – WHYMPI             | Yes (N = 22)          | 59%                  | No                   |                       |
| – FSSQ               | Yes (N = 17)          | 59%                  | No                   |                       |
| – MSPSS              | Yes (N = 19)          | 53%                  | No                   |                       |
| – SSQ6               | Yes (N = 17)          | 47%                  | No                   |                       |
| – BSSS               | Yes (N = 15)          | 47%                  | No                   |                       |
| – PFSSADI            | Yes (N = 15)          | 40%                  | No                   |                       |
| – FSSADI_PAIN        | Yes (N = 14)          | 36%                  | No                   |                       |
| – SSQ                | Yes (N = 15)          | 33%                  | No                   |                       |

N*: Indicates the number of experts who scored questionnaires for that factor in the whole group analysis, excluding “Don’t know” responses. N†: indicates the number of experts adjusted for experts who were involved in development, translation and/or validation of questionnaires, excluding “Don’t know” responses. Gray shadings (“Yes”) have been added to facilitate the comparison of the recommended questionnaires based on the total group analysis and the sensitivity analysis.

It is apparent that complex relationships exist between resilience and other psychosocial factors and the experience of pain. This study focused on positive psychosocial factors. As differences in scope between questionnaires hinders comparison and pooling of research data and clinical data, it is important to assess positive psychosocial factors in a more uniform way. The findings of this study provide guidance to clinicians and researchers regarding the selection of questionnaires to assess resilience, optimism, pain acceptance and social support in people with pain. Together with the findings from other Delphi studies [36, 37], a small number of self-administered questionnaires are recommended to assess positive psychosocial factors, such as resilience, optimism, pain acceptance, social support, self-efficacy and coping, and negative psychosocial factors, such as anxiety, depression, catastrophizing, and fear of movement.

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Supplementary Data

Supplementary data are available at Pain Medicine online.

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