MASTER‘S THESIS

Positive well-being of people with a chronic pain disorder

The role of psychological inflexibility and engaged living

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Samenvatting

Het doel van dit studie was om de werkmechanismen van positieve welbevinden in een doelgroep van mensen met chronische pijn te onderzoeken. Positieve welbevinden was gedefinieerd als optimaal emotioneel, psychologisch en sociaal functioneren. De relatie tussen psychologische inflexibiliteit gedefinieerd als moeite om zich veranderingen in het leven aan te passen, engageert leven gedefinieerd als leven en gedragen naar waarden en positieve welbevinden werd bekeken. De kennis over factoren die een relatie met positieve welbevinden hebben, markeert een open onderwerp in onderzoek binnen deze doelgroep. Deze mensen blijken door de pijn bepaald bedreigt in hun emotionele, psychologische en sociale domein. Het is niet duidelijk welke factoren er een bijdraag aan hebben. Een cross-sectional survey design met 238 deelnemers met chronische pijn werd gebruikt om de relatie tussen de variables te onderzoeken. De '*Psychological inflexibility in pain scale'*, de *'Engaged living scale'* en de '*Mental Health Continuum Short Form*' werden gebruikt. De resultaten laten zien dat psychologische inflexibiliteit in pijn een significante, negatieve relatie met welbevinden en engageert leven had. Positieve welbevinden en engageert leven hadden een significante, positieve relatie met elkaar. De resultaten laten zien dat psychologische inflexibiliteit en engageert leven significant positieve welbevinden voorspellen. Engageert leven was een significante, partiële mediator tussen psychologische inflexibiliteit en positieve welbevinden in mensen met chronische pijn. Dus engageert leven verklaart een deel van de predictie van psychologische inflexibiliteit op positieve welbevinden. Bij mensen met chronisch pijn zouden verdere psychologische factoren die in relatie tot psychologische inflexibiliteit, engageert leven en positieve welbevinden staan in een longitudinaal onderzoek worden geanalyseerd. Daardoor zou de kennis over positieve welbevinden bij mensen met chronisch pijn verder worden verdiept.

Abstract

The aim of this study was to investigate the relationship between psychological inflexibility, engaged living and positive well-being in a sample of people with chronic pain. Psychological inflexibility is defined as the inability to adapt to life changes. Engaged living includes a life based on values. Positive well-being is defined as feeling well and functioning effectively in personal and social domains. There is a research gap in the knowledge of factors which have a relationship with positive well-being in this special group. These people specially seem to be affected by pain in emotional, psychological and social parts of life. It is not yet clear why this is the case. A cross-sectional survey with 238 participants who suffered from chronic pain was used to investigate the relationship among the variables. The '*Psychological inflexibility in pain scale'*, the *'Engaged living scale'* and the '*Mental Health Continuum Short Form*' were utilized. The results showed that psychological inflexibility in pain had a significant, negative relationship with well-being and engaged living. However, positive well-being and engaged living had a significant, positive relationship. The results further indicated that psychological inflexibility and engaged living both significantly predicted positive well-being. Engaged living was a significant partial mediator between psychological inflexibility and positive well-being. Thus, engaged living explained a part of the prediction of psychological inflexibility on positive well-being. More psychological factors in relation to psychological inflexibility, engaged living and positive well-being in people with chronic pain should be analysed in a longitudinal study to increase the knowledge about positive well-being in chronic pain.

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Introduction

Well-being has become a popular research topic within both the academic literature and popular press (Olckers, George, & Van Zyl, in press; Van Zyl, Motschnig-Pitrik, & Stander, 2016) as it is one of the main constructs within positive psychology (Seligman & Csikszentmihalyi, 2014). Independent of the traditional definition, well-being is here defined in positive terms through an optimal functioning in emotional, psychological and social domains. Research suggests that 61% of the world's population experience lower levels of positive well-being (Hone, Jarden, Schofield & Duncan, 2014; Keyes, 2002; Seligman & Csikszentmihalyi, 2000). Having a low level of positive well-being may even be more prevalent within individuals who experience long term illness or chronic pain (Huber et al., 2011). Chronic pain here is meant as a pain which do not have an actual, physical cause and which already persists longer than 6 month (Gada, 2007). These individuals who suffer from chronic pain, have a lifelong prevalence of physical discomfort which directly affects, for example, physiological functionality and the level of positive well-being (Trompetter, Veehof, Bohlmeijer, & Schreurs, 2014).

The influence of chronic pain

People with chronic pain are less likely to act effectively or cope with daily life demands as the presence of unpleasant thoughts, emotions and physiological symptoms overpower positive experiences in life (Trompetter et al., 2014). Through this, individuals suffering from chronic pain disorders are negatively impaired in all life domains (e.g. work, leisure, relationships etc.) which severely distracts from their quality of life (Gada, 2007). As such, the experience of chronic pain acts as a 'negative lens' through which positive experiences may be interpreted, whereby individuals are not able to accurately experience or even be cognizant of aspects relating to the good life (i.e. experience psychological inflexibility and lower levels of engaged living). Further, research suggests that more than 2.2 million people in the Netherlands directly suffer from chronic pain with limited physical or psychological relief (Breivik, Collett, Ventafridda, Cohen, & Gallacher, 2006).

Beyond this there is supposed to be a much bigger number of people who indirectly suffer from chronic pain, for instance the important others of the chronic pain patients. They have to watch the harm of the sufferer and are also being affected by the inactivity of the chronic pain patient (Lambeek, Van Tulder, Swinkels, Koppes, Anema, & van Mechelen, 2011). Furthermore, pain disorder has a negative effect on society because of the non-profit work of the sufferers and the high costs for healthcare. These costs have to be sustained

through the society. The yearly costs for society due to chronic pain disorder run into billions of Euros in the Netherlands (Lambeek et al., 2011). People with chronic pain are not able to support the society in reducing these costs (Gaskin & Richard, 2012). Unfortunately, about 40% of the interviewed patients with a chronic pain disorder in Europe answered that they received no satisfying treatment to take part in life (Breivik et al., 2006).

The treatment of chronic pain

The actual treatment of the incriminating chronic pain disorder marks an enormous problem and needs more attention in public health. The treatment does not result in a reduction of symptoms. It is just consuming time, hope and energy of these patients (Gada, 2007). The endless and unsatisfactory searching has a negative effect on their quality of life (Sullivan, Thorn, Haythornthwaite, Keefe, Martin, Bradley & Lefebvre 2001). Furthermore, it is expected that more than 61% of people with a chronic pain disorder will not perceive any higher levels of positive well-being. But why is it important to think about positive well-being if the people affected by a chronic pain disorder have greater problems? The answer is given by the meaning of the word 'chronic': a chronic pain disorder is believed to have no cure, so these people have no hope of full recovery (Gaskin & Richard, 2012). The actual focus in treatment on trying to heal the pain symptoms is misleading and needs to be changed. What is possible instead? It is more successful to strengthen the fighter, save their energy and increase quality of life. But how could this work? The answer is given by Keyes (2007) with the *two continua model* for positive well-being.

The *two continua model* underlines that the people affected by a chronic pain disorder could focus on increasing their quality of life through establishing positive well-being instead of emphasizing the chronic pain symptoms (Keyes, 2007). Psychological inflexibility and engaged living could be key factors in relation to positive well-being. This needs special attention for two reasons. One reason is the influences of pain on psychological inflexibility and engaged living. Another reason is the expectation that lesser people with a chronic pain disorder perceive higher levels of positive well-being. Thus, the relationship between psychological inflexibility, engaged living and positive well-being in people with a chronic pain disorder needs to be investigated. These factors are capable to understand positive well-being as a possible new focus in treatment of chronic pain. In the following section psychological inflexibility, chronic pain disorders, engaged living and positive well-being as well as the associative relationships will be examined.

Literature Review

Psychological inflexibility in pain

Pain is a functional state of the body to warn and protect the organism (Gada, 2007). Pain starts with the physiological activation of the body, followed by the pain perception which includes the outcome of neuropsychological activities and conscious awareness (Loeser, 1982). The pain perception triggers the emotional reaction related to the perceived pain which guides the pain behaviour (Vlaeyen & Linton, 2000). If humans get hurt the damage usually heals after some time (Jacobsen & Mariano, 2001). If the damage heals but the perception of pain stays through the mechanisms of classical and operant conditioning the pain will be chronic (Verhaak, Kerssens, Dekker, Sorbi, & Bensing, 1998). The definition of chronic pain includes several criteria: Firstly, chronic pain is defined as pain which is perceived longer than six months. Secondly, chronic pain has usually no actual or changeable physiological cause. So the pain is not functional anymore (Gada, 2007), yet individuals actively avoid the negative symptomology associated with the disorder which results in a hindrance of activity which makes them inflexible (Hayes, Luoma, Bond, Masuda, & Lillis, 2006).

Psychological inflexibility in pain refers to the inability to act effectively in normal life domains in the presence of negative thoughts, emotions and/or physiological symptoms (Hayes et al., 2006). According to Hayes et al. (2006) psychological inflexibility in pain is comprised out of a dynamic interaction between two components: (a) avoidance of pain (i.e Avoidance) and (b) fusion with pain thoughts (i.e. Fusion). From this perspective, avoidance refers to a tendency to not accept the experience of harm or unwanted emotions. The avoidance leads in the short term to symptom relief but also to long term symptom deterioration (Wicksell, Lekander, Sorjonen, & Olsson, 2010). The avoidance emerges from a cognitive fusion which is defined as fusion of thoughts about an event with the real event. ‘Fusion with pain thoughts’ is defined as a link between the perception of pain with thoughts about pain. So that the thoughts are able to activate the perception of pain. Thoughts become facts (Hayes et al., 2006). The thoughts about pain become more and more present. This increases the perception of pain (Wicksell et al., 2010) especially, in people with chronic pain (Vlaeyen & Linton, 2000).

People with a chronic pain disorder often want to control the pain through an endless search for a cure, numerous doctor visits or the avoidance of daily activities to slacken off (Crombez, Eccleston, Van Damme, Vlaeyen, & Karoly, 2012). Through the avoidance of daily activities for example visiting friends, shopping, going outside or even leaving the bed.

People with chronic pain are sliding into a negative downwards spiral. The loss of important life domains supports the focus on pain which increases the perception and the influence of pain. The people concerned of a chronic pain disorder are getting more and more inflexible in their life structure which increases the focus on pain and thus the inflexibility as long term consequence (Vlaeyen & Linton, 2000). The inflexibility in pain is functional for a short term in order to manage and reduce the pain. Simultaneously, the inflexibility in pain is dysfunctional for a long term because of the negative influence on relationships, activity and work etc. (Linton, 2005). Being flexible in experiencing all kinds of feelings especially pain will enable a person to reflect and focus on values and committed actions (Trompetter, Ten Klooster, Schreurs, Fledderus, Westerhof, & Bohlmeijer, 2013). An engaged style of living could be a second important factor in the understanding of chronic pain.

Engaged living

The definition of engaged living is based on acceptance and commitment therapy (ACT) which focuses on acceptance of unwanted emotions and thoughts to make them manageable (Trompetter et al., 2014). ACT describes three response styles: An open, a centered and an engaged style of living (Hayes, Strosahl, & Wilson, 2011). The engaged style of living includes two processes. Firstly, 'Values' which includes knowing one's own values and living upon these values. Secondly, 'Committed action' which describes the translation of values in behaviour. Living in line with the values also during daily behaviour results in a feeling of life fulfillment (Trompetter et al., 2014). Values are intrinsically motivated, individually and freely chosen qualities of life (Hayes et al., 2011). Values produce the motivation to make choices and to account for behaviour. It describes what is important in life. Engaged living is an on-going process of a value orientated style of living directed to a feeling of life fulfillment and satisfaction (Hayes et al., 2011). Special life circumstances negatively influence the possibility to follow an engaged style of living (Wilson, Sandoz, Kitchens, & Roberts, 2010). The occurrence of an engaged style of living in chronic pain will be discussed in the following.

Engaged living seems to be a desirable way of living (Roberts & Robins, 2000) which seems far away from people who suffer from a chronic pain disorder (Vlaeyen & Linton, 2000). According to McCracken and Vowles (2007) the life of people with chronic pain often is not motivated by values and life goals but motivated by the trial to reduce the pain. The influences of pain control their daily life and their future, independent of individual values. Over time chronic pain sufferers are not able to reach their life goals (McCracken & Vowles,

2007). People with chronic pain reduce their favourable activities, contacts and productivity which negatively affect satisfaction with life (Gada, 2007). They become passive and dependent of the pain in their life structure (Breivik et al., 2006). As such, they actively disengage with life (Hayes et al., 2011) which reduces experiences of positive well-being and increase the manifestation of depression or anxiety (Vlaeyen & Linton, 2000). According to the *two continua model* of positive well-being this distance to an engaged style of living is not necessary. Aiding individuals with chronic pain to actively engage in life could lead to greater levels of positive well-being which marks a desirable life goal (Deci & Ryan, 2008).

Positive well-being

Traditionally mental health was defined through the absence of psychopathology (Westerhof & Keyes, 2010). Individuals who were free from general psychopathology and who were able to function 'normally' were seen as being psychologically well (Seligman & Csikszentmihalyi, 2014). However, this assumption has been changed in recent years (Van Zyl et al., 2016). According to Seligman and Csikszentmihalyi (2014) well-being cannot be defined by the mere absence of psychopathology, but should rather be seen as living in an optimal range of human functioning where individuals are not only actualizing their potential, but are living in accordance with their own unique difficulties. Keyes (2002) aptly labeled this as well-being. It is related to various positive individual, organizational and societal outcomes. According to Keyes (2002) and Van Zyl et al. (2016) positive well-being is the result of feeling good (emotional well-being), functioning well (psychological well-being) and fitting in (social well-being). From this perspective, positive well-being is comprised out of three dimensions.

The first dimension is emotional well-being which adheres to a hedonistic view of happiness (Lamers, Westerhof, Bohlmeijer, ten Klooster, & Keyes, 2011). From this perspective emotional well-being implies the pursuit of positive feelings and the avoidance of negative feelings such as pain (Deci & Ryan, 2008). Emotional well-being means satisfaction with life and the appearance of positive feelings like happiness and interest in life. The second dimension is psychological well-being which implies personal, psychological functioning in life. It includes aspects like self-acceptance, personal growth, purpose in life, environmental mastery, positive relationships and autonomy. The third dimension is social well-being which is defined as positive functioning in social life. It incorporates aspects like social integration, social acceptation, social actualization, social coherence and social contribution (Keyes, 1998). Psychological and social well-being adhere to the eudemonic view of happiness

(Lamers et al., 2011) which implies optimal functioning, personal growth and the ambition to find happiness in life (Deci & Ryan, 2008). Scoring high on each three of these components results in an optimal level of well-being which is also referred to as called "Flourishing" (Keyes, 2002). According to Schotanus-Dijkstra et al. (2014) 37% of a normal population, Dutch sample experience higher levels of positive well-being. However, some cohorts of individuals may have a greater possibility to perceive higher or lower levels of positive well-being than others (Kessler, Mickelson, Walters, Zhao, & Hamilton, 2005). Especially, people who suffer from chronic pain might have lower levels of positive well-being (Keyes, 2005). The exact percentage of how many people with chronic pain flourish is not clear until now (Hone et al., 2014).

Research suggests that people with chronic pain experience significantly lower levels of positive well-being than the general population (Trompetter et al., 2013). Individuals experiencing continuous pain for longer than a month report higher levels of emotional distress (i.e. lower levels of emotional well-being), lower levels of psychological well-being and higher levels of social disengagement (i.e. lower levels of social well-being) (Gureje, Von Korff, Simon, & Gater, 1998; Trompetter et al., 2014). So the first dimension of the *two continua model* implies low well-being. At the same time the second dimension shows high symptom perception. According to the *two continua model* the quality of life of people with chronic pain is negatively affected by both dimensions. Patients with a chronic disorder seldom have a chance to recover through medical treatment (Gaskin & Richard, 2012). Therefore, it is difficult to improve the second dimension. Consequently, these patients need to find another means to alleviate pain or enhance the quality of their life. The increase of positive well-being could be an alternative. For this, positive well-being in people with chronic pain has to be studied more thoroughly in order to understand the working mechanism and the construct of positive well-being in people with chronic pain. Especially, it is necessary to analyse, which factors have a strong relationship to positive well-being and in which combination.

The relationship between psychological inflexibility in pain, engaged living and positive well-being

Psychological inflexibility in pain and engaged living should be viewed more intensively concerning their relationship to positive well-being. There are two reasons. These factors have a great influence on the perception of the pain on the one hand and the behaviour of people with chronic pain on the other hand. Psychological inflexibility in pain makes these people

stay away from positive activities and an optimal psychological and social functioning (Hayes et al., 2006). The pain reinforces avoidance which disables the sufferers to live upon values and to have a satisfactory life. A feeling of life fulfillment will be reduced (Trompetter et al., 2014). Psychological inflexibility strongly reduces the possibility to live an engaged life for people with a chronic pain disorder (Viane et al., 2003). People with an engaged style of living are more hopeful, grateful, prosocial and happier. They reported more self-esteem, satisfaction in life and lesser depression (Froh, Kashdan, Yurkewicz, Fan, Allen & Glowacki, 2010). Therefore, these people are experiencing higher levels of positive mental health. This is just the opposite of what people with a chronic pain disorder perceive (McCracken & Vowles, 2007; Breivik et al., 2006). An active participation in valued activities and the satisfaction with a meaningful life have an influence on the domains of positive well-being (Deci & Ryan, 2008).

In summary the majority of people with a chronic pain disorder is psychologically inflexible and has no engaged style of living. Although the importance of these constructs are highlighted within the literature, it is not yet clear how the relationship between such will manifest in the special sample of chronic pain patients. Therefore, the purpose of this paper is to investigate the relationship between psychological inflexibility, engaged living and positive well-being within a sample of chronic pain patients.

Specifically, the following research questions address the purpose of the paper:

(a) What is the relationship between psychological inflexibility in pain, engaged living and positive well-being within a sample of chronic pain patients?
(b) Do psychological inflexibility and engaged living predict positive well-being?
(c) Does engaged living mediate the relationship between psychological inflexibility and positive well-being?

Based on the research questions, the following study hypotheses are formulated:

H_{a1}: Psychological inflexibility in pain correlates negatively with positive well-being

H_{a2}: Psychological inflexibility in pain correlates negatively with engaged living

H_{a3}: Engaged living correlates positively with positive well-being

H_{b1}: Psychological inflexibility in pain and engaged living predicts positive well-being

H_{c1}: Engaged living indirectly affects the relationship between psychological inflexibility and positive well-being.

Method

Design

An exploratory cross-sectional survey-based research design was employed to investigate the relationship between the variables. The dependent variable was 'Positive well-being' and the independent variables were 'Psychological inflexibility in pain' and 'Engaged living'.

Participants

Baseline data of participants were recruited in February and March 2012 by Trompetter et. al (2014). This data was used for this research. The baseline data consisted of a convenience sample of 238 individuals who were suffering from chronic pain in the Twente Region in the Netherlands. Participants were assembled through online patients' platforms and advertisements in Dutch newspapers. All people who perceive pain could react on the advertisements. The following inclusion criteria for this study were applied: age older than seventeen and having longer than six months on a daily basis pain. Thirty-one participants were excluded from the study because they scored above twenty-four on the depressive scale on the *Hospital Anxiety Depression Scale* (15 participants), they did not complete the baseline questionnaire (6 participants), the participants already followed other cognitive behaviour therapy (3 participants), the pain complained shorter than six month (2 participants), the pain complained shorter than four days a week (2 participants), they had reading problems (2 participants), they had no internet access (1 participant) or did not have enough time to follow the study (1 participant).The total amount of studied participants were 238 adults, predominate Dutch people with chronic pain. The mean age was 55 years. An overview of the most important distributions of the participants is shown in Table 1.

Table 1. *Overview of participants (N = 238): Demographics and general information*

Variable	**Subcategory**	**N**	**Percentage (%)**
Gender	Male	57	24
	Female	181	76
Educational level	Low	48	20
	Middle	163	69
	High	27	11
Work status	Fulltime	95	40
	Other	143	60
Life situation	With partner	183	76
	Alone	49	21
	Other	6	3
Diagnose CPD	Yes	197	83
	No	41	17
Pharmaceutical usage	Yes	168	71
	No	70	29

Notes. N, Amount; *CPD*, Chronic Pain Disorder.

The majority of the sample was female (76%), moderately educated (69%), worked other than fulltime (60%), lived with a partner (76%), had a diagnosis of chronic pain (83%) and used pharmaceutics (71%).

Procedure

After starting the advertisements in February and March 2012 the interested participants gave their personal information on the research website to join the study by Trompetter and her team (2014). After that the participant received an information letter with an informed consent form and a short explanation of that study. The interested participants filled in some online questionnaires and gave their demographical information on the research website to screen their baseline status. Then thirty-one participants were excluded through the exclusion criteria described above. After that the participants were randomized over three conditions, but this is irrelevant for the current study wherein only the baseline questionnaire is used. After 3 month and after 6 month the questionnaires were measured again. Just the data of the baseline measurement by Trompetter and her team (2014) were used for this study. The baseline data were further analysed.

Measurement

The following instruments were used to gather data for this study:

A *demographical questionnaire* was used to obtain information about participants' age, gender, educational level, life situation, work status like fulltime or part time.

Psychological inflexibility in pain was measured with the Psychological Inflexibility in Pain Scale (PIPS). It is a self-report questionnaire which measures psychological inflexibility with 12 items (Wicksell et al., 2010). Every item has to be rated on a 7-point Likert-scale from 1 (never true) to 7 (always true). PIPS includes two subscales. The first subscale is 'Avoidance' measured by 8 items for example '*I don't do things that are important to me to avoid feeling my pain*' and the second subscale is 'Cognitive fusion' with 4 items for example '*I would do almost anything to get rid of my pain*'. The total sum score and the subscores are used for this study. The total sum score range from 12 to 84. Higher scores mean a higher psychological inflexibility. PIPS has a concurrent validity and a good reliability of 0.86 for the total score (Wicksell, Renöfält, Olsson, & Melin, 2006).

Engaged living was measured with the Engaged Living Scale (ELS). This scale measures engaged living in two subscales and 16 items (Trompetter et al., 2013). Every item can be ranked on a 5-point Likert-scale from 1 (never true) to 5 (always true). The first subscale is 'Valued living' with 10 items and it is defined as knowing values and living upon these values. An example question is: *"I know what to do with my life"*. The second subscale is 'Life fulfillment' with 6 items and it is defined as sense of fulfillment through a valued oriented behaviour based on committed actions. An example question is: *"I live like I always wanted to live".* The total sum score of the 16 items is used for this study which ranged from 16 to 80. Higher scores mean higher forms of engaged living. The engaged living scale shows an excellent reliability with an Alpha of 0.9 for the total score (Trompetter et al., 2013).

Positive well-being was measured with the Mental Health Continuum Short Form (MHC-SF; Keyes, 2002). It is a self-report questionnaire which measures positive mental health via 3 sub-scales (emotional, psychological and social well-being) and 14 items. Emotional well-being includes 3 items for example: "*In the last month how often did you had the feeling of being unhappy*?", psychological well-being includes 6 items for example "*In the last month how often did you had the feeling that your life had no direction of sense?*" and social well-being includes 5 items for example "*In the last month how often did you had the feeling that you understood how society works?*". Every question can be rated on a 6-point-

Likert scale from 1 (*Never*) to 6 (*Every day*). Higher scores mean a higher presence of positive well-being. The final score is a total sum score and lies between 14 and 84. The mean norm score for the normal population is 2.98 (*SD* = 0.89) for a scale ranged from 0 to 5. MHC-SF is a well reliable and valid questionnaire for the Dutch population. The test-retest reliability for the total score is 0.65 (Lamers et al., 2011).

Data-analysis

The data were analysed with the statistic program *SPSS* 21 (IBM SPSS Statistics). First the sum scores for every questionnaire were estimated and new variables were created. After that the reliability score for every questionnaire was identified by using Cronbach's Alpha. An alpha greater than .70 was good reliable (Bruin, 2006). Then scatterplots, histograms, Kurtosis and Skewness analyses were used to check if the data were distributed monotone, linear and normal to decide which correlational analyses should be chosen. If the data were distributed in a normal, monotone and linear way a *Pearsons Correlation* had to be chosen. If the data were distributed different a *Spearman Correlation* had to be chosen. The data were distributed normal, monotone and linear. Afterwards Pearsons Correlation of the total score of 'Psychological inflexibility in pain', the total scores of 'Engaged living' and the total score of 'Positive well-being' were computed. A score equal 1 means a perfect correlation, a score between 0.7 and 0.99 means a very strong correlation, a score between 0.5 and 0.69 means a strong correlation, a score between 0.3 and 0.49 means a moderate correlation (Cohen, Cohen, West & Aiken, 2013). The correlation was set significant on a $p < .05$ level. After that the amount of people who flourished were analysed to get an overview. The people who perceive a high well-being (flourish) had at least a high score of 'every day' (6) or 'almost every day' (5) in at least 1 of 3 of the emotional well-being items and at least 6 scores of 'every day' (6) or 'almost every day' (5) in the 11 items of the psychological and social well-being items (Keyes, 2002). The participants with lower scores were count as 'not flourishing'.

If the data showed a significant correlation a multiple regression analysis in two steps were done. A signification level of $p < .05$ was used for the analysis. Significant correlations were examined. First, a regression analysis between positive well-being and psychological inflexibility in pain was done. Second, a multiple regression analysis of positive well-being, psychological inflexibility in pain and engaged living was done. To determine the relevance of the regression score an effect size (f^2) was estimated. A score between .02 to .14 meant a small effect. A score between .15 and .34 meant a moderate effect. A score from .35 and larger meant a strong effect (Cohen, 1992).

After that a mediation analysis with Hayes and Preacher's (2014) *SPSS PROCESS macro* was done to check if engaged living indirectly affected the relationship between psychological inflexibility in pain and positive well-being. To determine a mediation the direct-, the indirect- and the total effect had to be examined. The direct effect (path c') determined the effect of the independent variable (psychological inflexibility) on the outcome variable (positive well-being) independent of the mediator (engaged living). The indirect effect (path c) included the product of 'Path a' with 'Path b' independent of the direct effect. The effect of the independent variable (psychological inflexibility) on the mediator (engaged living) described 'Path a'. The effect of the mediator (engaged living) on the outcome variable (positive well-being) described 'Path b'. The total effect (path C) described the effect of the whole relationship and included the direct and the indirect effect. If all effects were significant a mediation was possible. The indirect effect was significant if the range of the indirect score gained of the bootstrapping with a 95% confidence interval did not go through zero. The analyses were based on 5000 bootstrapped samples. All effects were significant. Furthermore, a *Sobel-Z-test* was done to underline a possible mediation effect.

Results

Descriptive statistics

An overview of the descriptive statistics and the correlations is presented in Table 2.

Table 2. *Descriptive statistics and correlations.*

No	Factor	M	SD	Skewness	Kurtosis	α	1	2	3
1	Psychol. Inflexibility	4.57	.96	.13	-.53	.87	-	-	-
2	Engaged living	3.16	.62	.37	-.10	.91	-.34^{+*}	-	-
3	Positive well-being	3.71	.87	-.18	-.11	.89	-.32^{+*}	.57^{++*}	-

Notes. M, mean score; *SD*, standard deviation; *Skewness*, Skewness score; *Kurtosis*, Kurtosis score; *α*, Cronbach's Alpha; $^{*}p < .05$, statistically significant; $^{+}r > 0.30$, practically significant (medium effect); $^{++}r > 0.50$, practically significant (large effect).

All scales were normally distributed and had a good reliability (see Table 2). *Pearson's Correlations* were used. Psychological Inflexibility in Pain correlated significantly, moderately and negatively with positive well-being ($r = -.32$, $p < .05$). The first hypothesis of the first research question: 'Psychological inflexibility in pain correlates negatively with positive well-being' is accepted. Psychological Inflexibility in Pain correlated significantly, moderately and negatively with Engaged Living ($r = -.34$, $p < .05$). The second hypothesis of the first research question: 'Psychological inflexibility in pain correlates negatively with engaged living' is accepted. The negative correlation implies that if the level of one factor decreases, the level of the other factor oppositely increases. Engaged Living showed a significant, strong and positive correlation with positive well-being ($r = .57$, $p < .05$). The third hypothesis of the first research question: 'Engaged living correlates positively with positive well-being' is accepted. The positive correlation means that if the level of one factor increases, the level of the other factor increases as well.

Next to the description of the scales the amount of people who flourished were examined. This sample included 193 (81%) people who not flourished and 45 (19%) people who flourished well.

Regression analysis

An overview of the multiple regression analysis with positive well-being as dependent variable and psychological inflexibility and engaged living as independent variables is shown in Table 3.

Table 3. *Overview multiple regression analyses with positive well-being as dependent variable.*

Model		**Unstandardized Coefficients**		**Standard coefficient**	***t***	**p**	***F***	***R***	R^2	ΔR^2	f^2
		B	*SE*	BETA							
1	(Constant)	70.33	3.67		19.16	.00	26.29	.32	.10	.09	.33
	Psychological inflexibility	-.34	.07	-.32	-5.13	.00					
2	(Constant)	27.17	5.58		4.87	.00	61.69	.59	.34	.33	.72
	Psychological inflexibility	-.15	.06	-.14	-2.48	.01					
	Engaged living	.65	.07	.53	9.35	.00					

Note. B, regression coefficient*; F*, test score; *p*, Signification level p < .05*;* R^2, R square; ΔR^2, adjusted R square; f^2, effect size.

The first model was significant ($F_{(1, 236)} = 26.29$, $p < .05$; $R^2 = .10$) and showed the total effect. An effect size of $f^2 = .33$ determines a moderate effect. This result indicated that the level of psychological inflexibility in pain predicted 10 % of the level of positive well-being in this sample while not controlling for other variables. The second model was significant ($F_{(2, 236)} = 61.69$, $p < .05$; $R^2 = .34$). An effect size of $f^2 = .72$ determines a strong effect. The multiple regression coefficients of the psychological inflexibility in pain independent of engaged living ($t = -2.48$, $p < .01$) and of the engaged living score independent of psychological inflexibility ($t = 9.35$, $p < .05$) were significant. The first hypothesis of the second research question: 'Psychological inflexibility in pain and engaged living predicts positive well-being' is accepted. This indicated if psychological inflexibility increases positive well-being decreases. If engaged living increases positive well-being increases as well. Furthermore, the results of the second model indicated the possibility to predict 34% of the level of positive well-being through the level of psychological inflexibility and the level of engaged living controlling for each other.

Mediation analysis

The results of the mediation analysis is shown in Figure 1. All effects are significant. The further results of the mediation analysis showed that Psychological inflexibility in pain negatively predicts engaged living (b = -0.29, t (236) = -5.52, p < .05) in a significant model ($F_{(2, 235)}$ = 30.51, p < .05; R^2 = .11) with a strong effect size (f^2 = .35). The *Sobel-Z-test* significantly showed a stronger indirect effect than a direct effect between psychological inflexibility and positive well-being (Z = -4.74, p < .05). A significant direct effect next to a significant indirect effect indicated that engaged living partially mediated the effect between psychological inflexibility in pain and positive well-being. The first hypothesis of the third research question: 'Engaged living indirectly affects the relationship between psychological inflexibility and positive well-being.' is accepted.

An overview of the mediator analysis is viewable in Figure 1.

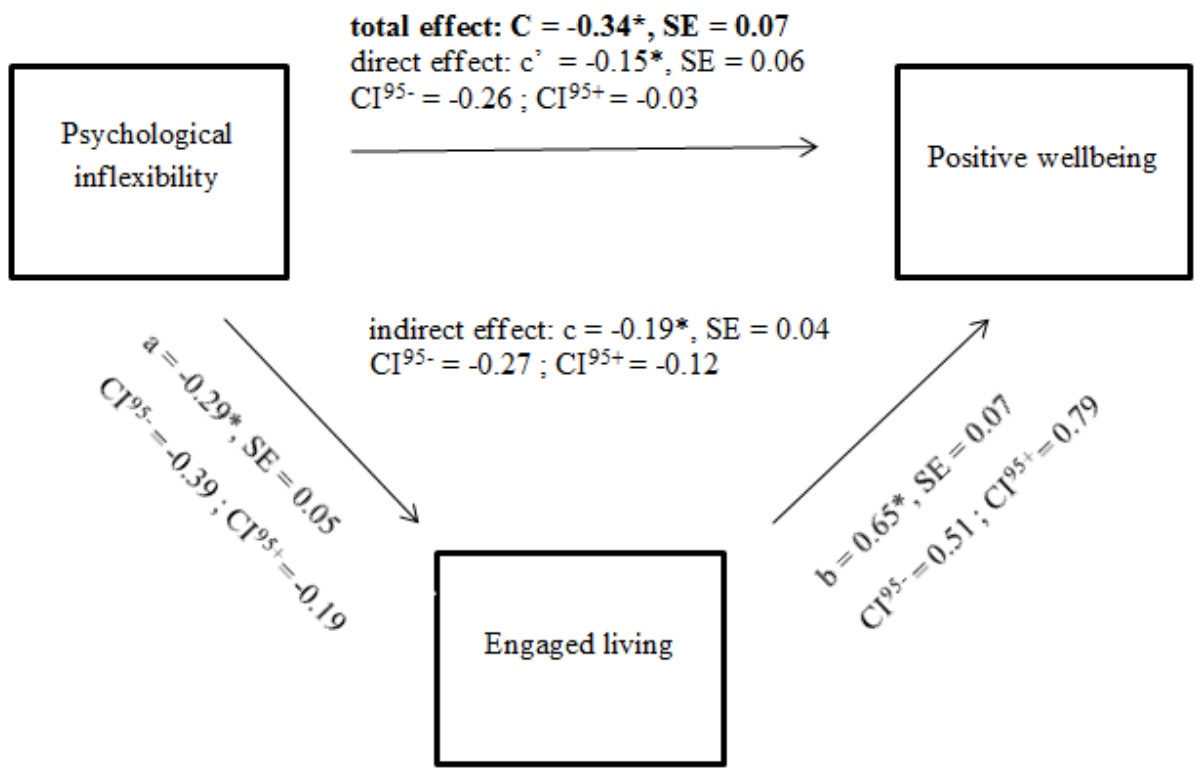

Figure 1. *Mediation analysis.*

Discussion

The aim of the study was to determine the relationship between psychological inflexibility, engaged living and positive well-being within a sample of people with chronic pain. Further, the aim was to determine whether engaged living indirectly affects the relationship between psychological inflexibility and positive well-being within the sample. All questionnaires were reliable and the analyses had a moderate to strong effect size. The results demonstrated that psychological inflexibility has a moderate, negative relationship to engaged living and positive well-being. Engaged living has a strong, positive relationship to positive well-being. Similarly, both psychological inflexibility and engaged living were significant predictors of positive well-being within this sample. Finally, it was found that engaged living does mediate the relationship between psychological inflexibility and positive well-being

The relationship between psychological inflexibility, engaged living and positive well-being

According to this study the concepts of psychological inflexibility in pain, engaged living and positive well-being are strongly related to each other in this sample of people with chronic pain. The relationships does not mean causality. The results imply if one factor changes the other factors change as well. These results are in line with recent literature. Psychological inflexible (Breivik et al., 2006), an engaged style of living (Trompetter et al., 2013) and positive well-being (Hone et al., 2014) theoretically seem to be affected in people with chronic pain. These factors seem to stand in relation to each other because they have an influence on behaviour, thoughts and feelings which are basically strong related to each other (Trompetter et al., 2014; Korrelboom & Ten Broeke, 2014). This present study showed these factors do practically have a relationship to each other in this sample of people with chronic pain. This result can be used as a hint for further analyses.

Psychological inflexibility and engaged living as predictors of positive well-being

The regression analysis indicated the exact relationship of the factors to each other. The first model indicated that the level of positive well-being is predictable by the level of psychological inflexibility in pain while not checking for possible confounding variables which could explain these prediction. *Model 1* did not make clear if there exist a direct or an indirect prediction of psychological inflexibility on positive well-being. It just made clear there is any prediction. *Model 2* indicated two factors (psychological inflexibility and engaged living) and their prediction of positive well-being independent of each other. The results indicated that engaged living also predicted positive well-being in people with chronic pain.

According to the results the strengths of relationship between psychological inflexibility in pain and positive well-being decreases while introducing engaged living. That indicated that engaged living influenced a part of the prediction of psychological inflexibility on positive well-being. The results are in line with the recent literature. Both predictions were underlined in literature: Bonanno, Papa, Lalande, Westphal and Coifman, (2004) described that psychological inflexibility reduces participation in positive activities and an optimal psychological and social functioning. Furthermore, it was expected that an engaged style of living promotes higher levels of hopefulness, gratefulness and happiness in adolescents (Froh et al., 2010) and thus positive well-being like it was shown in this sample. Ryff. (2014) point in a literature review the positive prediction of valued living on well-being which further backed up the results of this study. Moreover, the results are in line with the definition of positive well-being as a multifactorial construct (Seligman & Csikszentmihalyi, 2014), as the review of two factors (34%) explained more of the construct than just one factor (10%).

Engaged living as mediator between psychological inflexibility and positive well-being

The mediation analysis claimed that engaged living did not just influence but significantly explained a part of the relationship between psychological inflexibility and positive well-being as a mediator. There was strong evidence for the mediation. The significant, direct effect controlled for engaged living next to the significant, indirect effect determined the partial mediation. That meant that engaged living explained a part of the prediction of psychological inflexibility on positive well-being and not explained the whole prediction. This partial mediation underlined that engaged living was not the only factor which explained the prediction of psychological inflexibility on positive well-being. These results are in line with the literature. The literature review of Kashdan and Rottenberg (2010) focus on the role of inflexibility in mental health and theoretically described the direct effect of psychological inflexibility on well-being and a lot more factors. This review underlines that inflexibility affected feelings and personal- and social functioning. Additionally, Kashdan and Rottenberg (2010) theoretically describe the indirect relationship between psychological inflexibility and positive well-being: Psychological inflexibility negatively affected a valued oriented living which positively affected the level of feeling good and functionally well. The clear support of literature on both, the direct and the indirect relationship between psychological inflexibility and positive well-being strongly underlines the result of this study: the occurrence of a partial mediation. Engaged living as a mediator between psychological inflexibility and positive well-being in a sample of people with chronic pain marks a new awareness in the understanding of well-being in people with chronic pain.

Limitations & recommendations

This new awareness has to be evaluated with caution because of the different limitations of this study. First, the participants were recruited via advertisements and the study included several measurement points which involved an amount of investment. Thus, the data show a clustering of high motivated people with chronic pain. It is not clear if the data mirror the general chronic pain population. Second, the questionnaires were not validated for online usage. The classical bias through online usage are countable. It is possible that the participants did not understand the instructions, did not work concentrated or did not fill in the questionnaires seriously (Gemert-Pijnen, Peters, & Ossebaard, 2013). Third, a cross-sectional design was used for this study, that is why no causal relationship could be detected. A view on the longitudinal data could enable a deeper insight. In spite of the limitations this study had strengths as well which makes it trustworthy. All questionnaires showed a good reliability. The effect sizes of the analyses range between moderate to strong which strengthen the explanatory power of the results. Furthermore, this study focuses on mechanism of positive well-being in the special group of people with chronic pain which starts to fill an important research gap. This research underlines because of the *two continua model* and the unsatisfying, actual treatment of chronic pain the importance of further research about positive well-being in this population.

This study explained 34% of the variance of the construct positive well-being which leaves 66% of the variance of the construct unexplained. That is why further research should analyse more psychological factors in relation to psychological inflexibility in pain, engaged living and positive well-being within people with chronic pain. Furthermore, a longitudinal design should be used to be able to study causality. Kashdan and Rottenberg (2010) describe a great influence of inflexibility on factors related to daily life functioning. Factors like mindfulness (Christie, Atkins, & Donald, 2017), acceptance of pain or pain catastrophizing (Sturgeon & Zautra, 2013) are expected to have an influence on the perception of pain and on positive well-being. These factors could possibly explain a further part of this 66%. The relationship between psychological inflexibility and engaged living to positive well-being in combination with these factors could increase the knowledge about positive well-being in the sample of people with chronic pain. The ordinary goal of the collection of knowledge has to be the creation of an intervention to increase positive well-being and to change the life situation for people who strongly suffer from chronic pain.

Conclusion

To conclude, this study detected engaged living as a partial mediator between psychological inflexibility in pain and positive well-being. The results have a great relevance because it underlines the importance of increasing the attention on the harm of people with chronic pain and detects a part of the working mechanism of positive well-being in a special population. Further research is necessary to broaden the knowledge about the whole mechanism of positive well-being. This study marks a first step of many more necessary steps to finally improve quality of life for people with chronic pain through the mechanism of positive well-being.

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