

Clinical pain research

Pain patients' experiences of validation and invalidation from physicians before and after multimodal pain rehabilitation: Associations with pain, negative affectivity, and treatment outcome



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HIGHLIGHTS

- Most patients feel validated by their rehabilitation physician.
- However, there is a subgroup that experiences invalidation.
- This group reports more pain interference and negative affectivity after treatment.
- Increasing validation may be particularly important for this subgroup.

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ABSTRACT

Background and aims: Validating and invalidating responses play an important role in communication with pain patients, for example regarding emotion regulation and adherence to treatment. However, it is unclear how patients' perceptions of validation and invalidation relate to patient characteristics and treatment outcome. The aim of this study was to investigate the occurrence of subgroups based on pain patients' perceptions of validation and invalidation from their physicians. The stability of these perceptions and differences between subgroups regarding pain, pain interference, negative affectivity and treatment outcome were also explored.

Methods: A total of 108 pain patients answered questionnaires regarding perceived validation and invalidation, pain severity, pain interference, and negative affectivity before and after pain rehabilitation treatment. Two cluster analyses using perceived validation and invalidation were performed, one on pre-scores and one on post-scores. The stability of patient perceptions from pre- to post-treatment was investigated, and clusters were compared on pain severity, pain interference, and negative affectivity. Finally, the connection between perceived validation and invalidation and treatment outcome was explored.

Results: Three clusters emerged both before and after treatment: (1) low validation and heightened invalidation, (2) moderate validation and invalidation, and (3) high validation and low invalidation. Perceptions of validation and invalidation were generally stable over time, although there were individuals whose perceptions changed. When compared to the other two clusters, the low validation/heightened invalidation cluster displayed significantly higher levels of pain interference and negative affectivity post-treatment but not pre-treatment. The whole sample significantly improved on pain interference and depression, but treatment outcome was independent of cluster. Unexpectedly, differences between clusters on pain interference and negative affectivity were only found post-treatment. This appeared to be due to the pre- and post-heightened invalidation clusters not containing the same individuals. Therefore, additional analyses were conducted to investigate the individuals who changed clusters. Results showed that patients scoring high on negative affectivity ended up in the heightened invalidation cluster post-treatment.

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Conclusions: Taken together, most patients felt understood when communicating with their rehabilitation physician. However, a smaller group of patients experienced the opposite: low levels of validation and heightened levels of invalidation. This group stood out as more problematic, reporting greater pain interference and negative affectivity when compared to the other groups after treatment. Patient perceptions were typically stable over time, but some individuals changed cluster, and these movements seemed to be related to negative affectivity and pain interference. These results do not support a connection between perceived validation and invalidation from physicians (meeting the patients pre- and post-treatment) and treatment outcome. Overall, our results suggest that there is a connection between negative affectivity and pain interference in the patients, and perceived validation and invalidation from the physicians.

Implications: In clinical practice, it is important to pay attention to comorbid psychological problems and level of pain interference, since these factors may negatively influence effective communication. A focus on decreasing invalidating responses and/or increasing validating responses might be particularly important for patients with high levels of psychological problems and pain interference.

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1. Introduction

Although there are empirically supported psychological treatments for chronic pain (e.g. [1]), the effect sizes are fairly modest [2] and there is room for improvement. One potential area of improvement is communication between health care professionals and patients, as effective communication is important for adherence to treatment [3], treatment satisfaction [4], and positive effects on health outcomes [5].

One component of effective communication is validation [6–8]; that is, the communication of empathy, acceptance, and understanding [7,9–11]. Validation has a positive impact on adherence to treatment [12] and pain catastrophizing [13]. Validation is also known to help regulate negative emotions [8], which is relevant to pain patients, who commonly experience co-occurring emotional problems. Invalidation communicates that a person's perspective or experiences are strange, wrong, or unworthy of attention or respect [14]. Examples include negative judgments, or stating what the other person “should” feel. Consequences of invalidation include increased emotional arousal [8,15] and reduced mental well-being and social functioning [16].

The importance of validation when communicating with chronic pain patients has been highlighted [17], but many questions remain unanswered. For example, there is a lack of knowledge about the relation between patient perceptions of validation and invalidation from their physician (both before and after cognitive and behavioural pain treatment), and pain severity, pain interference, and negative affectivity. Comorbid emotional problems (e.g. depression and anxiety [18,19]), the tendency to view emotional symptoms as dangerous (i.e. anxiety sensitivity [20,21]) and the use of dysfunctional control strategies (e.g. pain catastrophizing [22]) are all known to be related to chronic pain. In this study, the term negative affectivity is used as an umbrella term to summarize these more specific constructs.

The occurrence of and differences between subgroups of pain patients based on psychological variables and treatment outcome is known [23,24], but subgrouping based on perceived validation and invalidation remains uninvestigated. There may be differences between patients who experience mainly validation, mainly invalidation, or a mix of both. Although objectively rated responses are important, it is also of interest to study patient perceptions, since it has been suggested that validation and invalidation are always in the eye of the beholder [25]. It is not known whether perceived validation and invalidation are stable over the course of treatment, or whether they can change, perhaps as a result of treatment being successful in modifying cognitive bias and/or reducing negative affectivity. Moreover, little is known about the connection between perceived validation/invalidation and

treatment outcome. Since effective communication in general has been shown to be important for positive health outcomes (e.g. [5]), this is worth investigating.

The overall aim of this study was therefore to examine the relationship between patient perceptions of validation and invalidation, negative affectivity, pain, and pain interference in a sample with chronic pain. More specifically, we aimed to answer the following questions. Firstly, what are pain patients' perceptions of validation and invalidation from their physicians before and after treatment? Secondly, are patient perceptions stable or do they change between pre- and post-treatment? Thirdly, do patients with different perceptions of validation and invalidation differ in terms of negative affectivity, pain, and pain interference? Finally, is there a connection between perceived validation and invalidation (before and after treatment) and treatment outcome?

2. Method

2.1. Procedure

The current study has a longitudinal design and is part of a larger prospective study investigating the comorbidity between social anxiety and chronic pain: the Social Anxiety and Pain (SAP) project. Data were collected between 2011 and 2014 in the context of routine care at a pain rehabilitation clinic in Sweden. Patients were asked to answer self-report questionnaires at three different time points: (A) immediately before or in conjunction with the assessment visit to the rehabilitation physician, (B) at the meeting with their rehabilitation physician before treatment start (which occurred if the patient was deemed eligible to receive treatment), and (C) at the meeting with their rehabilitation physician after treatment. The data used in the present study were collected at time points (B) and (C); that is, immediately before and immediately after treatment. The patients met with the same physician at both time points. In general, the purpose of the pre-treatment meeting with the physician was to provide a summary of the team's assessment. The purpose of the post-treatment meeting with the physician was generally to plan the future based on the treatment results. Participation in the study was voluntary, and all patients gave their written consent. The study was approved by the Regional Ethical Review Board in Uppsala (case no: 2011/010).

2.2. Participants

During the period of data collection, the pain rehabilitation clinic had 955 new patients seeking care, 535 of whom went on

to receive treatment. Of these 535 patients, 395 agreed to fill out self-report measures at one or more of the three different time points. The inclusion criterion for the present study was to have rated perceived validation and invalidation from the physician both before (B) and after treatment (C), since these were the variables used for subgrouping. A total of 108 patients (86% female; 91% born in Sweden; 42% with a university education, 44% with an upper secondary school education, 14% with compulsory school education) met this criterion and were included in the study. Their mean age was 45.50 years (range: 21–62, SD: 10.26), and the mean time since first pain episode was 11.76 years (range: 1–44, SD: 9.18). Most (74%) had generalized pain, defined as pain in more than six areas. There was great variation in other more specific areas of pain, with only one individual in each category (e.g. head/neck, lower body, and back/hip/thigh).

In order to account for sampling bias and increase the generalizability of the results, independent-samples t-tests were conducted to compare pre-treatment data between the 108 individuals included in the study and the 287 who completed a self-report questionnaire but did not fulfil the inclusion criterion. The comparisons included all measures used in the present study: perceived validation and invalidation, negative affect, depression and anxiety, pain severity and pain interference, anxiety sensitivity, and pain catastrophizing. The only significant difference between the groups was in pain intensity (measured by Multidimensional Pain Inventory [MPI]; see below under measures), where the included individuals ($M = 8.65$, $SD = 1.96$) scored significantly higher than the excluded individuals ($M = 8.09$, $SD = 1.93$; $t(272) = 2.33$, $p < .05$).

2.3. Measures

In this study, the term negative affectivity will be used in order to refer to depression, anxiety, negative affect, anxiety sensitivity and pain catastrophizing. As previously mentioned, all these measures are of relevance for chronic pain and are connected to negative emotions. Besides measuring these constructs, perceived validation and invalidation, pain severity and pain interference were also assessed. More specific information about all measures are given below.

2.3.1. Validation and invalidation

Perceived validation and invalidation from the rehabilitation physician before and after treatment was measured using a modified and translated version of the Validating and Invalidating Response Scale (VIRS) [26,27], which was originally developed in order to assess perceived or experienced validation and invalidation in close relationships. The questionnaire was translated from English to Swedish using the back-translation method. An English version of the questionnaire used in the present study is given in Appendix A. One item (item 9 in the original questionnaire) was removed because it contained double negations that made it difficult to understand. Another item (item 13) was removed because it was not applicable to a patient-physician interaction. The final translated and modified version of the original VIRS consisted of 14 items divided into two subscales, one measuring validation (9 items) and one measuring invalidation (5 items). Patients were instructed to rate how often the physician in charge of their care responded in specific ways when the patient expressed what they were thinking, feeling, or wanting. Responses ranged from 0 (never) to 4 (almost all the time). Questions measuring perceived validation included “My physician pays attention and listens carefully” and “My physician is accepting of what I think, feel, or want”. Questions measuring invalidation included “My physician fails to understand me when I express myself”. The maximum score on the validation subscale was 36 and that on the invalidation subscale was 20. The psychometric properties of the original version of VIRS have been

evaluated, and the results indicate that the scale has high internal consistency, convergent validity, and discriminant validity [26]. In the present study, Cronbach's alpha from before treatment was $\alpha = .92$ for the validation subscale and $\alpha = .74$ for the invalidation subscale.

2.3.2. Negative affect

Negative affect was measured using the negative affect subscale of the short version [28] of the Positive Affect Negative Affect Scale (PANAS) [29], which consists of 5 items, each represented by a negative emotion. Patients rate how they generally feel on a 5-point Likert scale ranging from 1 (“very slightly or not at all”) to 5 (“extremely”). Total score ranges from 5 to 25 on each subscale. The short version of PANAS has been validated and is considered a reliable measure of negative affect [30,31]. Cronbach's alpha from before treatment in the present study was $\alpha = .86$.

2.3.3. Depression and anxiety

The Hospital Anxiety and Depression scale (HAD) [32] was used to measure symptoms of depression and anxiety. This self-report questionnaire consists of two subscales, with 7 items measuring depressive symptoms and 7 items measuring anxiety. Patients rate their answers on a 4-point Likert scale ranging from 0 to 3. Scores are summarized on each subscale, and range from 0 to 21 points. Scores of 8 and above on each subscale indicate depression and anxiety, ranging from mild to severe [33]. The HAD is considered a reliable and valid instrument for assessing depression and anxiety [34,35]. Cronbach's alpha from before treatment in the present study was $\alpha = .86$ for the depression subscale and $\alpha = .89$ for the anxiety subscale.

2.3.4. Pain severity and interference with daily life

The Multidimensional Pain Inventory (MPI) [36] was used to measure pain severity and interference with life; specifically, we used two items measuring pain severity and the 11-item subscale measuring interference with daily life. Patients rate their answers on a 6-point Likert scale ranging from 0 to 6. Total score on each subscale was used in the analyses, giving a maximum score of 12 for pain intensity and 66 for interference. For participants who did not work, one item on the interference subscale (“How much has your pain changed the amount of satisfaction or enjoyment you get from work?”) was omitted and given a score corresponding to the mean value of the participant's other answers on the interference subscale. Both the pain severity items and the interference subscale have been shown to have good internal consistency [37]. Internal consistency in the present study was $\alpha = .86$ for pain intensity and $\alpha = .92$ for interference with daily life (from before treatment).

2.3.5. Anxiety sensitivity

Anxiety sensitivity was measured with the Anxiety Sensitivity Index (ASI) [38]. This instrument contains 16 items (e.g. “It scares me when I feel faint” and “When I cannot keep my mind on a task, I worry that I might be going crazy”), with answers ranging from 0 (“very little”) to 4 (“very much”). The present study used the total score of the scale, which has a minimum score of 0 and a maximum of 64. The questionnaire measures anxiety sensitivity, which is the tendency to fear somatic, psychological, and social symptoms of anxiety because of a belief that these symptoms might be dangerous. ASI has been shown to be both valid and reliable [39]. Internal consistency in the present study was $\alpha = 0.91$ (from before treatment).

2.3.6. Pain catastrophizing

Pain catastrophizing was measured with the Pain Catastrophizing Scale (PCS) [40]. On this self-report questionnaire, the patients

rate the degree to which they experience certain thoughts and feelings when they are in pain. It consists of 13 items (e.g. “I feel I can’t stand it anymore” and “I become afraid that the pain will get worse”), with answers ranging from 0 (“not at all”) to 4 (“all the time”). The maximum total score is 54 points. The PCS has been validated, and has shown good reliability [41,42]. In the present study, the PCS had a Cronbach’s alpha of $\alpha = .92$ (from before treatment).

2.4. Missing values

Overall, 4.31% of the items were missing from the dataset. A non-significant Little’s MCAR test ($X^2(10,784) = 10,262.88, p = 1.00$) indicated that the data were missing completely at random [43]. In order to increase power for the follow-up analyses, single imputation using the expectation maximization (EM) algorithm was used in order to complete the dataset on all measures but VIRS. This kind of imputation method provides unbiased estimates and improves statistical power when data are missing completely at random and only a small proportion of data are missing (i.e. less than 5% overall) [44]. For VIRS, EM imputation was only used if the individual had less than 20% of the items missing at one time point. The reason for this was that the cluster analyses, which were central to all other analyses in the study, were based on VIRS, and so it was considered best to avoid imputing a whole set of scores for an individual who had not filled out VIRS at that time point or had many items missing.

2.5. Statistical analyses

Version 24.0 of the Statistical Package for Social Sciences (SPSS) for Windows was used to identify subgroups of patients based on their perception of validation and invalidation from their physician. It was also used to compare the subgroups in terms of pain and emotional factors before and after treatment, as well as in terms of the relation between perceived validation and invalidation and treatment outcome. Stability and movement between subgroups from before to after treatment were examined using version 2.1 of SLEIPNER, which was developed for person-oriented analyses.

More specifically, cluster analysis was used to identify subgroups of patients (both before and after treatment) based on standardized scores of perceived validation and invalidation from their physician as measured by the modified version of VIRS. In previous studies validation and invalidation are inversely but modestly correlated; validating is not simply the opposite of invalidating, and a person may be low, or high, on both [8,14]. Hence, subgrouping based on these variables is possible. Cluster analysis is a person-oriented approach that groups individuals together based on their individual ratings, striving for homogeneity within subgroups and heterogeneity between subgroups [45]. This method makes it possible to identify patterns in the data that might not have been apparent if the data had been analyzed on a group level with a variable-oriented approach. There are several sets of criteria and guidelines for finding the most appropriate cluster solution [45,46], but currently none of them is considered more beneficial than the others. The choice of the final cluster solution in this study was based on a combination of the following criteria: (1) the Explained Error Sums of Squares (EESS) was around 67% and not less than 50% [46]; (2) the cluster coefficient percentage change from one level to the next was not less than 10% [45]; (3) each cluster contained at least 10 individuals [45]; and (4) the cluster solution was theoretically meaningful [45,46]. First, a hierarchical cluster analysis was conducted, using Ward’s method (to minimize within-cluster differences) with squared Euclidian distance as the similarity measure. To further increase the homogeneity of the clusters, the hierarchical cluster analysis was followed by a K-means cluster analysis with the centre points from the hierarchical cluster

analysis used as starting points. Using both hierarchical and non-hierarchical methods in order to arrive at the final cluster solution is recommended [47].

In order to answer the question about stability and movement between subgroups from pre- to post-treatment, the EXACON procedure in SLEIPNER [46] was used. EXACON produces a contingency table of the two cluster solutions (pre-treatment and post-treatment), and makes it possible to examine individual movement between the clusters from one time point to the next. EXACON identifies significant *types* (when more individuals than expected by chance changed or remained in a cluster) and *anti-types* (when fewer individuals than expected by chance changed or remained in a cluster). This is done by calculating the χ^2 component for each cell and the exact probability that the number of individuals (observed frequencies) is larger or smaller than would be expected by chance alone (expected frequencies).

Then, differences between the clusters were examined both before and after treatment. More specifically, one-way between groups multivariate analysis of variance (MANOVA) with Bonferroni corrections was conducted, with cluster membership as the independent variable and negative affect, anxiety and depression, pain severity and pain interference, anxiety sensitivity, and pain catastrophizing as dependent variables. In the case of a significant MANOVA, this analysis was followed by separate univariate analyses (ANOVA) with Hochberg’s GT2 as post hoc tests on each of the significant dependent measures.

In order to answer the research questions related to treatment outcome, the following analyses were conducted. First, to investigate if perceived validation and invalidation before treatment predicted treatment outcome, a repeated measures MANOVA was conducted with time as the within-subjects factor and cluster membership as the between-subjects factor. Due to their clinical relevance and the fact that the treatment targeted both pain and emotional factors, pain interference, depression, and anxiety were all considered outcome measures. Since the independent variable (the clusters) in this case had three levels, it was necessary to conduct follow-up univariate analyses in order to identify where the significant differences lay [48]. A one-way ANOVA with Hochberg’s GT2 as post hoc test was therefore conducted on the significant variables from the repeated measures MANOVA. Second, a MANCOVA was conducted to investigate the relation between perceived validation and invalidation from the physician after treatment and change in the dependent variables. In this analysis, cluster belonging was the independent variable, and as in the previous MANOVA, pain interference, depression, and anxiety were considered outcome measures and thus dependent variables. Total scores on the outcome measures from before treatment were included in the analysis as covariates in order to control for pre-scores.

3. Results

3.1. Identification of subgroups before treatment

The first research question involved looking closer at patient perceptions of validation and invalidation from their physician. This was done by investigating the occurrence of subgroups, both before and after treatment. The cluster analysis procedure performed on perceived validation and invalidation from before treatment, resulted in a three-cluster solution accounting for 73.40% of the variance. Table 1 shows the EESS values and the cluster coefficient percentage change to the next level for the cluster solutions between two to six.

The three-cluster solution identified a small subgroup that perceived low validation and heightened invalidation from their physicians (the “heightened invalidation cluster”), a subgroup that

Table 1

Explained Error Sums of Squares (EESS values) and cluster coefficient percentage change to the next level for the cluster solutions between two to six clusters (from both pre- and post-treatment).

Cluster solution	2		3		4		5		6	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
EESS (%)	54	50	73	71	80	77	84	82	87	86
Coefficient (%)	41	44	14	14	8	11	6	9	6	6

Table 2

Means (standard deviations) in raw scores and standardized scores for the three-cluster solution before treatment.

Clusters	Validation		Invalidation		N (Female)
	Raw score	Standardized score	Raw score	Standardized score	
Heightened invalidation/low validation	16.75 (4.67)	−1.59 (.68)	7.44 (2.22)	1.79 (.83)	16 (16)
Moderate validation and invalidation	24.41 (3.41)	−.47 (.50)	3.19 (1.43)	.21 (.53)	37 (29)
High validation/low invalidation	32.98 (2.72)	.78 (.40)	0.84 (1.10)	−.66 (.41)	55 (48)
Total	27.63 (6.84)	–	2.62 (2.68)	–	108 (93)

perceived the opposite (high validation and low invalidation; the “*high validation cluster*”), and another subgroup in between the two more extreme clusters. This third subgroup was very close to the mean validation and invalidation scores of the whole group, and is therefore referred to as the “*moderate validation and invalidation cluster*”. The name “*heightened invalidation cluster*” was chosen because its mean value on invalidation was high compared to the other two clusters, but not high when compared to the possible total score of the scale (which was 20). More detailed information about the final clusters is given in [Table 2](#).

3.2. Identification of subgroups after treatment

The second cluster analysis procedure, performed on perceived validation and invalidation post-treatment, resulted in a three-cluster solution accounting for 70.97% of the variance. The same patterns of perceived validation and invalidation found in the pre-treatment cluster analysis procedure were also found here. EESS values and the cluster coefficient percentage change to the next level for the cluster solutions between two to six are given in [Table 1](#), and more detailed information about the final clusters is given in [Table 3](#).

3.3. Examination of individual stability and movement between the clusters

The second research question investigated the stability of perceived validation and invalidation from the physician. Individuals in all clusters typically stayed in their original cluster after treatment. It was atypical for individuals to move from the high validation cluster to either the moderate validation and invalidation cluster or the heightened invalidation cluster. It was also atypical for individuals in the heightened invalidation cluster and the moderate validation and invalidation cluster to move to the high validation cluster (see [Fig. 1](#)). Note that the analysis only specifies typical and atypical movements, and the arrows indicate these typical and atypical movements. However, absence of arrows does not necessarily mean that no patients moved between two specific clusters (e.g. from the moderate validation and invalidation cluster to the heightened invalidation cluster).

3.4. Differences between clusters

The third research question involved examining differences between the clusters both before and after treatment. In order to theoretically validate the clusters and to investigate differences between the clusters found before treatment, one-way

between-groups MANOVA was performed on measures of negative affectivity, pain severity, and pain interference. More specifically, the three clusters were compared on pre-treatment measures of negative affect (PANAS), anxiety and depression (HAD), pain severity and pain interference (MPI), anxiety sensitivity (ASI), and pain catastrophizing (PCS). Results from the MANOVA showed no statistically significant differences between the clusters on the combined dependent variables ($F(16, 196) = .65, p = .84$; Wilks's lambda = .90; partial eta squared = .05). For more information, see [Table 4](#).

In order to investigate differences between the clusters found after treatment, the same analysis was conducted on post-treatment data. More specifically, the clusters found after treatment were compared on measures of negative affectivity, pain severity, and pain interference reported after treatment. There were statistically significant differences between the clusters on the combined dependent variables ($F(16, 196) = 2.58, p < .001$; Wilks's lambda = .68; partial eta squared = .17). When the group means for the significant dependent variables were investigated separately in the MANOVA, there were statistically significant differences between the clusters on all dependent measures except pain intensity. The separate follow-up ANOVAs confirmed this (negative affect: $F(2, 105) = 7.97, p < .001$; anxiety: $F(2, 105) = 4.90, p < .01$; depression: $F(2, 105) = 3.93, p < .05$; pain interference: $F(2, 105) = 3.17, p < .05$; anxiety sensitivity: $F(2, 105) = 12.12, p < .001$; and pain catastrophizing: $F(2, 105) = 3.19, p < .05$). Post hoc analyses showed that the heightened invalidation cluster stood out as a more symptomatic cluster, scoring significantly worse on negative affect, anxiety, and anxiety sensitivity than both the other clusters. It also scored significantly worse on depression, interference, and pain catastrophizing when compared to the high validation cluster. For more information, see [Table 5](#).

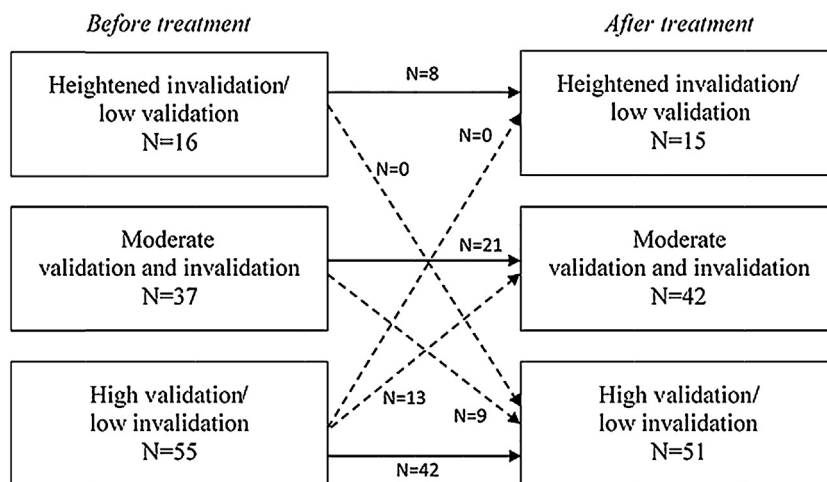
3.5. Relation to treatment outcome

The last research question investigated the connection between perceived validation and invalidation and treatment outcome. In order to answer the question of whether perceived validation and invalidation before treatment could predict treatment outcome, a repeated measures MANOVA was conducted on pain interference, anxiety, and depression. The results showed an overall improvement of mean scores on pain interference ($F(1, 105) = 10.74, p < .001$, partial eta squared = .09) and depression ($F(1, 105) = 8.33, p < .01$, partial eta squared = .07) within the full sample of patients when comparing pre-treatment scores with post-treatment scores. No significant main effects of time on anxiety were found from pre- to post-treatment ($F(1, 105) = .57, p = .45$, partial eta squared = .005). Overall, these results indicate

Table 3

Means (standard deviations) in raw scores and standardized scores for the three-cluster solution after treatment.

Clusters	Validation		Invalidation		N (Female)
	Raw score	Standardized score	Raw score	Standardized score	
Heightened invalidation/low validation	17.60 (5.01)	−1.38 (.73)	8.93 (2.15)	2.00 (.70)	15 (15)
Moderate validation and invalidation	23.31 (3.75)	−.55 (.54)	3.05 (1.56)	.08 (.51)	42 (34)
High validation/low invalidation	33.06 (2.85)	.86 (.41)	0.80 (1.20)	−.65 (.39)	51 (44)
Total	27.12 (6.91)	–	2.81 (3.07)	–	108 (93)

**Fig. 1.** Stability and movement between clusters from pre- to post-treatment. The first column represents the clusters before treatment and the second column represents the clusters after treatment. Bold arrows show significant typical paths and dashed arrows show significant atypical paths ($p < .05$).**Table 4**Comparisons between the clusters on measures of negative affect, anxiety and depression, pain severity, pain interference, anxiety sensitivity, and pain catastrophizing *before* treatment.

	Negative affect (NA)	Anxiety (HAD)	Depression (HAD)	Pain severity (MPI)	Pain interference (MPI)	Anxiety sensitivity (ASI)	Pain catastrophizing (PCS)
Heightened invalidation/low validation	11.69 (5.17)	9.60 (4.34)	9.50 (4.46)	9.12 (2.58)	53.63 (10.14)	15.23 (9.34)	22.12 (12.57)
Moderate validation and invalidation	11.76 (4.71)	9.19 (5.67)	9.05 (4.50)	8.59 (1.98)	49.41 (11.48)	14.88 (11.90)	22.67 (9.91)
High validation/low invalidation	11.05 (4.44)	8.11 (5.04)	8.04 (4.51)	8.57 (1.72)	48.15 (12.22)	13.44 (9.59)	22.48 (11.15)
Total	11.38 (4.62)	8.70 (5.16)	8.60 (4.50)	8.66 (1.94)	49.39 (11.73)	14.20 (10.34)	22.49 (10.86)
F-value	.30 ^{ns}	.77 ^{ns}	.94 ^{ns}	.53 ^{ns}	1.36 ^{ns}	.31 ^{ns}	.01 ^{ns}

Notes. Data are presented as mean (standard deviation). NA, negative affect; HAD, hospital anxiety and depression scale; MPI, multidimensional pain inventory; ASI, anxiety sensitivity index; PCS, pain catastrophizing scale; ns, non-significant.

Table 5Comparisons between the clusters on measures of negative affect, anxiety and depression, pain severity, pain interference, anxiety sensitivity, and pain catastrophizing *after* treatment.

	Negative affect (NA)	Anxiety (HAD)	Depression (HAD)	Pain severity (MPI)	Pain interference (MPI)	Anxiety sensitivity (ASI)	Pain catastrophizing (PCS)
Heightened invalidation/low validation	15.10 (5.17)	11.16 (3.84)	9.60 (4.35)	8.62 (1.87)	52.85 (10.09)	24.57 (10.49)	27.26 (11.06)
Moderate validation and invalidation	10.26 (4.55)	7.19 (4.58)	7.97 (4.32)	7.98 (2.26)	45.76 (11.87)	11.32 (9.55)	20.60 (10.14)
High validation/low invalidation	10.39 (3.78)	7.94 (4.05)	6.55 (3.43)	7.91 (2.20)	44.50 (11.27)	12.84 (8.46)	20.32 (8.94)
Total	11.00 (4.57)	8.10 (4.39)	7.53 (4.03)	8.04 (2.18)	46.15 (11.60)	13.88 (10.09)	21.39 (9.92)
F-value	7.97 ^{***}	4.90 ^{**}	3.93 [*]	.63 ^{ns}	3.17 [*]	12.12 ^{***}	3.19 [*]
Post hoc	1 > 2,3	1 > 2,3	1 > 3		1 > 3	1 > 2,3	1 > 3

Note. Data are presented as means (standard deviation). Post hoc analyses were performed with Hochberg's GT2. NA, negative affect; HAD, hospital anxiety and depression scale; MPI, multidimensional pain inventory; ASI, anxiety sensitivity index; PCS, pain catastrophizing scale; ns, non-significant.

* $p < .05$.** $p < .01$.*** $p < .001$.

that the whole group of patients significantly improved on both pain interference and depression, but not on anxiety. There were no significant interaction effects between cluster membership and time on any of the outcome measures, indicating that cluster membership pre-treatment did not predict treatment outcome. There were no significant main effects of group (cluster membership) on any of the outcome measures (pain interference: $F(2, 105) = 2.62$, $p = .08$, partial eta squared = .05; depression: $F(2, 105) = 1.10$, $p = .34$, partial eta squared = .02; anxiety: $F(2, 105) = 1.60$, $p = .21$, partial eta squared = .03).

In order to investigate if there were differences between the three clusters derived from the post-treatment ratings on change in outcome variables from pre- to post-treatment, a MANCOVA was performed with post-treatment cluster membership as the independent variable and pain interference, depression, and anxiety as dependent variables. Total scores on the dependent variables from before treatment were included in the analysis as covariates in order to control for pre-scores. The MANCOVA revealed no significant differences between the three clusters (pain interference: $F(2, 102) = .35$, $p = .71$, partial eta squared = .01; depression: $F(2, 102) = 1.02$, $p = .36$, partial eta squared = .02; anxiety: $F(2, 102) = 2.47$, $p = .09$, partial eta squared = .05). These results indicate that when controlling for pre-treatment scores there was no relationship between post-treatment cluster membership and change in outcome variables.

3.6. Post hoc analyses

As noted above, there were significant differences in pain interference and negative affectivity between the clusters at one time point (after treatment) but not the other (before treatment). Although our results showed that it was typical to remain in the same cluster both before and after treatment, about half of the individuals in the heightened invalidation cluster had been replaced by individuals from the moderate validation and invalidation cluster. This was thought to explain why there were differences after but not before treatment.

To understand why some individuals changed clusters, post hoc analyses were conducted. Wilcoxon signed-rank tests were used to examine whether there were significant differences between pre-treatment and post-treatment scores on negative affectivity, pain intensity, and pain interference for three groups of patients. The three groups of patients were (1) the eight individuals that remained in the heightened invalidation cluster after treatment, (2) the eight individuals that moved from the heightened invalidation cluster to the moderate validation and invalidation cluster, and (3) the seven individuals that moved from the moderate validation and invalidation cluster to the heightened invalidation cluster. It was hypothesized that treatment outcome, pain ratings or negative affectivity in the patients could play a role. For example, perhaps the reason for remaining in or moving between clusters could be related to changes in negative affectivity or pain. Feeling disappointed and experiencing negative emotions after completing treatment may have increased the likelihood to experience physician invalidation.

Only two of the Wilcoxon signed-rank tests revealed significant reductions in scores; specifically, pain catastrophizing for Group 1 and pain interference for Group 3 (see Table 6). This indicates that the movements between clusters were not related to improvement or worsening of negative affectivity or pain interference. Thus, treatment outcome did not seem to play a role. However, a closer look at the median values revealed that eight individuals scoring high on negative affectivity stayed in the heightened invalidation cluster, eight individuals scoring low on negative affectivity moved from the heightened invalidation cluster, and seven individuals with high negative affectivity moved from the moderate

validation and invalidation cluster to the heightened invalidation cluster. Overall, it seems that patients scoring high on negative affectivity ended up in the invalidation cluster after treatment.

4. Discussion

The present study was conducted to extend our understanding of chronic pain patients' experiences of physician validation and invalidation. To our knowledge, this is the first study investigating validation and invalidation in a clinical context from the perspective of pain patients. The results show that most of the patients felt validated and understood when communicating with their physician. However, a smaller group (pre: $N = 16$, post: $N = 15$) experienced the opposite: low levels of validation and heightened levels of invalidation. When compared to other patients, this group reported significantly more pain interference and negative affectivity after treatment, but not before. In terms of treatment outcome, the whole sample significantly improved on pain interference and depression, but no differences were found between clusters regarding change in outcome variables. Typically, patients had the same experience of validation and invalidation both pre- and post-treatment. However, post hoc analyses revealed that a change of cluster over time could be related to higher negative affectivity and pain interference. Hence, these results indicate the importance of physician validation and invalidation when communicating with pain patients who display high levels of negative affectivity and pain interference.

A comparison of the clusters (research question three) unexpectedly revealed differences after treatment, but not before. Since we believed that movements between clusters could have played a role, post hoc analyses were conducted. The post hoc analyses revealed that movement between clusters made the heightened invalidation cluster more homogeneous in terms of negative affectivity and pain interference after treatment, which could explain our unexpected results. Since several pathways are possible, this should be discussed further. Patients in the heightened invalidation cluster post-treatment may have received less validation and more invalidation from their physician due to having expressed more misery. Alternatively, receiving less validation and more invalidation may have exacerbated their emotional difficulties, which in turn elicited more invalidation and less validation. Due to cognitive bias, patients with high negative affectivity may also interpret neutral or somewhat validating communication as invalidation.

A comparison of clusters also showed that patients who experienced heightened levels of invalidation also experienced significantly more negative affectivity than other patients. This is in line with earlier studies connecting invalidation to negative emotions [8,15]. For example, experiencing intense negative emotions can make it difficult to take in and process information properly, which may impact negatively on communication [49,50]. Reasons for this can be found in the transactional model [11], which specifies that in unhealthy transactions, heightened emotional arousal leads to inaccurate expression of inner experiences. Inaccurate expression occurs when, for example, emotional distress negatively impacts how clearly an individual communicates their inner experiences. Inaccurate expression increases the risk of misunderstanding and invalidation from other people, which then further increases negative arousal, creating a cycle of emotional distress and invalidation. These inaccurate expression–invalidation transactions continue over time, and are suggested to be mediated by high negative emotional arousal. Based on this model, these patients possibly experience invalidation not only from their physicians, but also from other people, such as other health care professionals or relatives. This would explain why patients in the invalidation cluster scored higher on, for example, depression,

Table 6
Medians and Z values for pain interference, pain severity, and negative affectivity for the individuals found in the heightened invalidation cluster both before and after treatment (Group 1, $N=8$), the individuals who moved from the heightened invalidation cluster to the moderate validation and invalidation cluster (Group 2, $N=8$), and the individuals who moved from the moderate validation and invalidation cluster to the heightened invalidation cluster (Group 3, $N=7$).

	Group 1			Group 2			Group 3		
	Before treatment Median	After treatment Median	Z	Before treatment Median	After treatment Median	Z	Before treatment Median	After treatment Median	Z
Pain interference	58.50	61.00	-.70 ^{ns}	50.01	55.00	-.25 ^{ns}	58.00	52.00	-2.12 [*]
Anxiety	11.00	11.00	-.51 ^{ns}	8.50	9.00	-.35 ^{ns}	11.00	10.00	-.74 ^{ns}
Depression	10.50	8.50	-1.05 ^{ns}	7.68	8.50	-.28 ^{ns}	13.00	11.00	-.59 ^{ns}
Pain severity	10.00	8.50	-1.02 ^{ns}	9.46	9.00	-.32 ^{ns}	10.00	10.00	-1.91 ^{ns}
Anxiety sensitivity	20.50	20.50	-.42 ^{ns}	8.50	8.50	-.35 ^{ns}	24.69	29.00	-.17 ^{ns}
Pain catastrophizing	25.00	24.17	-2.03 [*]	16.50	17.71	-1.12 ^{ns}	31.00	27.67	-.68 ^{ns}
Negative affect	13.50	16.15	-.84 ^{ns}	8.00	8.80	-1.19 ^{ns}	13.00	12.08	-.43 ^{ns}

Note. ns = non-significant.

* $p < .05$.

pain catastrophizing, and anxiety sensitivity, which are all factors that could be expected to be more stable and less susceptible to invalidation in one specific interaction with a physician. Thus, physicians may not be to blame for the perceived invalidation in these interactions. Instead, these patients' communication of their inner experiences may be inaccurate and thus difficult to validate, potentially because of earlier experiences of being invalidated.

No connection was found when trying to answer the fourth research question regarding the link between patients' perceptions and treatment outcome. This was surprising, given the importance of effective communication for health outcomes [5]. It is possible that a significant difference in anxiety would have been detected with a higher statistical power, for example by having more individuals in the heightened invalidation group. Another possible explanation for the lack of significant results might be the fact that contact with the physician during treatment was limited and only took place before and after treatment. Instead, patients met with other professionals in the treatment team, such as psychologists and physical therapists. A connection between perceived validation/invalidation and treatment outcome may have been detected if the patients had rated the health care providers they saw throughout their treatment. Because of this, the results from this study cannot confirm that there is no relationship between perceived validation and invalidation and treatment outcome, just that there seems to be no relationship between treatment outcome and perceived validation and invalidation from a physician who is seen only before and after treatment. Further investigation is needed to discover whether perceived validation and invalidation from health care professionals encountered repeatedly during treatment could have a greater influence on outcome.

Limitations include the issue of sampling bias. The 108 individuals included correspond to about one fifth of the patients who received treatment during the data collection period, and about one third of all patients who agreed to fill out the questionnaires. Generally, the included and excluded individuals did not differ on the measures used, except for a small but significant difference in pain severity. This indicates that the results can be generalized to other pain patients in specialized care, albeit with caution. Generalizing the results to men may also be difficult. The sample consisted of 86% women, which is a higher proportion than in other studies conducted at specialized rehabilitation clinics in Sweden (e.g. [51,52]). Moreover, the heightened invalidation cluster consisted entirely of women pre-treatment and contained only one man post-treatment. On the other hand, this high proportion of women in the heightened invalidation cluster might indicate something important. For example, gender differences in medical encounters have a significant impact on the communication process [53], and several studies have shown that female pain patients report negative experiences and a feeling of not being taken seriously (e.g.

[54,55]). These gender differences may explain the high proportion of women in the heightened invalidation cluster. However, the low number of male respondents in this study prevents us from drawing conclusions about perceived validation and invalidation from the physician in relation to gender.

Another limitation has to do with the results from the post hoc analyses. Since the post hoc analyses only compared individuals who remained in the heightened invalidation cluster or moved between the heightened invalidation cluster and the moderate validation and invalidation cluster, it is unclear whether there were also individuals scoring high on emotional problems in the moderate validation and invalidation cluster or the high validation cluster. In addition, the number of participants included in each of the analyses was small. However, movements between clusters over time seemed to explain why there were significant differences between the clusters after treatment, but not before.

In relation to the transactional model, it is worth mentioning that this study cannot answer the question of whether the negative spiral between negative emotions and invalidation starts with negative affectivity in the patients which produces the perception of or actual validation/invalidation from the physician, or whether it starts with invalidation from the physician which negatively impacts emotional arousal in the patients. We do not have any observational data, so we do not know what actually happened in the patient-physician interactions. It is therefore possible that the patients who experienced heightened invalidation met with invalidating physicians, and experienced higher levels of negative affectivity because of this. In the future, both observational coding and self-report should be used in order to gain more information about the transactions in these interactions.

Despite its limitations, this study adds important information and has strengths worth mentioning. First, using a person-oriented approach made it possible to identify individuals who perceived their interaction with their physicians differently from the majority of individuals. As a whole, the patients scored high on perceived validation and low on perceived invalidation both before and after treatment. Without identifying the subgroups, the heightened invalidation group would not have been perceptible in the full sample, and the conclusion would have been that low levels of perceived validation in combination with heightened levels of perceived invalidation are not a problem for this group of patients; when in fact they are, if only for a smaller group. The prospective design with measurements both before and after treatment made it possible to follow these patients over time.

Taken together, most pain patients experienced high levels of validation and low levels of invalidation from their physician both before and after multimodal pain rehabilitation treatment. However, a smaller group of patients experienced the opposite: low levels of validation and heightened levels of invalidation. This group

of patients stood out as a more problematic group when compared to the other patients, both in terms of negative affectivity and pain interference. These results have implications for clinical practice. Since comorbid psychological problems and level of pain interference may interfere with effective communication, these factors are important to consider in clinical practice.

Ethical issues

The study was approved by the Regional Ethical Review Board in Uppsala (case no: 2011/010). Informed consent was obtained for all participants. Study protocol: not registered.

Conflict of interest

None declared.

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Appendix A.

Validating and Invalidating Response Scale: Health Care Provider (VIRS–HCP) Please rate how often your health care provider (in this case the physician in charge of your care) responds in these ways when you express what you are thinking, feeling, or wanting.

	<i>Never</i> 0	<i>Rarely</i> 1	<i>Sometimes</i> 2	<i>Fairly often</i> 3	<i>Almost all the time</i> 4
1. My health care provider pays attention and listens carefully.	☐	☐	☐	☐	☐
2. My health care provider listens with an open mind.	☐	☐	☐	☐	☐
3. My health care provider does not listen to me, ignores me, or even changes the subject when I try to express myself.	☐	☐	☐	☐	☐
4. My health care provider communicates that he or she understands what I'm saying and acknowledges my point of view, my feelings, and what I want.	☐	☐	☐	☐	☐
5. My health care provider tells me that I should <i>not</i> feel what I am feeling, think what I am thinking, or want what I am wanting—that my experiences are wrong or not legitimate	☐	☐	☐	☐	☐
6. My health care provider tries hard to understand what I am thinking, feeling, or wanting and shows this by asking sincere questions, and this helps me to clarify and express myself more accurately.	☐	☐	☐	☐	☐
7. My health care provider is accepting and understanding about what I think, feel or want.	☐	☐	☐	☐	☐
8. My health care provider fails to understand me when I express myself.	☐	☐	☐	☐	☐
9. My health care provider tells me what I am feeling, thinking, or wanting makes sense, is legitimate, is understandable, or is simply normal.	☐	☐	☐	☐	☐
10. My health care provider is very critical or judgmental of my thoughts, feelings, or desires.	☐	☐	☐	☐	☐
11. My health care provider treats me with respect, like a valued and equal human being, and like I am capable and worthwhile.	☐	☐	☐	☐	☐
12. My health care provider is patronizing, belittling, disrespectful, or condescending towards me, or blames me for even ordinary things that do not go well.	☐	☐	☐	☐	☐
13. My health care provider responds with a lot of support, patience, warmth, and/or soothing when I am struggling or upset.	☐	☐	☐	☐	☐
14. My health care provider tries to help me or support me in solving whatever problem I might have rather than taking over and solving it for me.	☐	☐	☐	☐	☐

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