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## The pain of being misunderstood

Invalidation of pain complaints in chronic low back pain patients

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# The pain of being misunderstood: Invalidation of pain complaints in chronic low back pain patients

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## Abstract

A particular form of social pain is invalidation. Therefore, this study (a) investigates whether patients with chronic low back pain experience invalidation, (b) if it has an influence on their pain, and (c) explores whether various social sources (e.g. partner and work) influence physical pain differentially. A total of 92 patients completed questionnaires, and for analysis, Pearson's correlation coefficients and hierarchical linear regression analyses were conducted. They indicated a significant association between discounting and disability due to pain (respective  $\beta = .29$ ,  $p > .05$ ). Especially, discounting by partner was linked to higher disability ( $\beta = .28$ ,  $p > .05$ ).

## Keywords

chronic low back pain, disability, invalidation, social pain, social rejection

Back pain is one of the most prevalent medical problems in the developed world today (Campbell and Guy, 2007; Leary et al., 1995). However, only 15–20 percent of back complaints receive a clear diagnosis. The rest of the patients are classified with the label “non-specific chronic low back pain” (cLBP) (Hart et al., 1995). In these patients, a clear pathological cause is not detectable despite their symptoms of pain (Hart et al., 1995). The likelihood of recovery decreases over time, as pain lasting longer than 12 weeks can lead to chronic conditions (Campbell and Guy, 2007; Leary et al., 1995).

According to the biopsychosocial model, the persistence of pain is influenced by various biological, psychological, and social factors (Zimmermann, 2004). Examples of biological factors are hard physical work, or precisely the opposite, underuse of the musculoskeletal

system (Leary et al., 1995; Zimmermann, 2004). Psychological risk factors are depression, fear-avoidance behavior, or the catastrophizing of symptoms, leading to higher pain perception and immobility (Leary et al., 1995; Zimmermann, 2004). Social factors can also influence pain perception for example through secondary gain (Leary et al., 1995; Zimmermann, 2004) and may support the process of chronicity.

The biopsychosocial perspective on cLBP is widely accepted and all three domains must be considered to understand the full scope of pain

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(Hart et al., 1995; Leary et al., 1995). However, with regard to social factors, research on cLBP has mainly concentrated on the effects of positive social interactions, while knowledge concerning the impact of negative social support in the pathogenesis and manifestation of cLBP is lacking. In this study, the scope and impact of negative social support in cLBP patients will be investigated.

The most basic of human motivation is the desire for social connections (Raspe et al., 2003) and inclusion into social groups has always been a key to survival (Phillips and Gatchel, 2000). Support from others can be fundamental for pain patients, making their life more bearable and helping them to better cope with their symptoms. Research on social interaction and pain primarily describes operant models of positive social support (Cano et al., 2008; Leary et al., 1995; Schulz and Schwarzer, 2003), focusing on the effects of positive social attention and positive reinforcement. Findings from this line of research suggest that positive social support has beneficial effects for pain patients. For example, empathetic and concerned responses from close others have been found to enhance emotional regulation in pain patients (Cano and De C Williams, 2010). Likewise, a study investigating the communication style of nurses with pain patients indicated that a validating communication style had a beneficial effect on patients' satisfaction, reduced negative affect, and lowered pain intensity ratings in patients with back pain (Vangronsveld and Linton, 2012). On the other hand, empathetic responses may also reinforce the pain (behavior), with studies demonstrating that solicitous partner responses to overt pain behavior can actually increase pain ratings (Hadjistavropoulos et al., 2011; Romano et al., 2000).

Much less is known about the effect of negative social interactions or invalidation. Following the definition by Kool et al. (2010), invalidation "encompasses the perception of cognitive, affective, and behavioral responses of others which are perceived as denying, lecturing, overprotecting, not supporting, and not

acknowledging with respect to the condition of the patient" (p. 1650). It consists of two dimensions: lack of understanding and discounting (Kool et al., 2010, 2013). Invalidation is linked to, but different from, not receiving social support (Kool et al., 2013). Social support includes receiving positive encouragement, such as affection (Singer et al., 2004), and a paucity of it might be related to worsening health (Cano et al., 2010). However, invalidation is not just a lack of social support; it is also characterized by overt rejection, disbelief, or a lack of understanding. As such, invalidation, and especially discounting, could be a more hurtful experience than not receiving social support.

Invalidation has started to receive more empirical attention in the past few years, especially through research on rheumatic and fibromyalgia patients. These diseases are characterized by "invisible" symptoms such as pain, fatigue, stiffness, and sometimes a lack of clinical findings (e.g. physical deformity or laboratory abnormalities). Like rheumatic patients, cLBP sufferers also often show invisible symptoms such as pain, fatigue, or stiffness. Therefore, cLBP patients may experience invalidation. Studies of invalidation in rheumatic and fibromyalgia patients have demonstrated that invalidation is associated with more self-reported pain and lower level of mental well-being. Especially discounting behavior in close relationships, such as partners, may lead to an increase in self-reported pain and worsen mental well-being (Kool et al., 2010). Previous research also suggests that invalidation, as form of social rejection, may be directly and indirectly associated with various aspects of physical pain (Eisenberger et al., 2003; MacDonald and Leary, 2005), suggesting that there could be a link between experienced invalidation and pain symptoms in cLBP patients.

First, invalidation may be linked to pain via behavioral changes. For example, some people tend to distance themselves from others when they repetitively experience rejection because of their pain and physical disability (Bourgeois and Leary, 2001). This in turn could lead to social

isolation, retraction, or non-disclosure of the illness (Asbring and Narvanen, 1991), which then could aggravate the condition further. On the other hand, overt pain behavior and disclosure of pain may be more likely to elicit responses from the environment, including invalidating responses. Evidence suggests that these types of social rejection can be directly associated with physical pain. For example, MacDonald and colleagues (MacDonald and Kingsbury, 2006; MacDonald and Leary, 2005) postulated a positive relationship between reports of physical pain and social rejection in their social pain theory which is based on findings that higher levels of pain correlated positively with reports of “hurt feelings” (MacDonald et al., 2005). This relationship is further supported by recent evidence demonstrating that responses to physical pain and social exclusion are mediated by several common brain and neuroendocrine mechanisms. Neuroimaging evidence has shown social and physical pain to be overlapping in their underlying neural circuitry and computational processes (Eisenberger et al., 2006). Eisenberger et al. (2006) experimentally induced social exclusion and observed an activation of the periaqueductal gray, as well as the anterior cingulate cortex (ACC), similar to the activation seen in response to physical pain. Based on these findings, social rejection, such as the invalidation of one’s complaints, could be associated with physical pain through shared neural pathways.

To date, it has yet to be investigated whether everyday forms of social rejection are linked with higher levels of physical pain in cLBP patients. It is assumed that cLBP patients encounter invalidation from their social environment due to the invisible nature of the pathology and symptoms. While former studies evaluating invalidation in other patient populations have demonstrated the negative effects of invalidation on general health and well-being (Blom et al., 2012; Kool et al., 2010, 2013), this study in cLBP patients will assess invalidation and its influence on pain, specifically focusing on the following three pain dimensions: pain intensity, pain-related impairment, and pain

sensation. Overall, the aims of this study are threefold: the first aim being to evaluate whether cLBP patients experience invalidation from their social environment. The second aim was to assess whether a higher invalidation level is linked to higher physical pain and the final aim was to explore which specific sources of invalidation in the social environment of cLBP patients have a great impact on pain.

## Methods

### Participants

We recruited 92 patients with cLBP in gym courses targeting low back pain problems (“Rückenschule”) and in the Potsdam University Outpatient Clinic, Potsdam, Germany. Inclusion required an age between 18 and 65 years, continuous cLBP for at least 6 months and not having been diagnosed with a medical cause during this time span (e.g. an infection or tumor). The data set consisted of 64 females and 28 males with mean age of  $45.1 \pm 11.0$  years. The majorities of participants were of German nationality (91%), had a high-level of education (i.e. at least 12 years) (50.0%), were employed (90.2%), and were living together with a partner (72.8%) and/or with children (38%). Further demographic characteristics and chronic pain status of participants can be found in Table 1.

### Materials

The questionnaire battery included different standardized questionnaires such as back pain status, pain symptoms and treatments, pain sensation, invalidation, social support, and demographic characteristics.

*Demographics and back pain status.* Selected items from the Deutscher Schmerzfragebogen (DSF) were evaluated (Pfungsten et al., 2007). Additionally, back pain characteristics such as location, duration of symptoms and episodes, frequency, treatments, and subjective causes were assessed.

**Table 1.** Demographic characteristics and pain status of participants.

Variable	Statistics	Variable	Statistics
Gender, <i>n</i> (%)		Health status, <i>n</i> (%)	
Females	64 (69.6%)	Location of pain	
Males	28 (30.4%)	Lumbar spine	92 (100%)
Age (years)		Thoracic spine	23 (25.0%)
Mean ( <i>SD</i> )	45.1 (11.0)	Neck/cervical spine	39 (42.4%)
Median (range)	48 (21–65)	Head	4 (4.3%)
Nationality, <i>n</i> (%)		Shoulder, arms	7 (7.6%)
German	91 (98.9%)	Hip	5 (5.4%)
Others	1 (1.1%)	Knees	6 (6.5%)
House community, <i>n</i> (%)		Feet	1 (1.1%)
Alone	17 (18.5%)	Time with symptoms (years) <sup>a</sup>	
With partner	67 (72.8%)	1–2 years	13 (14.1%)
With children	35 (38.0%)	2–5 years	30 (32.6%)
Parents (-in law)	6 (6.5%)	>5 years	21 (22.8%)
Others	4 (4.3%)	Longer	19 (20.7%)
Graduation, <i>n</i> (%)		Subjective pain reasons, <i>n</i> (%) <sup>a</sup>	
Higher-level (after 12 years in school)	46 (50.0%)	Physical load	53 (57.6%)
Polytechnic	16 (17.4%)	Psychological load	21 (22.8%)
O-level	23 (25.0%)	Therapies, <i>n</i> (%) <sup>a</sup>	
Lower secondary education	6 (6.5%)	Physiotherapy	55 (59.8%)
No graduation	0	Massage	52 (56.6%)
Work status, <i>n</i> (%)		Medication	38 (41.3%)
Employed	83 (90.2%)	Injections in pain location	28 (30.4%)
Unemployed	7 (7.6%)		
Disabled	2 (2.2%)		

SD: standard deviation.

<sup>a</sup>Only most frequently reported answers are shown in the table.

**Invalidation.** It was measured with the Illness Invalidation Inventory (3\*I, German version, Kool et al., 2009), which includes scales for discounting (five items) and lack of understanding (three items). Lack of understanding reflects the situation of not recognizing or emotionally supporting the patient and refers for example to the following statements: “(Person)/... takes me seriously” and “(Person)/... understands the consequences of my health problems or illness” (Kool et al., 2009). Discounting is characterized through admonishing or not acknowledging symptomatic variation of the patient and is, for example, expressed

by: “(Person)/... finds it odd that I can do more on some days than on other days,” or “(Person)/... thinks I should be tougher” (Kool et al., 2009). The same eight items were applied to each of five sources (partner, family, medical professionals, work environment, and social services) and patients judged on a 5-point Likert scale (0=never to 4=very often) how often they experience the specific reaction from that source. If a category did not apply to the participant’s situation, it was skipped. Based on the means of the answers, we calculated scores for each subscale (lack of understanding and discounting), which were then

used for further analysis (Kool et al., 2010). For interpretation of the descriptive analysis, we classified the mean invalidation score into three groups (also see Kool et al., 2010: “never/rarely” (1): .0–1.5, “sometimes” (2): 1.6–2.5, and “often/very often” (3): 2.6–4.0). However, for regression and correlation analysis, raw scores were used. Studies by Kool et al. (2010) in patients with rheumatoid arthritis showed good reliability and validity of invalidation scores. Cronbach’s  $\alpha$  (Bland and Altman, 1997) in this study was .69 for discounting and .78 for lack of understanding across all sources. Reliabilities for the separate sources ranged from .76 to .90 for discounting (apart from medical professionals, which was low  $\alpha$  = .56) and from .73 to .82 for lack of understanding.

**Pain intensity and pain-related impairment.** It was assessed through the German version of the Von Korff scale (Von Korff et al., 1992), grading low back pain and the extent to which people are impaired in their daily activities due to pain. It includes three items considering pain intensity and three items evaluating pain-related impairment, which participants answered on an 11-point Likert scale (0=no pain/no impairment, 10=strongest pain/unable to do anything). An example item for pain intensity is as follows: “How would you rate your back pain on a 0–10 scale right now?” and an example item for pain-related impairment is as follows: “Did your pain prevent you from doing activities with your friends or family or pursuing hobbies?” Following the scoring rules as described by Von Korff (1992), the raw scores were calculated separately for intensity and pain-related impairment by multiplying the mean of the three items by 10 (scoring 0–100). Afterward, these results were transformed into pain-related impairment points ranging from 0 to 3 (0 meaning 0–29 points and 3 designating 70+). Additionally, the number of days in the prior 3 months with impairment (subject was unable to carry out normal daily activities such as work and household) because of pain was assessed. Participants could either choose “0 days” or write down the number of

days in which this statement applied to them. Again, pain-related impairment points were allocated (0–3 points), depending on the number of pain-related impairment days. Finally, all impairment points were summed to determine the grade of chronicity. A minimum score of grade 0 implies no pain/chronicity and a maximum score of grade 4 is classified as severe chronicity (Von Korff et al., 1992). Reliabilities (Cronbach’s  $\alpha$ , Bland and Altman, 1997) for scales in this study were good with .82 for pain intensity and .92 for pain-related impairment.

**Pain sensation.** We evaluated pain sensation through the German pain sensation scale (Schmerzempfindungsskala (SES); Geissner, 1996). It includes 24 items describing two dimensions of pain: affective sensation (items 1–14) and sensory sensation (15–24). Patients characterized their experienced pain by indicating the extent to which an adjective, for example, “unbearable, paralyzing, or stinging,” describes their pain on a 4-point Likert scale (1=not applicable to 4=completely applicable). Reliabilities in this study were good to very good (Bland and Altman, 1997), with a Cronbach’s  $\alpha$  of .75 for sensory scale and .94 for affective scale.

**Treatments.** Additionally, we assessed the pain treatments of participants as a control variable expecting that other treatments like physical therapy or different medications could influence the dependent variable and, therefore, in need of controlling for assessing the relationship between invalidation and pain. Participants indicated all types of treatments they had utilized up to this point from a list of 15 current treatments (e.g. medication, physiotherapy, massage, chiropractic, and rehabilitation). The sum of all received treatments was used as a measure of total treatments.

**Social support.** As it has been shown to influence pain (Cano et al., 2008; Kappesser and De C Williams, 2008), social support was included as control variable and assessed by the Berlin Social Support Scale (BSSS; Schulz and

Schwarzer, 2003). The BSSS measures cognitive, as well as behavioral aspects of social support (perceived, actually received and actually provided support, need for support, support seeking, and protective buffering). We focused on the overarching subcategories: perceived available social support and actually received social support. Participants were asked to specify their accordance with the assertions on a 4-point Likert-type scale (1 = strongly disagree to 4 = strongly agree). In this study, Cronbach's  $\alpha$  was low for received social support (.52), but good for perceived available social support (.79) (Bland and Altman, 1997).

### Procedure

The research project was approved by the Ethical Committee of the University of Potsdam. Participants were informed on the study's primary goals and received the questionnaire during their courses/therapy, which was then collected 2 weeks afterward. All participants were informed about anonymity of data before providing written informed consent. Participation was voluntary and participants could withdraw from the study at any time if they wished.

**Statistical analysis.** All analyses were done with SPSS 20.0 (IBM SPSS, 2011). A significance level was set to  $p$  value < .05. When three (or more) values within a category were missing in the 3\*I, this category was excluded from data analysis. Therefore, "social services" was generally excluded for further analyses due to the high number of missing values in the sample size (59.8%). Hierarchical linear regression analyses were done to examine the predictive power of the two dimensions of invalidation (discounting and lack of understanding) on pain intensity, pain-related impairment, and pain sensation (affective, sensory). As age correlated significantly with the dependent variables and gender is known to have an impact on pain (Salvetti et al., 2012), these demographical variables were controlled for in the first step of the regression analysis. Likewise, because social support and treatments also may impact pain (Cano

et al., 2008; Kappesser and De C Williams, 2008), these were included as control variables in the second step in order to separate the effects of these independent variables from the effects of invalidation. In addition to generally experienced invalidation, each of the 3\*I subscales (spouse, family, medical professionals, and work environment) were separately analyzed to obtain an insight into the association between invalidation and pain for each specific source. Our hypotheses were the following:

1. We expected that cLBP patients experience invalidation from their social environment. Therefore, subjective experience of general invalidation, lack of understanding, and discounting was assessed by calculating mean scores (descriptively analyzed), both generally and for each of the separate sources of invalidation.
2. We expected that higher levels of invalidation (discounting and lack of understanding) would predict higher levels of physical pain (intensity, pain-related impairment, and pain sensation).
3. Finally, based on previous findings (Kool et al., 2010), we assumed that invalidating responses from close relationships, like the partner, would have been a higher impact on physical pain, presumably because these people have the most contact with the patient or are emotionally closer to the patient, and thus, their invalidation may have a greater impact both in terms of frequency and quality. This was assessed by separate regression analyses for the experienced invalidation by each separate source.

## Results

### *Hypothesis 1: cLBP patients experience invalidation from their social environment*

The descriptive analysis showed that invalidation was evenly distributed for all three



**Table 2.** Descriptive statistics of invalidation (absolute, and relative values are shown).

Source	Raw <i>M</i> and <i>SD</i>	Classified		
		Never/rarely (%)	Sometimes (%)	Often/very often (%)
<b>Invalidation</b>				
Invalidation (general)				
Invalidation (all scales)	2.0 ± .84	25 (35.2%)	22 (31.0%)	24 (33.8%)
Partner	1.1 ± .30	70 (76.1%)	3 (3.3%)	1 (1.1%)
Family	1.1 ± .35	71 (77.2%)	6 (6.5%)	1 (1.1%)
Medical professionals	1.1 ± .34	71 (77.2%)	6 (6.5%)	1 (1.1%)
Work	1.2 ± .54	60 (65.2%)	9 (9.8%)	4 (4.3%)
<b>Discounting</b>				
Discounting (all scales)	2.1 ± .88	25 (35.2%)	16 (22.5%)	30 (42.3%)
Partner	1.1 ± .29	69 (75.0%)	2 (2.2%)	1 (1.1%)
Family	1.1 ± .28	82 (89.1%)	3 (3.3%)	1 (1.1%)
Medical professionals	1.0 ± .12	74 (80.4%)	1 (1.1%)	–
Work	1.2 ± .52	61 (66.3%)	5 (5.4%)	4 (4.3%)
<b>Lack of understanding</b>				
Lack of understanding (all scales)	2.0 ± .87	27 (38.0%)	18 (25.4%)	26 (36.6%)
Partner	1.3 ± .59	66 (71.7%)	13 (14.1%)	6 (6.5%)
Family	1.4 ± .62	56 (60.9%)	16 (17.4%)	6 (6.5%)
Medical professionals	1.4 ± .66	58 (63.0%)	11 (12.0%)	8 (8.7%)
Work	1.7 ± .78	36 (39.1%)	22 (23.9%)	14 (15.2%)

SD: standard deviation.

categories (“never/rarely,” “sometimes,” and “often/very often”). Looking separately at the dimensions of discounting and lack of understanding, more participants responded with “often/very often,” especially for discounting (nearly half of the participants). Lack of understanding was “often/very often” experienced in nearly one-third of the participants. Detailed results can be found in Table 2. As seen in Table 3, the majority of the sample size reached a low score on the Korff scale, and therefore, most of the participants were classified into Grade 1 for chronic pain severity, which means the pain intensity, as well as the impairment due to pain, is low. The results for pain sensation and social support are displayed in Table 4. In general, participants scored high on perceived social support and to a lesser extent on received social support.

**Hypothesis 2: experienced invalidation is associated with physical pain**

**Pain-related impairment.** Two hierarchical regression analyses were conducted for each of the predictors, lack of understanding and discounting. The results of both regression analyses can be found in Table 5. With regard to the final model, lack of understanding did not significantly predict pain-related impairment. In the second regression analysis with discounting as predictor, the final model was significant explaining 11 percent of the variance in total pain-related impairment. Looking at the separate predictors, discounting significantly contributed to the prediction of pain-related impairment ( $\beta = .29, p = .01$ ).

**Pain intensity and pain sensation (affective and sensory).** A similar set of regression analyses

**Table 3.** Descriptive statistics pain disability and pain intensity (Von Korff).

Value	M and SD	Frequencies (%)
Characteristic pain intensity	38.2 ± 18.8	Score <50: 66.5 Score >50: 33.5
Subjective disability	24.7 ± 23.8	0 Points: 64.1 1 Point: 16.3 2 Points: 10.9 3 Points: 7.6
Amount of disability days (disability points) <sup>a</sup>	0.2 ± .5	0 Points: 90.2 1 Point: 5.4 2 Points: 3.3 3 Points: 1.1
Disability score (sum of subjective disability and amount of disability days) <sup>a</sup>	0.8 ± 1.2	0 Points: 63.1 1 Point: 14.1 2 Points: 12.0 3 Points: 7.6 4 Points: 2.2 5 Points: 0 6 Points: 1.1

SD: standard deviation.

<sup>a</sup>These values are just included in the descriptive analyses.

**Table 4.** Descriptive statistics pain perception and social support.

Value	M and SD
SES	
Sensory pain (score)	14.1 ± 4.3
Affective pain (score)	23.1 ± 9.4
BSSS	
Perceived available social support	3.7 ± .4
Received social support	3.2 ± .4

SD: standard deviation; SES: Schmerzempfindungsskala;

BSSS: Berlin Social Support Scale.

were conducted for pain intensity and pain sensation. They were used as dependent variables and yielded no significant results (as seen in Table 6).

### *Hypothesis 3: closer relationships of cLBP patients have a higher impact on pain sensation when invalidation is experienced*

*Source of invalidation.* Regression analyses for lack of understanding and discounting by the

separate sources (invalidation by partner, family, work, and medical professionals) can be found in Table 6. Both yielded comparable results for partners. Discounting by the partner was a significant predictor for pain-related impairment ( $\beta = .28, p = .03$ ) and the final model could explain 12 percent of pain-related impairment. None of the other analyses for social sources of invalidation revealed significant predictors.

## Discussion

The aims of this study were threefold. First, we explored whether patients with cLBP experience invalidation. Second, we investigated whether higher levels of invalidation were related to higher levels of physical pain. Third, we explored the impact of distinct sources of invalidation (partner, family, work, and medical professionals) on pain in cLBP patients.

With regard to the first aim, results were evenly divided in each invalidation experience category: approximately one-third never or rarely had experienced invalidation, while one-third had experienced invalidation sometimes,

**Table 5.** Hierarchical multiple regression analyses predicting pain (impairment), pain (intensity), and pain sensation (affective, sensory) from (1) demographic variables (age and gender), (2) demographic variables (age, gender) + treatments, and (3) demographic variables (age, gender), treatments, and invalidation (discounting or lack of understanding).

Step	Variables	Pain (impairment)		Pain (intensity)		Pain (sensation)			
		$\beta$	$\Delta R^2$	$\beta$	$\Delta R^2$	Affective		Sensory	
						$\beta$	$\Delta R^2$	$\beta$	$\Delta R^2$
Invalidation: discounting									
(1)	Age	.10	.02	.06	.01	.13	.03	.06	.02
	Gender	.10		-.10		-.14		-.15	
(2)	Age	.03	.04	-.00	.03	.06	.06	-.03	.05
	Gender	.10		-.10		-.14		-.15	
	Treatments	.17		.15		.17		.17	
(3)	Age	.08	.11	.01	.04	.09	.07	.02	.06
	Gender	.08		-.10		-.15		-.16	
	Treatments	.09		.13		.14		.13	
	Discounting	.29*		.08		.12		.14	
Invalidation: lack of understanding									
(1)	Age	.10	.02	.06	.01	.13	.03	.06	.02
	Gender	.10		-.10		-.14		-.15	
(2)	Age	.03	.05	-.00	.03	-.06	.06	-.00	.05
	Gender	.10		-.10		-.14		-.15	
	Treatments	.17		.15		.17		.17	
(3)	Age	.04	.05	.02	.03	.04	.06	-.01	.05
	Gender	.10		-.10		-.14		-.15	
	Treatments	.17		.15		-.18		.17	
	Lack of understanding	.00		.06		-.06		-.02	

\*Correlation is significant below the .05 level (two-tailed).

and one-third stated that they had experienced invalidation often. These results are comparable to studies in rheumatoid and fibromyalgia patients (Kool et al., 2010).

Based on these results, it can be concluded that invalidation, as a social phenomenon, exists among cLBP patients. It should be noted that in this sample, most of the participants were classified as Grade 1 on the Korff scale (Von Korff et al., 1992). Yet, even with a low level of chronicity, patients experienced invalidation and it might be possible that invalidation is even more frequently experienced by patients who reach higher Korff scale grades. This, however, could not be verified with this data set.

The second hypothesis, that invalidation predicts physical pain experience, was partially

confirmed. Our results revealed that discounting was a positive predictor for pain-related impairment, yet failed to expose any significant associations between lack of understanding and discounting and the two other dimensions of pain. The association between discounting and pain is consistent with previous findings from a study in fibromyalgia and rheumatic patients (Kool et al., 2010). In this study, discounting, but not lack of understanding, was positively related to self-reported general pain, as measured by the Medical Outcomes Study (MOS) 20-Item Short-Form General Health Survey (SF-20) (Kool et al., 2010; Sherbourne and Stewart, 1991). Although we would have expected that invalidation predicts all three aspects of pain, this was not observed in the

**Table 6.** Three sets of regression analyses showing the predictive power of discounting and lack of understanding (for each source) on three pain outcomes.

Variables	Pain (impairment)		Pain (intensity)		Pain (sensation)			
					Affective		Sensory	
	$\beta$	$\Delta R^2$	$\beta$	$\Delta R^2$	$\beta$	$\Delta R^2$	$\beta$	$\Delta R^2$
General invalidation								
Discounting	.29*	.11	.08	.04	.11	.07	.20	.11
Lack of understanding	.00	.05	.06	.03	-.07	.06	-.01	.08
Invalidation by partner								
Discounting	.28*	.12	.15	.04	.10	.04	.18	.09
Lack of understanding	-.07	.05	-.02	.02	-.13	.06	-.11	.08
Invalidation by family								
Discounting	.09	.06	-.00	.04	-.01	.10	.15	.12
Lack of understanding	-.06	.06	.05	.06	-.05	.07	-.08	.11
Invalidation by medical professionals								
Discounting	.17	.07	.01	.05	.15	.09	.13	.09
Lack of understanding	.03	.04	.00	.05	-.07	.08	-.03	.08
Invalidation by work environment								
Discounting	.19	.07	.08	.05	.03	.06	.07	.09
Lack of understanding	-.09	.05	-.01	.05	-.14	.10	-.11	.12

Asterisk entries in the table mark significant correlations or the corresponding amount of explained variability. Results of the final model are just shown in the Table.

\*Correlation is significant below the .05 level (two-tailed).

actual results. The specific connection between invalidation and pain-related impairment, but not pain intensity and sensation, is interesting. Originally, we expected pain-related impairment to be a reflection of pain intensity, in the sense that high levels of pain intensity would be associated with higher levels of impairment. However, finding only an association between discounting and impairment suggests that the observed relation may operate mainly via a behavioral pathway. For instance through operant processes, where discounting by the environment elicits pain behavior or reinforces pain behavior in patients. For the other, less observable dimensions of pain, such as pain intensity and pain sensation, such operant processes are less likely to take place. Another possible explanation for the relation between discounting and pain-related impairment could be that people who expose high levels of impairment (because it is the most visible component of pain) will

receive more invalidating reactions, whereas sensory pain may not be as noticeable, and therefore, less likely to evoke invalidating responses.

With regard to our third hypothesis, our findings revealed a significant relationship between discounting by partner and pain-related impairment, indeed suggesting that social rejection from closer relations has a greater impact on the well-being of back pain patients. This is consistent with findings of others in different patient groups (Cano et al., 2008; Kool et al., 2010). They showed that deterioration of nearby relationships could lead to a decrease of usual activities (home, work, and recreation) and is linked to pain amplification (Kemeny, 2009). Patients who suffer from rheumatic or fibromyalgia diseases experiencing invalidation from nearby sources, such as partner or family, reported a greater impact on their well-being, compared to those experiencing invalidation by

health professionals or colleagues (Kool et al., 2010, 2013). As we did not directly investigate this, we can only speculate about the underlying reason for this observed prediction, but there are several potential possibilities. It could be that invalidation by a partner has a greater impact on the patient's complaints simply because the partner spends the most time with the patient and is often personally affected by the patient's complaints (as these patients tend to avoid activities which could provoke/worsen the pain), and thus may expose the patient to higher levels of invalidation. Another explanation could be that invalidation by a person, whom is emotionally close, such as one's partner, is experienced as more hurtful or rejective compared to a person whose opinion is not as relevant or is not in the position to emotionally hurt the patient. It could also have an indirect effect, as Kool's study showed that invalidation by one's partner has an effect on mental-well-being. Invalidation by a partner could then be associated with pain through psychological complaints, which, according to the biopsychosocial model, contribute to pain.

While further research should focus on experimental designs to fully understand the underlying causal mechanisms to explain the observed link between invalidation and pain-related impairment, the present findings have several implications for patients with cLBP. First, the findings indicate that invalidation is experienced by this patient group, which is relevant because invalidation has been related to lower levels of well-being (Kool et al., 2010). Next, invalidation is associated with pain-related impairment which could result in reduced activity and deteriorated use of the musculoskeletal system, as well as potential retraction from professional or social life, which in turn may also impact psychological well-being. According to the biopsychosocial model of pain, both of these factors, psychological well-being and reduced (musculoskeletal) activity, contribute to the maintenance and recovery of chronic back pain, suggesting that while invalidation may not have a direct relationship with pain sensation, it may be a factor

of importance in the chronicity of the disease. Therefore, therapies addressing cLBP should consider the close relationships of the patients and their perceptions of and reactions to the complaints of the pain patient.

Our study has some limitations. Foremost, the cross-sectional design of this study limits any conclusions about the direction of the relationship between invalidation and pain, which should be addressed by future studies using an experimental set-up under controlled conditions. Likewise, future studies should include a control group of healthy, matched individuals to assess whether invalidation is also experienced by people without cLBP. A further limitation of this study is the low reliability of some scales (i.e. invalidation by medical professionals). As these scales have been found to have a good reliability in previous studies, it could be that some participants misinterpreted some questions. In future studies, this could be avoided by clearer instructions. Despite these limitations, this study is the first of its kind to explore invalidation among cLBP showing that invalidation among cLBP sufferers exists, and that it may negatively impact the course of their complaints.

## Conclusion

In summary, to our knowledge, this is the first study assessing invalidation in cLBP patients. Consistent with studies in fibromyalgia and rheumatic patients, our study shows that invalidation is also experienced in cLBP patients. We also show that discounting is associated with pain-related impairment, but not with pain intensity or sensation. Whether invalidation is the cause or consequence of pain-related impairment needs to be confirmed in future studies using an experimental design. Finally, the present findings indicated that discounting particularly by partners was associated with pain-related impairment. Further studies are needed to reveal the clinical impact of invalidation on well-being and pain symptoms in order to better understand the mechanisms contributing to cLBP.

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