

Validation: A New Way to Help Friends Better Deal with Pain?

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Abstract

Pain validation is one method that has been studied as a way in which one can interact with a friend or family member in pain. Past studies focusing on pain validation have yielded contrasting results on its influence on affect and pain behaviors. In this study, 94 undergraduate students at Duke University completed an online questionnaire survey to assess how pain validation is related to positive affect, negative affect, pain intensity, and pain disability. It was hypothesized that an undergraduate's pain intensity and pain disability would be minimized if a close friend validated his pain. Further, it was predicted that perceived pain validation would be positively correlated with positive affect and negatively correlated with negative affect. This study had no significant results for correlations between perceived pain validation and positive affect, perceived pain validation and negative affect, perceived pain validation and pain intensity, and perceived pain validation and pain disability.

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Have you ever had a friend in pain and didn't know how to interact with him or her? How we respond to people's pain-related thoughts and feelings may affect how they experience pain. One way in which we can respond to pain-related thoughts and feelings is through validation, a process in which listeners communicate to others that their thoughts and feelings are understandable and legitimate (Linehan, 1997). The purpose of this study is to investigate perceived pain validation and its influence on affect and pain-related outcomes in undergraduate students.

Pain is a subjective experience, which means that others may have an impact on how one experiences pain (Hadjistavropoulos et al., 2011). Pain communication is an important component in any dyadic relationship consisting of one person experiencing pain, yet there is currently no one best method that has been implemented for interacting with someone who is in pain. Of the various approaches to interact with someone experiencing pain, validation is one that has been recently explored. Another important component of validation is perceived partner responsiveness, which is the way in which a person perceives the validation they are receiving. How a person perceives validation may be more important than the actual act of validation (Laurenceau, Barrett, & Pietromonaco, 1998).

One way to assess how levels of validation can affect a person experiencing pain is through affect, the expression of one's emotions. Understanding the impact of perceived pain validation on affect is particularly important because of the connection between affect and pain. According to biosocial theory, the degree to which responses are validating can influence individuals' affect, and, in turn, impact pain intensity and behaviors (Linehan, 1993). The biosocial model predicts that if patients disclose pain-related thoughts and feelings and are

validated while doing so, they will feel understood and accepted, will experience improved emotional regulation and reduced negative affect, and may also experience a reduction in pain (see Figure 1; Edmond & Keefe, 2015). On the other hand, the operant conditioning model of pain states that reinforcement of pain communication (i.e. verbal complaints about pain) may actually exacerbate the pain (Fordyce, 1976). One can reinforce pain communication by responding with sympathy or praise towards someone's pain (e.g. "I am sorry you are in pain"). In addition, reinforcement of well talk (i.e. stating that one feels better) may actually reduce the amount of pain that a participant experiences. Reinforcement of well talk includes praise and encouragement (e.g. "I am so glad you are feeling better). The operant conditioning model suggests that if one is reinforced for pain talk, but is not reinforced for well talk, then the patient in pain is more likely to have worse pain symptoms (White & Sanders, 1986). This suggests that validation may lead to increased pain disability and intensity and more negative affect (see Figure 2; Edmond & Keefe, 2015).

In comparison to validation, invalidation has been shown to lead to higher levels of negative affect, heart rate, and skin conductance in pain patients over time compared to those who received validating responses (Shenk & Fruzzetti, 2011). Furthermore, receiving an invalidating response while performing a pain task led to a decline in positive affect, whereas validation resulted in more positive affect. (Linton, Boersma, Vangronsveld, & Fruzzetti, 2012). Cano, Leong, & Williams (2012) found that invalidation by a spouse was positively correlated with helplessness in the patient, affective distress, and pain behaviors reported by individuals with chronic pain. In addition, Linton et al. (2001) found that participants in an invalidation group reported an increase in worry while participants in a validation condition reported a significant decrease in worry. Thus, in accordance with the biosocial theory, these studies show

that invalidation may have a direct relationship with psychological distress related to the pain experience, as well as play a significant role in decreasing positive affect and increasing negative affect, which may also lead to less positive results for pain-related outcomes.

In addition to these studies, there is also research that supports the operant conditioning model of pain validation. In a study conducted by White and Sanders (1986), it was found that pain intensity was higher after reinforcement of pain talk. In another study, it was found that participants in a pain condition where their pain was reinforced experienced greater pain than those who were not reinforced (Jolliffe & Nicholas, 2004). Further, Linton and Gotestam (1985) found that reinforcing pain reports led participants to report an increase in pain, even when they lowered the noxious stimulus eliciting the pain by a large amount. Together, these studies support the notion that validation may actually be a harmful way to interact with patients in pain because it may inadvertently increase pain intensity and disability.

In addition to having such contrasting results on validation's relationship with pain and affect, research is also limited. Many studies focus on spousal relationships, but few studies have focused on a younger age group and validation by close friends. This study focuses on undergraduate students and validation by a close friend. Younger people experience pain as well, but there hasn't been much focus on this particular age group. Also, most young adults are not married and don't have a spouse for support. Many college students are away from home and don't have family members around for immediate support. As a result, close friends play a big part in their lives and may have a significant role when validating pain. This study also looks at other factors that may influence the relationship between validation and affect, as well as validation and pain. Most studies have only focused on relationships between validation and affect, but failed to explore other factors that could have moderated this relationship.

Therefore, the current study also had an exploratory aim of analyzing how intimacy, emotion regulation, and solicitousness may impact the relationship between perceived validation and affect, as well as perceived validation and pain-related outcomes.

Not all individuals with pain who are being validated may experience a change in affect and pain outcomes. Intimacy may impact the degree to which perceived validation and pain, as well as perceived validation and affect, are related. The intimacy process model of interaction suggests that intimacy develops when one person's self-disclosure of emotions is met with the partner's empathic and validating responses (Reis & Shaver, 1988). In intimacy models, emotional disclosure, a process in which a patient verbally expresses her pain-related distress, can be validated or invalidated by her partner, which can affect levels of intimacy (Cano & Williams, 2010). In Manne et al.'s (2004) study, it was found that greater perceived partner responsiveness was related to higher levels of intimacy, which also was related to higher levels of disclosure by the patient. If a person discloses pain thoughts and feelings and they are validated for doing so, they would experience greater intimacy and would experience less pain. Therefore, it is hypothesized that high levels of intimacy may strengthen the negative relationship between perceived validation and pain.

Emotion regulation may also impact the strength of the relationship between perceived validation and pain, and validation and affect. Emotion regulation refers to the ability to control one's emotions in a flexible manner. According to biosocial theory, emotion regulation has three main components: vulnerability to experiencing emotions, deficient emotion-relevant skills needed to act effectively, and problematic responses of others to expression of emotion, wants, thoughts, and goals (Fruzzetti, Shenk, & Hoffman, 2005). Shenk & colleagues (2011) studied the role of emotion reactivity in validation and found that invalidating responses led to an increase in

emotional reactivity, which may make regulation of this reactivity more difficult. Also, participants in an invalidating condition had higher levels of negative affect, heart rate, and skin conductance compared to individuals in a validating condition (Shenk et al., 2011). Therefore, it is hypothesized that if one has greater difficulty in regulating his or her emotions, then the relationship between perceived validation and pain intensity and disability would be greater.

Lastly, the relationship between perceived validation and pain, and perceived validation and affect may also depend on the degree of solicitousness expressed by a friend, family member, or partner of a person in pain. Solicitous behavior includes expressions of concern, expressions of support, and assistance related to a person's pain (Romano et al., 1992). Even though solicitous responses are meant to be endearing, the operant model of chronic pain states that solicitousness can actually be detrimental to patients with pain and increase pain and disability behavior (Hanley et al., 2004). Romano & colleagues (1995) found that spouse solicitous responses to patient pain behaviors are correlated with an increase in pain behaviors and disability in chronic pain patients. Research suggests that pain is exacerbated when individuals with pain receive solicitous responses (Romano et al., 1992). Further, solicitous responses to pain have been found to be correlated with depression, which may also be correlated with negative affect (Hanley et al.). Therefore, it is hypothesized that receiving more solicitous responses may strengthen the relationship between validation and negative affect, as well as the negative relationship between validation and positive affect.

Currently, 126.1 million Americans experience some sort of pain, with 25.3 million adults reporting chronic pain (Nahin, 2015). Therefore, it is important to find the best way for others to interact with them. Thus, this study examines the relationship among perceived pain validation, positive and negative affect, and pain-related outcomes in undergraduate students at

Duke University. The following primary hypotheses were tested: (1) participants who report that their friend provides pain validation will be more likely to experience positive affect, and participants who report that their friend provides higher levels of pain validation will be less likely to experience negative affect; (2) participants who report that their friend provides pain validation will be more likely to experience lower levels of pain intensity and disability, and participants who report that their friend provides low levels of pain validation will be more likely to experience higher levels of pain intensity and disability. Exploratory aims will also be investigated to examine the impact of solicitousness, difficulty in emotion regulation, and social intimacy on the relationship between validation and our outcome variables: positive affect, negative affect, pain intensity, and pain disability.

Method

Participants

Participants were 94 undergraduate students at Duke University in the Psychology and Neuroscience subject pool. Students enrolled in a psychology or neuroscience course granting credit for participation received one credit for participating. Of the 94 participants, 73 were female (77.7%), and 21 were male (22.3%). The majority of the participants were first year undergraduate students at 56.4%, followed by second year at 38.3%, fourth year at 4.3%, and third year at 1.1%. Most of the participants were white (57.4%).

Procedure

Prior to its implementation, Duke University Institutional Review Board approved this study. Participants in the Psychology and Neuroscience subject pool were all invited to participate in a prescreen questionnaire. Participants who had an average pain of 3 or a higher out of 10 in the

past sixth months were eligible to participate in our study. Students who participated were first directed to a form describing the minimal risks, the benefits of participation, and their right to terminate participation at anytime. Those who consented to participate were able to continue to our study in the Qualtrics website. This separate link ensures participant anonymity. After finishing the survey, participants were thanked for their participation.

Measures

Prescreen Phase. To ensure that the participants who were recruited experienced pain, we included certain measures in the prescreen questionnaire to identify participants with pain. The graded chronic pain scale (GCPS; Von Korff, Ormel, Keefe, & Dworkin, 1992) is a 7-item questionnaire to assess the level of chronic pain that a participant has.

The GCPS was put in the prescreen to identify participants who have chronic pain to be eligible for our study. Participants who scored an average of 3 or above in the past six months on the prescreen were subsequently contacted to participate in the questionnaire phase of the study. Demographic information was also collected in the prescreen, including gender, age, race, ethnicity, class standing, and native language.

Questionnaire Phase of Study. Ninety-four undergraduate students experiencing pain met prescreening criteria and were recruited from the Duke University Psychology & Neuroscience subject pool. This phase of the study took place online via Qualtrics and lasted for approximately one hour. For those who were eligible and agreed to participate, they had to electronically sign the consent form by clicking a consent box (replacing a signature).

Validation. Perceived validation was measured using the Perceived Partner Responsiveness Scale (Laurenceau, Barrett, & Pietromonaco, 1998; Laurenceau, Barrett, &

Rovine, 2005). This scale is a 4-item scale that assesses the degree to which individuals feel understood, validated, accepted and cared for by their friend. The scale is measured on a 5-point Likert scale (from 1 = not at all to 5 = very much). Cronbach's α in the sample studied was .821.

Positive and negative affect. Positive and negative affect were assessed using the PANAS, where participants were asked to rate how much they felt 20 emotion words "right now" on a 5-point scale (from 1 = very slightly or not at all to 5 = extremely; Watson, Clark, & A., 1988). Positive affect word scores and negative affect word scores are averaged separately. Examples of positive affect items included asking participants if they felt interested, excited, and proud. Some items on the negative affect scale included being distressed, upset, and irritable. A higher score indicates greater levels of affect. Cronbach's α in this study was .905 for the positive affect (PA) scale and .890 for the negative affect (NA) scale.

Pain intensity and disability. Pain intensity and disability were measured using the GCPS scale in the prescreen using the characteristic intensity and pain disability points scale. The Graded Chronic Pain Scale (GCPS; Von Korff, Ormel, Keefe, & Dworkin, 1992) is a 7-item questionnaire to assess the level of chronic pain that a participant has. Pain intensity items measured current, worst, and average pain in the past six months. Pain disability items measured pain interference in daily activities, family activities, and ability to work in the past six months. Cronbach's α for the pain intensity mean was .559. For pain disability mean, Cronbach's α was .907.

Friendship closeness. Friendship closeness was measured using the Relationship Closeness Inventory (RCI; Berscheid, Snyder, & Omoto, 1989). The purpose of this is to determine how close the individuals completing the questionnaire feel toward their friend for whom the questions were asked about. The RCI has a Chronbach's α of .549.

Social intimacy. Social intimacy was measured using the Miller Social Intimacy Scale, a 17-item questionnaire that is rated on a 10-point scale (from 1 = not much to 10 = a great deal; Miller & Lefcourt, 1982). Items included asking how satisfying their relationship was, how long they spent alone time together, and how important the relationship was in their lives. Items are added together, and a higher score indicates greater intimacy. The Cronbach's α value was .922.

Emotion regulation. Emotion regulation was measured with the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). This scale has 36 questions asking about potential difficulties with emotion regulation and is measured on a 5-point scale (from 1 = never feel this way to 5 = always feel this way). Subscales include nonacceptance of emotional responses, difficulty engaging in goal-directed behavior, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity. Scores are added together to get a total score sum, with higher scores showing more difficulties in emotion regulation. The DERS has demonstrated high internal consistency ($\alpha = .921$).

Solicitousness. Perceived solicitousness was measured using the solicitous subscale of the West Haven-Yale Multidimensional Pain Inventory (WHYMPI; Kerns, Turk, & Rudy, 1985). Participants were asked to rate how they feel about a certain statement regarding how others respond to their pain on a 7-point Likert scale (from 0 = never to 6 = very often). Items included asking how likely the friend asks to help the participant and how likely the friend tries to get the patient to rest. Cronbach's α for the solicitous subscale of the WHYMPI was found to be .652.

Data analysis

Descriptive statistics were first conducted to describe the variables in our study.

Correlations were then run to see whether participant characteristics (i.e. gender, class standing, race/ethnicity) were significantly ($p < 0.05$) associated with study variables (i.e. pain disability, pain intensity, affect). There were no significant correlations between demographic characteristics and any of our study variables, so none of the participant characteristics had to be controlled for. Correlations were run to examine the relationship between our predictor variable (validation), and our outcomes (positive and negative affect and pain disability and intensity). Correlations were also run to examine the relationships among our moderators (i.e., solicitousness, difficulty in emotion regulation, intimacy). Finally, multiple linear regressions were run to see if there were any interactions that were significant for the moderators examined.

Results

Descriptive Statistics

Descriptive information on demographic variables is displayed in Table 1. The majority of participants were female (77.7%). There were 73 female participants and 21 male participants. Of the 94 participants, 53 were first year students (56.4%), 36 were second year students (38.3%), 1 was a third year student (1.1%) and 4 were fourth year students (4.3%). For race/ethnicity, 54 participants were non-Hispanic white (57.4%), 9 participants were Black/African-American (9.6%), 17 participants were Asian (18.1%), 9 participants were Hispanic (9.6%), 3 participants were biracial/multiracial (3.2%), and 1 participant was listed as other (1.1%).

Descriptive information on study variables is displayed in Table 2. Participants had an average self-reported pain intensity of 43.78 ($SD=13.93$) out of 100, and an average self-reported pain disability of 30.25 ($SD=22.59$) out of 100. The pain intensity reported is lower than past studies that have been conducted. In past studies, they found the average Pain Intensity to be

56.20 (SD=19.3) and pain disability 30.91 (SD=15.5) (Lungenhausen et al., 2007). The values for pain disability are approximately the same, but the pain intensity in this study is lower than past studies. The average positive affect score was 29.86 (SD=8.67) out of 50 and the average negative affect score was 21.49 (SD=7.94) out of 50. The mean and standard deviation for positive affect is consistent with past literature. However, the reported negative affect in this study is higher than the normal, which is usually around 14.8 (Watson, Clark, & Tellegen, 1988). The mean perceived partner responsiveness score was 3.99 (SD=0.92) out of 5. The mean and standard deviation for perceived partner responsiveness is consistent with past literature.

Correlations among Study Variables

Correlations were run between our predictor variables, our outcome variables, and our moderators. Table 3 displays the correlations between all of our variables. There was no significant correlation between perceived validation and pain intensity ($r=.020$). There was a non-significant correlation between perceived validation and pain disability ($r=.183$). There was a non-significant correlation between perceived validation and positive affect ($r=.116$). There was a non-significant correlation between perceived validation and negative affect ($r=.026$).

There were significant positive correlations between social intimacy and perceived validation ($r=.503$, $p<.01$), solicitousness and perceived validation ($r=.319$, $p<.01$), pain intensity and negative affect ($r=.266$, $p<.05$), pain intensity and difficulty in emotion regulation ($r=.261$, $p<.05$), negative affect and difficulty in emotion regulation ($r=.384$, $p<.01$), solicitousness and social intimacy ($r=.348$, $p<.01$), and pain disability and pain intensity ($r=.331$, $p<.01$). Since there were significant correlations between difficulty in emotion regulation and some of our outcome variables, difficulty in emotion regulation was controlled for in our multiple linear regressions.

Multiple Linear Regressions

Even though there were no statistically significant correlations between our predictor and outcome variables, five models were run to investigate our exploratory aims of seeing whether certain moderators impacted the relationship between our predictor and outcome variables. These models were chosen based on the correlations obtained between our moderator variables and our predictor and outcome variables. There were no significant correlations between perceived validation and our outcome variables, so we chose models that made the most sense based on our data and past studies and theories. The model with social intimacy as a moderator for the relationship between perceived validation and pain disability was used because it was the only model that yielded a statistically significant interaction. Solicitousness was used in the models for the relationship between perceived validation and affect since this relationship has not been tested before. Two models used difficulty in emotion regulation as a moderator for the relationship between validation and pain-intensity and pain disability based on the biosocial theory. It must be noted that these results should be interpreted cautiously given the small sample size and the lack of correlation between our variables. Relationship closeness was controlled for in all of the models based on results from past studies. Theoretically, it is thought that results would be different based on closeness of friendships. How close the participant is to his or her friend may change the way he or she interprets the validation being given, which would influence their affect and pain behaviors. In addition, difficulty in emotion regulation was also controlled for because there were significant correlations between this variable and our outcome variables.

The first model tested the interaction between perceived validation and social intimacy and its influence on pain disability. Full results are listed in Table 4. There was a significant

effect for social intimacy being a moderator between perceived validation and pain disability (total $R^2 = .144$, $F[5, 78] = 2.634$, $p = .030$). There is a significant interaction between social intimacy and validation ($p=.0337$). At low and medium levels of social intimacy, there was no significant effect of perceived validation on pain disability. For participants who reported high levels of social intimacy, there was a strong positive relationship between perceived validation and pain disability ($B=10.78$, $SE = 4.44$, $t=2.43$, $p=.018$). The results are graphed in Figure 3.

The model in which the interaction of validation and solicitousness impacted positive affect did not have statistically significant results. Validation does not significantly explain the variation of scores for positive affect (total $R^2 = .124$, $F[5, 78] = 2.199$, $p = .063$). There were main effects for relationship closeness, such that as relationship closeness increased, positive affect increased ($B=.45$, $SE = .19$, $t=2.37$, $p=.02$). There was also main effect for difficulty in emotion regulation. When difficulty in emotion regulation increased, positive affect decreased ($B=-.105$, $SE = .047$, $t=-2.22$, $p=.03$). Full results are listed in Table 5.

The third model tested the interaction of solicitousness and perceived validation on negative affect. There was no significant effect for solicitousness being a moderator between perceived validation and negative affect (total $R^2 = .262$, $F[5, 78] = 2.995$, $p = .016$). However, there was a main effect for difficulty in emotion regulation. When difficulty in emotion regulation increased, negative affect increased ($B=.149$, $SE = .041$, $t=3.64$, $p=.000$). Full results are listed in Table 6.

The fourth model tested the interaction between perceived validation and difficulty in emotion regulation and its influence on pain intensity. Perceived validation does not significantly predict pain intensity (total $R^2 = .092$, $F[4, 81] = 2.052$, $p = .095$). However, there was a main effect for difficulty in emotion regulation. When difficulty in emotion regulation increased, pain

intensity increased ($B=.196$, $SE = .076$, $t=2.58$, $p=.012$). The full results are listed in Table 7.

The last model tested the interaction between perceived validation and difficulty in emotion regulation and its influence on pain disability. Perceived validation was not a significant predictor of pain disability (total $R^2 = .287$, $F[4, 81] = 1.822$, $p = .133$). The full results are listed in Table 8.

Discussion

Validation is one construct that has been receiving increased attention as a way of explaining how others can interact with patients in pain. However, studies are rather limited and often provide varying results. Two potential models for validation include the biosocial model and the operant conditioning model. While the biosocial model predicts a decrease in pain-related behaviors after validating responses, the operant conditioning model predicts an increase in pain-related behaviors. The contrasting theories make the topic of validation an interesting and important one to research. In this study, we aimed to further investigate the concept of validation in relation to pain intensity and disability, as well as positive and negative affect. We did so by measuring perceived partner responsiveness and its influence on positive and negative affect, as well as pain-related outcomes in participants of young adults who reported pain.

There were no statistically significant correlations between our predictor and our outcomes, suggesting that validation may not actually have as big of a role influencing pain and affect than originally thought. There was one statistically significant interaction between social intimacy and validation on pain disability. This model indicates that as intimacy between the participant and a friend increases, then the relationship between perceived validation and pain disability is strengthened. This finding is somewhat similar to the operant conditioning model and results in other studies that support it, suggesting that if one is being validated for his pain,

then he or she is more likely to report pain symptoms. However, given the number of predictive models run, one must interpret this finding with caution.

This study has severable noteworthy strengths. First, this study focuses on *perceived* validation and its influence on affect and pain-related behaviors, whereas most past studies mainly focus on *observed* validation (i.e. coding behaviors believed to be indicative of validation). Since pain is subjective, how one perceives validation about their pain may be of more importance than the actual act of validation. Another strength of this study is its focus on the younger population. Many studies on pain and validation have focused on older populations usually with validation provided by a spouse. However, this study focuses on the undergraduate population, which is important because it explores a different age cohort of people experiencing pain. Most past studies have focused on older populations of pain, yet there are many people younger people suffering with pain. Pain may manifest differently in younger patients in comparison to older patients. Further, the way that one interprets validation could be different based on age. Also, it is important that we are looking at relationships between friends instead of spousal relationships because many young people do not have spouses, making their friends an important listener in their pain sharing.

Finally, the current study researched how intimacy, emotion regulation, and solicitousness may impact the relationship between perceived validation and affect, as well as perceived validation and pain-related outcomes, whereas most past studies have just focused on the relationship between validation and affect without looking at potential moderators.

Despite the strengths of the study, there are some limitations that must be noted. First, there is a limitation with the design of the study. Since the study is solely reliant on self-report measures, it is hard to properly infer whether the measures were accurate. Thus, it would be

worth observing the act of validation in future studies instead of relying simply on self-reporting perceived validation. This would help ensure that validation is indeed occurring. Also, this study only tests the level of validation, but it may be insightful to measure both validation and invalidation. Measuring both would be useful to compare the differences in outcomes.

Another limitation is that the questionnaire was online, so there is no way of knowing whether the participants were distracted while completing the study. In our consent form, participants were told to rest if needed be, but there is no way of knowing if they followed this advice.

The final limitation is the participants in our study. The sample size was rather small (n=94), which makes the possibility of error greater. Further, it may be hard to generalize to clinical pain populations. All participants had some level of pain in our study; however, we did not examine if participants were actually diagnosed with a clinical pain condition

Future directions

To address some of the issues with this study, it is advised that in future studies, researchers should directly observe participants interacting with friends while being validated.

Further, it may be useful for future studies to implement an experiment to more directly examine the effects of validation and invalidation on affect and pain-behaviors. If an experiment were implemented, the researcher could assign participants to a validation, invalidation, or control group and compare the results obtained to get a better understanding of the ways validation and invalidation influence affect and pain-related behaviors. Causality would be able to be inferred as opposed to the correlational data that was obtained in this study.

Lastly, future researchers should address the sample size and expand the study to include

a more diverse population. The sample of this study was restricted to students attending Duke University. Future studies should have a wider range of ages to be more representative of young adults having pain.

Conclusion

Overall, the results of the present study do not lend support to either the biosocial theory or the operant conditioning theory. Since there were no significant correlations between perceived validation and positive affect, negative affect, pain intensity, and pain disability, it may be possible that validation does not have a relationship with pain outcomes and affect. However, results may be non-significant due to the limitations of our study, as noted earlier. Further research is needed to investigate the effects of validation in pain participants, but this correlational study may show that validation is insignificant in predicting pain behaviors and affect.

References

- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology*, 51(6), 1173.
- Berscheid, E., Snyder, M., & Omoto, A. M. (1989). The Relationship Closeness Inventory: Assessing the closeness of interpersonal relationships. *Journal of personality and Social Psychology*, 57(5), 792.
- Cano, A., Leong, L. E., Williams, A. M., May, D. K., & Lutz, J. R. (2012). Correlates and consequences of the disclosure of pain-related distress to one's spouse. *PAIN®*, 153(12), 2441-2447.
- Davis, M. H. (1980). A multidimensional approach to individual differences in empathy.
- Cano, A., & Williams, A. C. D. C. (2010). Social interaction in pain: Reinforcing pain behaviors or building intimacy?. *Pain*, 149(1), 9.
- Davis, M. H. (1980). A multidimensional approach to individual differences in empathy.
- Edmond, S. N. (2015). *The Influence of Validation of Pain-Related Thoughts and Feelings on Positive and* (Doctoral dissertation, Duke University).
- Edmond, S. N., & Keefe, F. J. (2015). Validating pain communication: current state of the science. *Pain*, 156(2), 215-219.
- Fruzzetti, A. E., Shenk, C., & Hoffman, P. D. (2005). Family interaction and the development of borderline personality disorder: A transactional model. *Development and psychopathology*, 17(04), 1007-1030.
- Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in

- emotion regulation scale. *Journal of psychopathology and behavioral assessment*, 26(1), 41-54.
- Hanley, M. A., Jensen, M. P., Ehde, D. M., Hoffman, A. J., Patterson, D. R., & Robinson, L. R. (2004). Psychosocial predictors of long-term adjustment to lower-limb amputation and phantom limb pain. *Disability and Rehabilitation*, 26(14-15), 882-893.
doi:10.1080/09638280410001708896
- Jolliffe, C. D., & Nicholas, M. K. (2004). Verbally reinforcing pain reports: an experimental test of the operant model of chronic pain. *Pain*, 107(1), 167-175.
- Kerns, R. D., Turk, D. C., & Rudy, T. E. (1985). The west haven-yale multidimensional pain inventory (WHYMPI). *Pain*, 23(4), 345-356.
- Laurenceau, J. P., Barrett, L. F., & Rovine, M. J. (2005). The interpersonal process model of intimacy in marriage: a daily-diary and multilevel modeling approach. *Journal of Family Psychology*, 19(2), 314.
- Linehan, M. (1993). *Cognitive-behavioral treatment of borderline personality disorder*. Guilford press.
- Linehan, M. M. (1997). Validation and psychotherapy. *Empathy reconsidered: New directions in psychotherapy*, 353-392.
- Linton, S. J., Boersma, K., Vangronsveld, K., & Fruzzetti, A. (2012). Painfully reassuring? The effects of validation on emotions and adherence in a pain test. *European journal of pain*, 16(4), 592-599.

- Lungenhausen, M., Lange, S., Maier, C., Schaub, C., Trampisch, H. J., & Endres, H. G. (2007). Randomised controlled comparison of the Health Survey Short Form (SF-12) and the Graded Chronic Pain Scale (GCPS) in telephone interviews versus self-administered questionnaires. Are the results equivalent? *BMC medical research methodology*, 7(1), 50.
- Miller, R. S., & Lefcourt, H. M. (1982). The assessment of social intimacy. *Journal of personality Assessment*, 46(5), 514-518.
- Nahin, R. L. (2015). Estimates of pain prevalence and severity in adults: United States, 2012. *The Journal of Pain*, 16(8), 769-780.
- Reis, H. T., & Shaver, P. (1988). Intimacy as an interpersonal process. *Handbook of personal relationships*, 24(3), 367-389.
- Romano, J. M., Turner, J. A., Friedman, L. S., Bulcroft, R. A., Jensen, M. P., Hops, H., & Wright, S. F. (1992). Sequential analysis of chronic pain behaviors and spouse responses. *Journal of consulting and clinical psychology*, 60(5), 777.
- Romano, J. M., Turner, J. A., Jensen, M. P., Friedman, L. S., Bulcroft, R. A., Hops, H., & Wright, S. F. (1995). Chronic pain patient-spouse behavioral interactions predict patient disability. *Pain*, 63(3), 353-360.
- Shenk, C. E., & Fruzzetti, A. E. (2011). The impact of validating and invalidating responses on emotional reactivity. *Journal of Social and Clinical Psychology*, 30(2), 163.
- Von Korff, M., Jensen, M. P., & Karoly, P. (2000). Assessing global pain severity by self-report in clinical and health services research. *Spine*, 25(24), 3140-3151.
- Von Korff, M., Ormel, J., Keefe, F. J., & Dworkin, S. F. (1992). Grading the severity of chronic pain. *Pain*, 50(2), 133-149.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of personality and social psychology*, 54(6), 1063.

White, B., & Sanders, S. H. (1986). The influence on patients' pain intensity ratings of antecedent reinforcement of pain talk or well talk. *Journal of Behavior Therapy and Experimental Psychiatry*, 17(3), 155-159.

Table 1: Demographic data

Variable	n	%
Gender		
Female	73	77.7
Male	21	22.3
Class Standing		
First year	53	56.4
Second year	36	38.3
Third year	1	1.1
Fourth year	4	4.3
Race/ethnicity		
White – non-Hispanic	54	57.4
Black/African-American	9	9.6
American Indian/Alaska Native	0	0
Asian	17	18.1
Native Hawaiian/Pacific Islander	0	0
Hispanic – any race	9	9.6
Biracial/Multiracial	3	3.2
Other	1	1.1

Table 2: Descriptive statistics

Variable	M	SD	α
Pain Intensity Mean (GCPS)	43.777	13.928	.559
Pain Disability Mean (GCPS)	30.248	22.588	.907
Positive Affect (PANAS)	29.859	8.670	.905
Negative Affect (PANAS)	21.489	7.940	.890
Perceived Partner Responsiveness (PPRS)	3.989	0.921	.821
Relationship Closeness (RCI)	13.802	5.000	.549
Social Intimacy (MSIS)	131.703	21.986	.922
Difficulty in Emotion Regulation (DERS)	101.196	19.953	.921
Solicitousness (WHYMPI)	2.918	1.063	.652

Note. GCPS = Graded Chronic Pain Scale; PANAS = Positive and Negative Affect Scale; MSIS = Miller Social Intimacy Scale; DERS = Difficulty in Emotion Regulation Scale; WHMPI = West Haven-Yale Multidimensional Pain Inventory

Table 3: Correlations among Study Variables

	1.	2.	3.	4.	5.	6.	7.	8.
1. Perceived Validation (PPRS)	1.00							
2. Pain Intensity (GCPS Intensity Mean)	.020	1.00						
3. Pain Disability (GCPS Disability Mean)	.183	.331**	1.00					
4. Positive Affect (PANAS Positive Sum)	.116	-.043	.080	1.00				
5. Negative Affect (PANAS Negative Sum)	.026	.266*	.133	-.138	1.00			
6. Social Intimacy (MSIS)	.503**	-.070	.177	.025	.028	1.00		
7. Difficulty in Emotion Regulation (DERS)	.005	.261*	.195	-.183	.384**	.176	1.00	
8. Solicitousness (WHYMPI)	.319**	-.080	.045	.034	-.101	.348**	-.077	1.00

Note. * $p < .05$, ** $p < .01$. GCPS = Graded Chronic Pain Scale; PANAS = Positive and Negative Affect Scale; MSIS = Miller Social Intimacy Scale; DERS = Difficulty in Emotion Regulation Scale; WHMPI = West Haven-Yale Multidimensional Pain Inventory

Table 4

Multiple Regression Results for Predicting Pain Disability

	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Perceived Validation (PPRS) (Total $R^2 = .49$)				
Relationship Closeness (RCI)	.352	.493	.714	.478
Difficulty in Emotion Regulation (DERS)	.180	.126	1.432	.156
Social Intimacy (MSIS)	.109	.137	.796	.428
Perceived Validation (PPRS)	4.905	3.098	1.583	.117
Perceived validation x social intimacy	.285	.127	2.250	.027

Table 5

Multiple Regression Results for Predicting Positive Affect

	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Perceived Validation (PPRS) (Total $R^2 = .124$)				
Relationship Closeness (RCI)	.450	.190	2.366	.020
Difficulty in Emotion Regulation (DERS)	-.105	.047	-2.216	.030
Solicitousness (WHYMPI)	-.854	.967	-.884	.380
Perceived Validation (PPRS)	1.813	1.149	1.578	.119
Perceived validation x solicitousness	.599	.967	.6191	.537

Table 6

Multiple Regression Results for Predicting Negative Affect

	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Perceived Validation (PPRS) (Total $R^2 = .161$)				
Relationship Closeness (RCI)	-.143	.165	-.865	.390
Difficulty in Emotion Regulation (DERS)	.149	.041	3.637	.000
Solicitousness (WHYMPI)	-.556	.838	-.663	.509
Perceived Validation (PPRS)	.806	.996	.809	.421
Perceived validation x solicitousness	.616	.838	.735	.465

Table 7

Multiple Regression Results for Predicting Pain Intensity

	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Perceived Validation (PPRS) (Total $R^2 = .092$)				
Relationship Closeness (RCI)	.153	.299	.513	.610
Difficulty in Emotion Regulation (DERS)	.196	.076	2.576	.012
Perceived Validation (PPRS)	.787	1.598	.492	.624
Perceived validation x difficulty in emotion regulation	.006	.081	.076	.940

Table 8

Multiple Regression Results for Predicting Pain Disability

	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Perceived Validation (PPRS) (Total $R^2 = .083$)				
Relationship Closeness (RCI)	.327	.498	.657	.513
Difficulty in Emotion Regulation (DERS)	.180	.127	1.423	.159
Perceived Validation (PPRS)	4.531	2.667	1.699	.093
Perceived validation x difficulty in emotion regulation	.087	.136	.639	.525

Note. R^2 values are unadjusted and partial regression coefficients are unstandardized. PANAS = Positive and Negative Affect Scale; MSIS = Miller Social Intimacy Scale; DERS = Difficulty in Emotion Regulation Scale; WHMPI = West Haven-Yale Multidimensional Pain Inventory; PPRS=Perceived Partner Responsiveness Scale; RCI=Relationship Closeness Inventory

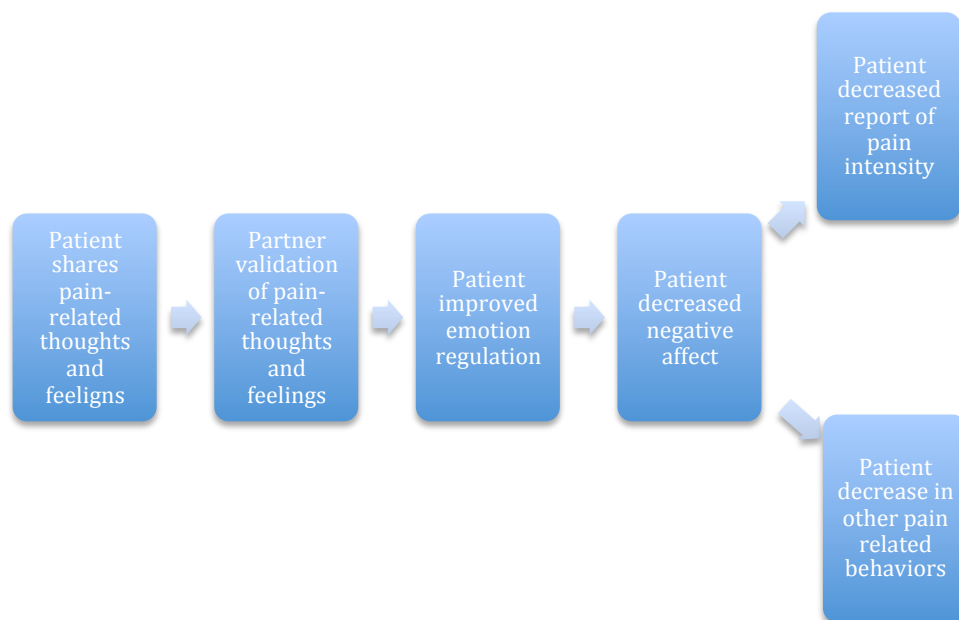


Figure 1. The biosocial model predicts that if patients disclose pain-related thoughts and feelings and are validated while doing so, they will feel understood and accepted, will experience improved emotional regulation and reduced negative affect, and may also experience a reduction in pain.

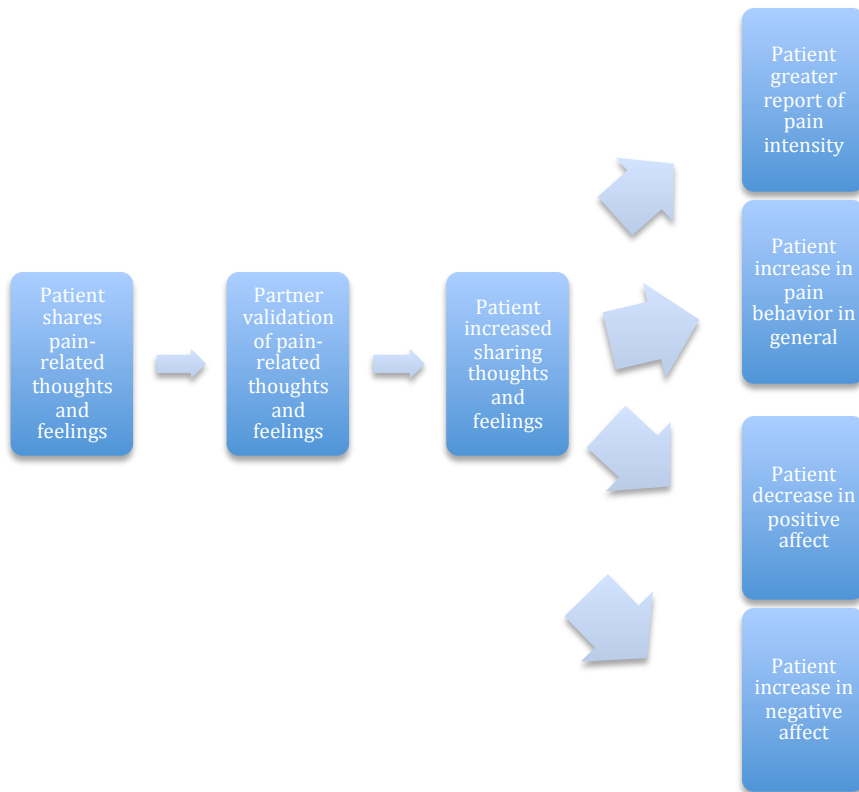


Figure 2. The operant conditioning model predicts that if patients disclose pain-related thoughts and feelings and are validated while doing so, they will feel share more of their pain related thoughts and feelings, which will lead them to experience an increase in pain intensity and pain behavior, an increase in negative affect, and a decrease in positive affect.

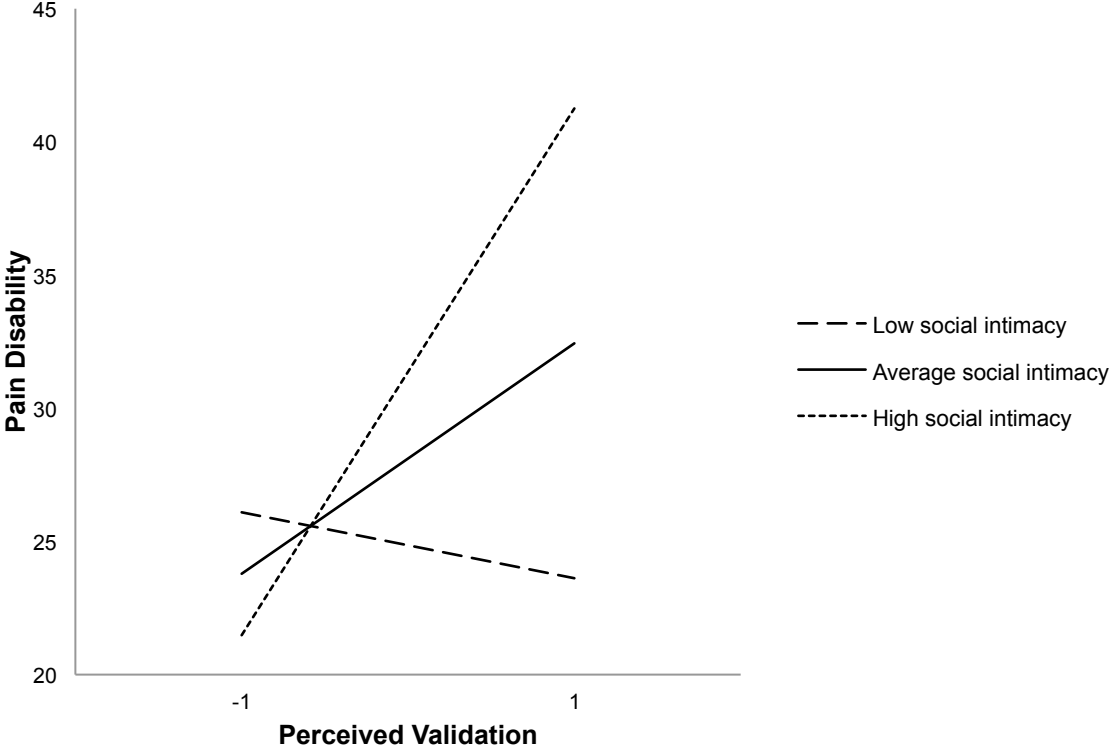


Figure 3. This graph shows the interaction of intimacy and validation on pain disability. At high levels of social intimacy, the relationship between perceived validation and pain disability is strengthened.