University of Groningen

A Cross-Sectional Study of Psychological Comparison Processes That May Underlie the Acceptance of Chronic Pain

Orfgen, Harald; Dijkstra, Arie

Published in:
Clinical psychology & psychotherapy

DOI:
[10.1002/cpp.1973](https://doi.org/10.1002/cpp.1973)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2015

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Orfgen, H., & Dijkstra, A. (2015). A Cross-Sectional Study of Psychological Comparison Processes That May Underlie the Acceptance of Chronic Pain. *Clinical psychology & psychotherapy*, 23(6), 487-495.
<https://doi.org/10.1002/cpp.1973>

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

A Cross-Sectional Study of Psychological Comparison Processes That May Underlie the Acceptance of Chronic Pain

Harald Orfgen and Arie Dijkstra*

University of Groningen, Groningen, the Netherlands

Acceptance of chronic pain varies between patients but may also be expected to develop and change within patients. In this latter framework, the present study explored three psychological processes that may contribute to changes in acceptance: social comparisons, temporal comparisons and counterfactual comparisons. In general, these comparisons are used to cope with negative life events, and they may also play a role in acceptance of pain. In this study, the two subscales of the Chronic Pain Acceptance Questionnaire (Activity Engagement and Pain Willingness) were complemented with a scale of Affective Acceptance. Using linear regression analyses, data from these three acceptance scales were regressed on three scales of temporal comparison processes, four scales of social comparison processes and one scale of counterfactual comparisons. The results showed that the comparison processes explained up to 37% of the variance in acceptance, especially a higher frequency of thinking of one's present condition in relation to a condition in the past, and feeling bad when comparing with others who are doing better, were consistently related to lower acceptance. These explorative results may inspire experimental studies to influence comparison processes and, eventually, to address those comparison processes in interventions for patients with chronic pain to improve acceptance. Copyright © 2015 John Wiley & Sons, Ltd.

Key Practitioner Message:

- In addition to beliefs indicating Activity Engagement and Pain Willingness, Affective acceptance of pain may also be a relevant dimension and manifestation of acceptance
- Social comparisons, temporal comparisons and counterfactual comparisons are related to acceptance of pain
- In patients with pain psychological comparison processes can be relevant in diagnosing possible causes of non-optimal acceptance of chronic pain
- Practitioners may try to influence each of the three types of psychological comparison processes in individuals and observe the effects

Keywords: Chronic Pain, Acceptance, Social Comparison, Temporal Comparison, Counterfactual Comparison

Pain symptoms are frequently reported in the general population. Epidemiological research suggests that at least 30% of the American population (Lohnberg, 2007) suffers chronic pain or chronic recurrent pain. When medical treatments do not lower pain, patients have to cope with their pain on the longer term. One special case of coping with chronic pain is accepting the pain. McCracken (1998) conceptualized acceptance of pain in patients with chronic pain as '...a willingness to experience continuing pain without needing to reduce, avoid or otherwise change it'. This implies that patients may engage in activities

despite the pain and try to live a 'normal' life. Acceptance is a state of mind or an attitude towards the pain and towards oneself having chronic pain that determines how patients give meaning to their lives (Dijkstra, Buunk, Tóth, & Jager, 2008). Patients vary in acceptance of their pain: some show low acceptance, strongly focusing on the pain as a negative state and designing their life around the pain, while others may highly accept their pain; no or less focus on the pain and living a normal life. Importantly, acceptance can change over time and it may develop over time. However, there is little known about this process yet, although some empirical data have been gathered on how illness beliefs (Rankin & Holtum, 2003) and social responses (McCracken, 2005) may influence acceptance. The present study explores some of the psychological

*Correspondence to: Arie Dijkstra, University of Groningen, Social Psychology, Grote Kruisstraat 2/1, 9712 TS, Groningen, the Netherlands.
E-mail: arie.dijkstra@rug.nl

processes that may be causally related to the development of acceptance of pain.

One angle towards the development of the acceptance of pain is that people cope with it as they cope in general with negative life events. When negative states cannot be objectively changed (as in chronic pain), the interpretations of these states may be changed. People can use a number of psychological methods and tricks to change the meaning of negative life events and states (Brakel, 2014). One important set of psychological processes are the *relativity processes*: These processes make people perceive their own state *relative* to possible other states, e.g., possible states of other people (social comparisons), possible past or future states of themselves (temporal comparisons), and states that 'might have been' (counterfactual comparisons). In these psychological relativity processes, people use mental simulation to relate themselves or their own state to better or worse alternative realities (Markman & Mcnullen, 2003), and they can renounce it or identify with it (Buunk & Ybema, 1997; Van der Zee, Buunk, Sanderma, Botke, & Van den Berg, 2000). As a result of comparing themselves, people gather information that may shed a different light on their own state or situation. We propose that in patients with chronic pain, making social comparisons, temporal comparisons and counterfactual comparisons are related to the level of acceptance of pain.

Social comparisons refer to the psychological actions of comparing the self to one or more actual or imagined other(s) (Carmona, Buunk, Peiro, Rodrigues, & Jesus Bravo, 2006). There is much empirical support for the notion that when people live in uncertainty and fear because of chronic health problems, they cope by making social comparisons (Bogart & Helgeson, 2000). This response can be conceptualized as a coping response (Tennen & Affleck, 1997). Patients may compare themselves to others who are better off (upwards comparisons) or who are worse off (downwards comparison), and in both cases they may conclude that they are different from the other (contrasting) or that they are very similar to the other (identification). Contrasting or identifying upwards and contrasting or identifying downwards will have different emotional effects that may contribute to acceptance or not. For example, *feeling similar* to another patient with pain, who is coping very well with the chronic pain, may lead to positive emotions (Taylor & Brown, 1988; Van der Zee *et al.*, 1996) and support the development of acceptance (LaChapelle, Lavoie, & Boudreau, 2008). However, *feeling different* from another patient with pain, who is coping very well with the chronic pain, may lead to negative emotions (Taylor & Brown, 1988; Van der Zee *et al.*, 1996) and inhibit the development of acceptance.

Temporal comparisons refer to comparing one's present self and situation to that of a specified past self and

situation (Peetz, Wilson, & Strahan, 2009; Suls, 1986; Suls & Mullen, 1982). A person can identify himself with how he was in the past ('I still am a strong person') but he can also feel dissimilar to it ('I am a completely different person now'). This identification with or dissociation of a former self is often cognitively manipulated to keep up or improve present self-appraisal (Wilson & Ross, 2001). In the framework of illness, making temporal comparisons can also be conceptualized as a coping response (Klauer, Ferring, & Sigrun-Heide, 1998; McFarland & Alvaro, 2000). Temporal comparisons may have affective consequences that are related to acceptance. Comparing one's present situation to the past and concluding that one is better off now may contribute to the development of acceptance. However, comparing one's present situation to the past may activate negative emotions when the conclusion is that one is worse off now, which in turn, may inhibit acceptance.

Counterfactual comparisons refer to comparing one's present situation to 'how the situation could have been'. Most people believe that those things which happen *had to* turn out in the way they happened, and this specific outcome is governed by unknown and individually unswayable forces (Burrus & Roese, 2006). But complementary and maybe also contradictorily to this belief, people also consider how actual or occurred events might have turned out in a different manner (Haynes *et al.*, 2007) or how certain occurrences could have developed differently. Thus, counterfactual reflections can help to understand vigorous life events, see the benefits of it, give meaning to it, and can even strengthen the belief in fate (Kray *et al.*, 2010) or in bad luck, and they can be conceptualized as coping responses (Roese, 1997). Counterfactual comparisons can influence evaluations as well as cognitions and mood (Sanna, Chang, & Meier, 2001). The more often patients come to conclude that their present situation 'easily could have been different', the stronger they may feel that their present situation of having chronic pain is bad luck, which may inhibit acceptance. However, the more often patients come to conclude that their present situation 'could have been worse' when things would have gone differently, the better they may feel and the more they may accept their present situation.

The Present Study

In the present cross-sectional study, acceptance of pain is conceptualized as a consequence of the above comparison processes: During a psychological process of change, comparisons shape an accepting attitude towards the pain in its broader (self) context. In this development we consider social comparisons, temporal comparisons and counterfactual comparisons as independent variables. In this study, each of these concepts will be measured by

several scales. Acceptance is assessed with three scales: two scales of the Chronic Pain Acceptance Questionnaire (CPAQ) (McCracken, Vowles, & Eccleston, 2004; Nilges, Köster, & Schmidt, 2007), the Activity Engagement (AE) and the Pain Willingness (PW) scales and one scale used in an earlier study on chronic illness, the Affective acceptance (AF) scale (Dijkstra *et al.*, 2008). The AE scale assesses to what extent patient are actively pursuing their life goals despite the pain. Thus, higher scores indicate that patients are less controlled by their pain and mean that their acceptance is higher. The PW scale assesses the need of patients to lower their pain, with a stronger need indicating a lower acceptance. The AF scale assesses the negative emotional reactions of patients towards their pain and the limitations it brings about. It is a measure of momentary experiences of emotions in reaction towards confrontation with pain. The less negative emotions experienced, the higher the acceptance.

As this is the first study to test the relationship of the three types of comparisons using different operationalization's, and acceptance, however, the analyses will be exploratory. The primary question is: 'are comparison processes related to acceptance?'

METHOD

Recruitment

The participants were recruited, first, from a doctor's practice for orthopaedics, from a practice of a general medical doctor, via a medic who was specialized in the treatment of pain and/or was specialized in analgesic therapy and via a psychotherapist. The professionals asked their adult patients to join the study, when according to their professional judgements they were considered a patient with chronic pain. These patients, living in a region in the northwest of Germany, were handed out a paper questionnaire, together with an information sheet and a return envelope. Second, patients with chronic pain all over Germany were invited through websites of chronic pain self-help groups. These patients were presented the questionnaire online. In total, approximately 190 questionnaires were distributed, 150 (79%) questionnaires were filled out.

Measurements

Every participant provided information about age, gender, educational level, and pain characteristics. Pain characteristics were measured with several questions: the question 'How bad is your pain usually?' could be scored from 'no pain' (1) to 'extreme pain' (6). The question 'How strong was your pain on average during the last week'

could be answered from 'not strong' (1) to 'very strong' (6). In the question 'How long do you have pain', the duration could be filled in months and years. In addition, participants were asked to indicate their pain location(s) with a pencil on a front and rear body diagram.

Acceptance

The first and second parts of the acceptance measurement in this study stem from the CPAQ-D (Nilges *et al.*, 2007). This is the German version of the Chronic Pain Acceptance Questionnaire, which was developed in close cooperation with the author of the English version of the Chronic pain Acceptance Questionnaire (McCracken, 1998). The original version in the English language and the version in the German language contain 20 items. The items are assigned to two sub-scales, AE and PW. The sub-scale AE refers to the continuation of daily tasks and leisure activities as usual, even if the person experiences pain. An example of a question is 'There are many activities I do when I feel pain'. The second sub-scale, PW, measures the insight that the tendency to avoid pain or wanting to control pain does often not have a positive effect, so that it would be advisable to orientate more on attainable objectives and less on impaired aspects of life. An example of a question is 'I need to concentrate on getting rid of my pain'. The PW items were inversely coded. The internal consistencies (Cronbach's alpha) of the scales were 0.91 and 0.72 for the AE and the PW scales, respectively. The higher scores on these scales mean a higher acceptance. The third part of the acceptance measurement was the AF scale. The 10 items of this scale were directly based on an 8-item acceptance scale that was tested and validated in patients with diabetes, which had good internal consistencies in two studies: 0.85 and 0.87 (Dijkstra *et al.*, 2008). The original items were adapted to be applicable to patients with pain, and two fitting new items were added. The items all refer to the impact of pain experiences on mood and emotions. Examples of items are 'When I think about my pain I feel sad' and 'When I realize my pain will not go away I feel angry'. The internal consistency of this scale in the present sample was 0.94. The AF items were inversely coded: Higher scores on this scale mean a higher acceptance.

Temporal Comparisons

Three temporal comparisons scales were composed. The first scale (TC-Frequency) assesses the frequency with which patients think of different past moments that may be relevant in their history of chronic pain. Five questions measured the frequency of thinking about pain on several past points of time. The five points in time were those times in which (a) pain was not present; (b) when pain just started to emerge; (c) how the situation was a month ago; (d) those times when things were going very bad; and (e)

times when things were going very well. For example, 'How often do you think of the time before you had chronic pain?'. The answering options were 'never' (1), 'seldom' (2), 'sometimes' (3), 'regularly' (4), 'often' (5) and 'very often' (6). A higher score means more frequent comparing with the present to the past (Cronbach's alpha of 0.87).

The second scale (TC-Evaluation) was composed of 5 items that assessed the evaluation of thinking of different moments in the past. The question asked how people feel when they think of each of the same five past points in time as in the above TC scale. For example, 'How do you feel when you think of the time before you had chronic pain?'. The questions could be answered from 'very bad' (1) to 'very good' (5). A higher score means a more positive evaluation of temporal comparisons (Cronbach's alpha 0.70).

The third scale (TC-CHange) was composed of 12 items that assessed participants' perceived changes in their situation, inspired by the measurements of Klauer *et al.* (1998). The items assessed perceptions of whether at present participants feel they are better or worse off compared with earlier past points in time on specified dimensions. The dimensions were 'feeling better or worse', 'are you more or less happy' and 'are you feeling more or less confident about yourself'. For example, 'Compared with the time before you had chronic pain, do you now feel more or less happy?', the questions could be answered from 'much worse' (1) or 'less happy' (1) to 'much better' (7) or 'more happy' (7). A higher score means a more positive perceived change in time (Cronbach's alpha 0.91).

Social Comparisons

The Identification-Contrast Scale (Van der Zee *et al.*, 2000) was applied to assess the upwards-downwards identification and contrast social comparisons made by the patients. In his original form this scale has proven to be satisfactory reliable when applied to patients with cancer (Van der Zee *et al.*, 2000; Van der Zee *et al.*, 1996). This scale was translated into the German language by the first author, covering the four original dimensions, each assessed with three items. The four dimensions are upwards identification (SC-UI), upwards contrast (SC-UC), downwards identification (SC-DI), downwards contrast (SC-DC). The format of all items is that they draw an upwards or downwards comparison that leads to negative or positive emotions. Examples of the items are 'When I think about other people who are better off than I am (upwards comparison), I feel frustrated (negative emotion caused by contrasting)'; 'When I see other people who are worse off than I am (downwards comparison), then I realize that I am not that bad off (positive emotion caused by contrasting)'; 'When I think about other people who are better off than I am (upwards comparison), I feel great (positive emotion caused by identification)' and 'When I see other people who are worse off than I am (downwards

comparison), than I feel bad (negative emotion caused by identification)'. All items could be scored on five point scales from 'does not apply at all to me' (1) to 'applies to me very strongly' (5). Higher scores on each scale mean that participants more strongly engage in the specific social comparison. The Cronbach's alphas of the four scales ranged from 0.78 to 0.92.

Counterfactual Comparisons

The counterfactual thinking scale (CT-FR) contained 12 items that assess the frequency with which participants engage in thinking about how things might have been different than they are at present. For example, "How often do you think: 'my pain could have been worse?'" or 'I would have less pain now, when I had made other decisions in the past'. The answering options were never (1), seldom (2), sometimes (3), regularly (4), often (5) and very often (6). A higher score means more frequent comparing the present to an imagined other reality (Cronbach's alpha 0.79).

Statistical Analyses

To start with, the distribution of the data from each of the three acceptance scales was checked for normality and possible extreme scores. Then, each of the three measures of acceptance was regressed on the three (sets of) comparison measures: temporal comparisons, social comparisons and counterfactual comparisons according to the following procedure. To be able to only include the necessary covariates in the regression model, first, each of the three measures of acceptance were regressed on gender, age and the three measures of pain. Variables that had no significant relation with the specific measure of acceptance were removed from the model, leaving the significant covariates. Second, the three types of comparisons were each entered separately in a regression model: temporal comparisons in model 1, social comparisons in model 2 and counterfactual comparisons in model 3. Third, all three types of comparisons were entered in one model: model 4. In all regression analyses β 's and P values of the t -tests of each entered variable were computed. In addition, for each model the unique explained variance (above that of possible covariates) was also computed in the R^2 or R^2 change.

RESULTS

Participant Characteristics

Eventually 141 participants started to fill in the questionnaire, although on different variables the number of missing cases ranged from 8 to 22. The patients suffered from general pain difficulties and reported multiple pain symptoms: 22.7% reported headaches, 21.3% pain in arms

and/or hands, 26.7 % pain in the feet, 31.3% in the legs, 38.7% pain in their knees and 56% reported back pain. Furthermore, 60.3% of the participants were women, 57% used analgesic medication on a daily basis, the mean age was 52.8 (standard deviation (SD)=13.7), the mean number of years of pain was 11.2 (SD = 10.6) and the mean pain ratings on the six-point scales were 4.06 and 4.28 regarding the usual level of pain and the average pain during the past week, respectively.

Data Check

The data from the AE acceptance scale and the AF scale were approximately normally distributed. However, the data from the PW acceptance scale indicated non-normality. This was caused by 3 participants with extreme mean scores (7 on the seven-point scale) of more than 3 SD (1.09) above the scale mean (3.43). These participants left out the analysis concerning the PW acceptance scale.

Correlations Among the Scales

Activity Engagement Acceptance had a significant correlation with AF ($r = .52$, $P < 0.001$, $n = 129$) but not with PW acceptance ($r = .15$, $P < .09$, $n = 127$). Affective acceptance had a significant correlation with PW acceptance ($r = .37$, $P < .001$, $n = 126$).

Regressing Acceptance

The results of regressing each of the measures of acceptance on the comparison processes are presented in Table 1.

Activity Engagement Acceptance

Of the tested possible covariates, only the variable pain during the last week had a significant relation with acceptance and was included in the statistical model.

Model 1 showed that all three measures of temporal comparisons had a significant relation with acceptance in the expected directions: the more often they look at the past ($\beta = -0.22$), the lower the acceptance, and the more positive the affect caused by looking at the past ($\beta = 0.24$) and the better off patients felt now compared with the past ($\beta = 0.24$), the higher they scored on acceptance. Temporal comparisons explained 22% of the variance above the covariate.

Model 2 showed that the two measures of the emotional effects of upwards social comparisons were related significantly to acceptance: the stronger the positive emotions ($\beta = 0.20$) and the weaker the negative emotions ($\beta = -0.34$), the higher they scored on acceptance. Social comparisons explained almost 20% of the variance above the covariate.

In model 3 the relation of counterfactual comparisons with acceptance approached significance ($P < 0.10$): the less they compared their situation with how it might have been ($\beta = 0.14$), the higher they scored on acceptance. It only explained 2% of the variance above the covariate.

In model 4, including all comparison scales, only the frequency of temporal comparisons ($\beta = -0.21$) and the affective consequences of temporal comparisons ($\beta = 0.18$) were still significant. The significances of the three other variables in the model 1 to 3 analyses dropped and now only approached significance ($p < .10$). The whole model 4 explained 26.6% of the variance above the covariate.

Pain Willingness Acceptance

Of the tested possible covariates, only the variable usual pain had a significant relation with acceptance and was included in the statistical model.

Model 1 showed that the lower the frequency of temporal comparisons ($\beta = -0.23$), the higher the acceptance score. Temporal comparisons added 6% explained variance above the covariate; this addition approached significance.

Model 2 showed that two of the four measures of social comparisons were related significantly to acceptance: the more negative emotions patients experience when they look upwards ($\beta = -0.27$), or downwards ($\beta = -0.22$), the lower they score on acceptance. Social comparisons explained 22.1% of the variance above the covariate.

In model 3 the relation of counterfactual comparisons with acceptance was significant: The less they compared their situation with how it might have been ($\beta = -0.39$), the higher they scored on acceptance. It explained 15% of the variance above the covariate.

In model 4, including all comparisons scales, two variables were related significantly to acceptance: the stronger the negative emotions in the case of an upwards social comparison, ($\beta = -0.32$), and the stronger they make counterfactual comparisons ($\beta = -0.24$), the lower the acceptance. The whole model 4 explained 28.7% of the variance above the covariate.

Affective Acceptance

Of the tested possible covariates, only the variables pain during the last week and usual pain had a significant relation with acceptance and were included in the statistical model.

Model 1 showed that the lower the frequency of temporal comparisons ($\beta = -0.24$), and the better off patients feel now ($\beta = 0.36$), the higher the acceptance score. Temporal comparisons explained 22.5% of the variance above the covariates.

Table 1. Predicting three measures of acceptance with temporal, social, and counterfactual comparisons

	Model 1		Model 2		Model 3		Model 4	
	β	R^2 change	β	R^2 change	β	R^2 change	β	R^2 change
Activity Engagement acceptance								
TC-FR	-0.22*	22***					-0.21*	26.6***
TC-EV	0.24**						0.18*	
TC-CH	0.21*						0.16 [†]	
SC-UI			0.20*	19.8***			0.17 [†]	
SC-UC			-0.34***				-0.19 [†]	
SC-DI			0.01				0.03	
SC-DC			0.09				0.03	
CT-FR					-0.14 [†]	0.02 [†]	0.15	
Pain Willingness acceptance								
TC-FR	-0.23*	0.06 [†]					0.06	28.7**
TC-EV	-0.04						-0.12 [†]	
TC-CH	0.01						0.02	
SC-UI			0.03	22.1***			-0.09	
SC-UC			-0.27*				-0.32*	
SC-DI			-0.22*				-0.14	
SC-DC			-0.17 [†]				-0.10	
CT-FR					-0.39**	0.15***	-0.24*	
Affective acceptance								
TC-FR	-0.24**	22.5***					-0.1	37***
TC-EV	0.10						0.02	
TC-CH	0.36***						0.28**	
SC-UI			0.17*	27.1***			0.1	
SC-UC			-0.33***				-0.32**	
SC-DI			-0.21*				-0.19*	
SC-DC			0.01				-0.01	
CT-FR					-0.28**	0.07**	0.07	

Due to missing data the number of participants in the analyses varied between 117 and 131. The R^2 change refers to the addition of explained variance beyond that related to the covariate. In predicting Activity Engagement, pain during the last week was included as covariate; in predicting Pain Willingness usual pain was included in the model; in predicting Affective acceptance, level of pain during the last week and the usual pain were included as covariates. TC-FR is the frequency of temporal comparisons; TC-EV is the evaluation of temporal comparisons; TC-CH is the perceived temporal changes; SC-UI is social comparison upwards identification; SC-UC is social comparison upwards contrasting; SC-DI is social comparison downwards identification; SC-DC is social comparison downwards contrasting; CT-FR is the frequency of counterfactual thinking.

[†] $P < 0.10$. * $P < 0.05$. ** $P < 0.001$. *** $P < 0.0001$.

Model 2 showed that three of the four measures of social comparisons were related significantly to acceptance: the more positive emotions patients experience when they look upwards ($\beta = .17$), but also the less negative emotions they experience when they look upwards ($\beta = -0.33$), and the less negative emotions they have when they look downwards ($\beta = -.21$), the higher they scored on acceptance. Social comparisons explained 27.1% of the variance above the covariates.

In model 3 the relation of counterfactual comparisons with acceptance was significant: The less they compare their situation with how it might have been ($\beta = -0.28$), the higher they scored on acceptance. It explained 7% of the variance above the covariates.

In model 4, including all comparisons scales, one type of temporal comparisons (being better off) was significantly related to acceptance: The better off they feel now ($\beta = 0.28$), the higher their acceptance score. In addition,

the two social comparison measures related to experiencing negative emotions were significantly related: the stronger the negative emotions when they make social comparisons, upwards ($\beta = -0.32$) and downwards ($\beta = -0.19$), the lower the acceptance score. The whole model 4 explained 37% of the variance above the covariates.

DISCUSSION

The aim of this study was to test whether comparison processes are related to acceptance of chronic pain. In our conceptualization, acceptance of chronic pain is considered to refer to a psychological state: a perceptual framework that gives meaning to one's situation of having chronic pain and a resulting attitude towards having pain. The psychological state of acceptance, however, can change, from perceiving one's condition as aversive, and therefore unacceptable and to be avoided, to perceiving

one's condition as aversive but acceptable and not completely controlling one's behaviour and life.

At this moment, little is known about *how* this state of acceptance can change. In this study we start to explore this question on the processes that are involved in changing acceptance of illness and we argue that these processes are not different from the processes that are involved in coping with life events in general. One set of processes known to be active in coping with life events are comparison processes (Brakel, 2014). The present study, indeed, showed that comparison processes are related to acceptance. Different comparison processes explained up to 37% of the variance in acceptance. Thus, psychological relativity processes are related to variance in acceptance, and therefore, they may be related to changes in acceptance.

One central question that arises is whether these processes are causes or effects of acceptance. The present cross-sectional data in isolation cannot answer this question. However, relativity processes have been manipulated in other studies, and they have been shown to be causes of emotions and changes in perceptions. For example, manipulations of temporal comparisons have been shown to lead to changes in self-evaluations (Zell & Alicke, 2009). Regarding social comparisons, Dijkstra *et al.* (2008) presented patients with diabetes with a positive social comparison target and showed that this led to subsequent changes in acceptance of illness. Similarly, Brakel, Dijkstra, Buunk, and Siero (2012) presented patients with cancer with social comparison targets and showed effects on quality of life. Counterfactual comparisons have been shown to influence emotional reactions (Zhang & Covey, 2013), while Kray *et al.* (2010) found that the activation of alternative realities led participants to provide more meaning to events. All in all, it is clear that relativity processes have the *potential* to cause changes in acceptance. However, it may be that acceptance leads to changes in relativity processes. For example, when patients experience less negative emotions in reaction to their pain as they become accepting of their pain, they may be less inclined to use relativity processes for coping. In reality, probably both relations are active, comparison processes as causes but also as effects of acceptance. Experimental tests will have to reveal that at least part of the relation is causal.

When we take a closer look at the relationships of comparison processes on the one hand and the three measures of acceptance, however, we observe differences. For example, the extent to which patients experienced making temporal comparisons as positive, was only related to AE, not to both other measures of acceptance. In addition, the social comparison process of downwards identification was related to PW and AF but not to AE. Thus, experiencing negative emotions when observing others who are doing worse was related

to a stronger inclination to avoid pain and to more negative affective reactions towards pain, but not to less engagement in life activities. For counterfactual comparisons the same pattern (not related to AE) was found. These results concern the three separate tests of the types of comparison processes. The test in which all comparison processes were entered also revealed differences: The frequency of temporal comparisons and the positive affect caused by making temporal comparisons had the strongest relation with AE; upwards contrasting and counterfactual comparisons had the strongest relations with PW; perceived temporal changes and upwards contrasting had the strongest relations with AF. All these differences stress the different angles on acceptance that the three scales seem to grasp.

Besides these differences, there were consistencies that may be the backbone of the relationship between comparison processes and acceptance. The frequency of making temporal comparisons was related negatively to all three measures of acceptance. This is in line with findings of Suls, Marco, and Tobin (1991), who showed that that making more past temporal comparisons was related to lower perceived health and more health concerns among elderly. In a causal interpretation, frequent thinking of the past may serve dissociating from the present state of chronic pain. The other way around, the more patients may live here and now in a mindful way, the more they may come to accept their condition (McCracken, Gauntlett-Gilbert, & Vowles, 2007). Also, all three acceptance scales were related to the extent of the negative emotions patients experience when they compare with others who are better off: The more they use the process of contrasting (the stronger they define themselves as different from those who are doing well), the less they accept their condition. There was only one measure of comparisons that was not related to all three scales: downwards contrasting; feeling better when thinking of others who are worse off.

We assessed acceptance with three questionnaires that each provided a different angle on the phenomenon of acceptance. AE refers to the degree to which one engages in life activities regardless of the pain, PW refers to the motivation to avoid the pain, while AF refers to the negative emotions one experiences in reaction to confrontations with one's pain. These affective reactions towards one's condition of chronic pain were significantly correlated to AE ($r=0.52$) and PW ($r=0.37$). These figures suggest that our measure of AF was related to the more widely used measures but did not assess the same dimension. AE and PW were not correlated significantly ($r=0.15$). This finding deviates from that of Kranz, Bollinger, and Nilges (2010), who found a significant $r=0.32$ correlation among the scales in a German sample recruited through a pain centre. Similarly, McCracken *et al.* (2004) report a significant $r=0.36$

correlation among the scales. However, all these figures can also be interpreted as showing that AE and PW are relatively independent, providing clearly different angles on acceptance. Even the highest correlation of $r=0.52$ between AF and AE implies only 25% overlap. This means that patients can score high on one scale but low on the other. Thus, patients with pain may be active despite their pain but at the same time motivated to avoid their pain and still have negative emotions towards their condition. In sum, our measures of acceptance are diverse, representing the multi-faceted nature of acceptance.

The present study had some limitation that must be acknowledged. First, we do not exactly know how representative our sample of patients was and, therefore, generalizations to the total population of patients with chronic pain should be made with care. Second, as mentioned above, the cross-sectional design makes it impossible to distinguish between causes and effects. However, we know from experimental studies that in principle, comparisons can be causes of relevant affective outcomes. Still, experimental designs in patients with pain are needed to prove that all three types of comparisons can cause changes in acceptance. A third limitation of the present study is that some measures that were used were developed for this study and have not been validated in earlier studies. For example, the temporal comparison measures (but also the counterfactual comparisons measure) were primarily based on formats and formulations derived from the literature and our own clinical experience with patients. However, the internal consistencies of the scales were good and the questions and answering categories rather straight forward, thus with at least satisfactory face validity. Fourth, because this was an exploratory study, the global question was more about testing the relationships of comparison processes with acceptance than on learning exactly about each of the three types of comparisons. For example, the scale assessing the frequency of making temporal comparisons contained items that referred to different past points in time. However, we only analyzed the overall frequency, ignoring these differences. The same is true for the other temporal comparisons scales and the counterfactual comparisons scale.

In conclusion, this exploratory study assessed eight measures of comparisons processes, and, in general, it can be concluded that they are related to acceptance in chronic pain. The next step is to focus on specific processes and test whether inducing specific processes leads to desired changes in acceptance. That is, in the end we want to be able to support the development of stronger acceptance by stimulating some types of comparisons or discourage other types of comparisons. This type of knowledge may be used to develop interventions that aim to improve acceptance of chronic pain.

REFERENCES

- Bogart, L. M., & Helgeson, V. S. (2000). Social comparisons among women with breast cancer: A longitudinal investigation. *Journal of Applied Psychology*, 30, 547–575. DOI: 10.1111/j.1559-1816.2000.tb02496.x
- Brakel, T. M. (2014). The effects of social comparison information on cancer survivors' quality of life: A field-experimental intervention approach. Dissertation, University of Groningen, Faculty of Behavioral and Social Sciences.
- Brakel, T. M., Dijkstra, A., Buunk, A. P., & Siero, F. W. (2012). Impact of social comparison on cancer survivors' quality of life: An experimental field study. *Health Psychology*, 31, 660–670. DOI: 10.1037/a0026572
- Burrus, J., & Roese, N. J. (2006). Long ago it was meant to be: The interplay between time, construal, and fate beliefs. *Personality and Social Psychology Bulletin*, 32, 1050–1058. DOI: 10.1177/0146167206288282
- Buunk, B. P., & Ybema, J. F. (1997). Social comparison and occupational stress: The identification-contrast model. In B.P. Buunk, & F.X. Gibbons (Eds.), *Health, Coping and Well-being: Perspectives from Social Comparison Theory*. Erlbaum: Hillsdale, NJ.
- Carmona, C., Buunk, A. P., Peiro, J. M., Rodrigues, I., & Jesus Bravo, M. (2006). Do social comparison and coping styles play a role in the development of burnout? Cross-sectional and longitudinal findings. *Journal of Occupational and Organizational Psychology*, 79, 85–99. DOI: 10.1348/096317905X40808
- Dijkstra, A., Buunk, A. P., Tóth, G., & Jager, N. (2008). Psychological adjustment to chronic illness: The role of prototype evaluation in acceptance of illness. *Journal of Applied Biobehavioral Research*, 12, 119–140. DOI: 10.1111/j.1751-9861.2008.00018.x
- Haynes, G. A., Sorrentino, R. M., Olson, J. M., Szeto, A. C. H., Sirkka Wirkki, J., & O'Connor, M.C. (2007). The effects of temporal framing on counterfactual thinking and self-appraisal: an individual differences perspective. *Social Cognition*, 25, 339–366. DOI: 10.1521/soco.2007.25.3.339
- Klauer, T., Ferring, D., & Sigrun-Heide, F. (1998). "Still stable after all this...?": Temporal comparison in coping with severe and chronic disease. *International Journal of Behavioral Development*, 22, 339–355. DOI:10.1080/016502598384405
- Kranz, D., Bollinger, A., & Nilges, P. (2010). Chronic pain acceptance and affective well-being: A coping perspective. *European Journal of Pain*, 14, 1021–1025. DOI: 10.1016/j.ejpain.2010.03.010
- Kray, L. J., George, L. G., Liljenquist, K. A., Galinsky, A. D., Tetlock, P. E., & Roese, N. J. (2010). From what might have been to what must have been: Counterfactual thinking creates meaning. *Journal of Personality and Social Psychology*, 98, 106–118. DOI: 10.1037/a0017905
- LaChapelle, D. L., Lavoie, S., & Boudreau, A. (2008). The meaning and process of pain acceptance. Perceptions of women living with arthritis and fibromyalgia. *Pain Research Management*, 13, 201–210.
- Lohnberg, J. A. (2007). A review of outcome studies on cognitive-behavioral therapy for reducing fear-avoidance beliefs among individuals with chronic pain. *Journal of Clinical Psychology in Medical Settings*, 14, 113–122. DOI: 10.1007/s10880-007-9062-y
- Markman, K. D., & McNullen, M. N. (2003). A reflection and evaluation model of comparative thinking. *Personality and Social Psychology Review*, 7, 244–267. DOI: 10.1207/S15327957PSPR0703_04
- McCracken, L. M. (1998). Learning to live with the pain: Acceptance of pain predicts adjustment in persons with chronic pain. *Pain*, 74, 21–27. DOI: 10.1016/S0304-3959(97)00146-2

- McCracken, L. M., Vowles, K. E., & Eccleston, C. (2004). Acceptance of chronic pain: component analysis and a revised assessment method. *Pain*, 107, 159–166. DOI: 10.1016/j.pain.2003.10.012
- McCracken, L. M. (2005). Social context and acceptance of chronic pain: The role of solicitous and punishing responses. *Pain*, 113, 155–159. DOI: 10.1016/j.pain.2004.10.004
- McCracken, L. M., Gauntlett-Gilbert, J., & Vowles, K. E. (2007). The role of mindfulness in a contextual cognitive-behavioral analysis of chronic pain-related suffering and disability. *Pain*, 131, 63–69. DOI: 10.1016/j.pain.2006.12.013
- McFarland, C., & Alvaro, C. (2000). The impact of motivation on temporal comparisons: Coping with traumatic events by perceiving personal growth. *Journal of Personality and Social Psychology*, 79, 327–343. DOI: 10.1037/0022-3514.79.3.327
- Nilges, P., Köster, B., & Schmidt, C. O. (2007). Schmerzakzeptanz - konzept und überprüfung einer deutschen fassung des Chronic Pain Acceptance Questionnaire. *Der Schmerz*, 21, 57–67. DOI: 10.1007/s00482-007-0614-8
- Peetz, J., Wilson, A. E., & Strahan, E. J. (2009). So far away: The role of subjective temporal distance to future goals in motivation and behavior. *Social Cognition* 27, 475–495. DOI: 10.1521/soco.2009.27.4.475
- Rankin, H., & Holtttum, S. E. (2003). The relationship between acceptance and cognitive representations of pain in participants of a pain management programme. *Psychology, Health and Medicine*, 8, 329–334. DOI: 10.1080/1354850031000135768
- Roose, N. J. (1997). Counterfactual thinking. *Psychological Bulletin*, 121, 133–148. DOI: 10.1037/0033-2909.121.1.133
- Sanna, L. J., Chang, E., & Meier, S. (2001). Counterfactual thinking and self-motives. *Personality and Social Psychology Bulletin*, 27, 1023–1034. DOI: 10.1177/0146167201278009
- Suls, J., Marco, C. A., & Tobin, S. (1991). The role of temporal comparison, social comparison, and direct appraisal in the elderly's self-evaluations of health. *Journal of Applied Social Psychology*, 21, 1125–1144. DOI: 10.1111/j.1559-1816.1991.tb00462.x
- Suls, J. (1986). Comparison processes in relative deprivation: A life-span analysis. In J.M. Olson, C.P. Herman, & M.P. Zanna (Eds.), *Relative deprivation and social comparison: The Ontario Symposium*, 4, (pp. 95–116). Hillsdale, NJ: Erlbaum.
- Suls, J., & Mullen, B. (1982). From the cradle to the grave: Comparison and self-evaluation across the life-span. In J. Suls (Ed.), *Psychological perspectives on the self* 1, (pp. 97–125). Hillsdale, NJ: Erlbaum.
- Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin*, 103, 193–210. DOI: 10.1037/0033-2909.103.2.193
- Tennen, H., & Affleck, G. (1997). Social comparison as a coping process: A critical review and application to chronic pain disorders. In B.P. Buunk, & F.X. Gibbons (Eds.), *Health, coping, and wellbeing: Perspectives from social comparison theory*, 263–298. Mahwah, NJ: Erlbaum.
- Van der Zee, K. I., Buunk, B., De Ruiter, J. H., Tempelaar, R., Van Sonderen, & Sanderman, R. (1996). Social comparison and the subjective well-being of cancer patients. *Basic and Applied Social Psychology*, 1, 453–458. DOI:10.1207/s15324834basp1804_6
- Van der Zee, K., Buunk, B., Sanderman, R., Botke, G., & Van den Berg, F. (2000). Social comparison and coping with cancer treatment. *Personality and Individual Differences*, 28, 17–34. DOI: 10.1016/S0191-8869(99)00045-8
- Wilson, A. E., & Ross, M. (2001). From chump to champ: People's appraisals of their earlier and current selves. *Journal of Personality and Social Psychology*, 80, 572–584. DOI: 10.1037/0022-3514.80.4.572
- Zhang, Q., & Covey, J. (2013). Past and future implications of near-misses and their emotional consequences. *Experimental Psychology*, 61, 118–126. DOI: 10.1027/1618-3169/a000231
- Zell, E., & Alicke, M. D. (2009). Self-evaluative effects of temporal and social comparison. *Journal of Experimental Social Psychology*, 45, 223–227. DOI: 10.1016/j.jesp.2008.09.007