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THE IMPACT OF SOCIAL SUPPORT AND INVALIDATION ON THE
SEVERITY OF SOMATIC SYMPTOMS IN WOMEN WITH FIBROMYALGIA

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Abstract

The current study examines the association of perceived social support and invalidation with the severity of somatic symptoms in women with fibromyalgia, using a patient-based research methodology. The model used in this research proposes that fibromyalgia is rooted in an imbalance between the 'threat' system and the 'soothing' system, as described by Gilbert´s affect regulation model (Gilbert, 2005). This study focused on the social side of this model. Literature reveals the positive impacts of social support on health and well-being for patients, and a relation between social support and perceived pain severity. Research also indicates the potency of negative impact by invalidation, a social threat, in predicting well-being. In the current study, patients with enduring physical symptoms had identified all factors that threaten or soothe them. In the current study 64 women with fibromyalgia participated (mean age 47, ranging from 22 to 65). They completed the Patient Health Questionnaire-15 to establish the severity of their symptoms. Through regression analysis it was examined whether the importance placed in social support as a soother, and the importance placed in invalidation as a threat is associated with the severity if somatic symptoms. Relationship status was significantly correlated with social support ($p= .03$) and entered as a covariate. The regression analysis showed that neither social support nor invalidation nor the interaction between the two significantly predicted PHQ-15 values ($F =1.565, p =.22, R2 adj.=.0254$). This may be due to forced sorting procedure. Participants had to sort 5 piles for the value they placed in each soother and threat: if a participant regarded all soothers as equally soothing, she still had to hierarchically sort them on a scale of 1 to 5, from least to most soothing (or threatening, for threats). This may have caused a distorted view of the importance that participants placed in the social support or invalidation statements. Furthermore, participants who were in a relationship (51 participants) put higher importance in social support than did participants who were single (13 participants), with 69.33% of singles in in 'high' versus 92.16% of those in a relationship. This perhaps caused the sample size for low social support to become too small to generate an effect, because no good comparison could be made between low importance social support and high importance in social supporMore research on the way that social support or invalidation shapes the disease experience is necessary to understand the impact of the value that people with fibromyalgia themselves place in social support and invalidation.

1. Introduction

Fibromyalgia syndrome is a non-articular rheumatic disease characterized by diffuse musculoskeletal pain, distinct tender points, fatigue, sleep disturbance, headaches and cognitive difficulties (Smith, Harris, & Clauw, 2011). The recognition of fibromyalgia as a legitimate category of physical illness has been challenged, causing patients to receive lack of understanding and acceptance, which in turn can cause delayed or ineffective care (Mengshoel, Sim, Ahlsen, & Madden, 2017). A possible reason for this is that although biomedical factors prompt initial pain report among fibromyalgia patients, psychosocial factors often play a significant role over time (Turk & Melzack, 2001). In research, a focus on the biopsychosocial aspects of fibromyalgia seems justified.

The biopsychosocial model for chronic pain conditions such as fibromyalgia is characterized by complex interactions in which psychosocial vulnerability and resilience factors play an important role (Gatchel et.al., 2007; Edwards et.al., 2011). Perceived threats are vulnerability factors, for example distress, trauma, fear, and catastrophizing. These may exacerbate pain and pain-related outcomes. Soothers are examples of resilience factors, such as social support, active coping skills, acceptance, and self-efficacy. They may improve pain and pain-related outcomes (Clauw, et.al., 2019). Pinto and colleagues proposed that 'fibromyalgia is rooted in persistent activation of the brain's salience network, including an imbalance between an overactive threat detection system and a deficient soothing system' (Pinto et.al., 2020). Biopsychosocial threats and soothers might thus influence the prognosis of fibromyalgia.

Especially social support has been indicated as an important factor determining disease prognosis (Demange et al., 2004; Eisenberger, 2013; Gunduz, Usen & Atar, 2019). Research on social support for chronic pain patients that focuses on its relationship with depression generally indicates that patients who receive more social support experience less depression and negative mood (Holtzman, Newth, & Delongis, 2004; Neugebauer and Katz, 2004; Edwards et.al., 2011; Gündüz, Ahmet & Atar, 2019). When social support is threatened or perceived as such, this could raise awareness of pain (Zhou & Gao, 2008). Experimental research has demonstrated that (perceived) social support is associated with pain intensity (Brown, Sheffield, Leary, & Robinson, 2003; Roberts, Klatzkin & Mechlin, 2015). Thus,

receiving social support might alleviate pain or symptom severity, and not receiving social support could have a negative impact.

Some studies indicate the potency of negative impact of social relations in predicting well-being (Coty & Wallston, 2010; Kool et.al., 2010). Positively perceived social support was found to improve the prognosis of fibromyalgia (Gunduz, Usen & Atar, 2019), but dissatisfaction with social support may actually have negative impact on well-being, as found in a study with rheumatic arthritis patients (Griffin, Friend, Kaell, & Bennett, 2001). The most positive impact on pain severity was found when patients were encouraged to use effective coping strategies by significant individuals in their life (Holtzman, Newth, & Delongis, 2004; López-Martínez et.al, 2008) as a way of social support. Griffin and colleagues found that dissatisfaction with social support was associated with both poor mood and disease status (Griffin et al., 2001). The way social support is perceived and the value that people place in it might thus impact symptom severity.

Socially supported patients experience more positive psychological states and less depressive symptoms (Kawachi & Berkman, 2001; Eisenberger, 2013; Hughes et.al., 2014) and are better equipped to make sense of their experience (Cooper & Gilbert, 2017). But also, mentally healthier patients search and get support sooner than depressed or anxious patients (Badger et al., 1999). It is hard to pinpoint what it is about social support or socially supported people that alleviates their symptoms, the severity or creates a different disease experience then people who don't experience social support. Knowledge on the importance that people with fibromyalgia themselves place in social support could possibly offer insight into these mechanisms.

Invalidation can be seen as a 'negative' type of social interaction that people with fibromyalgia often face. Invalidation encompasses feelings of nonacceptance by others, or for example rejection and disbelief, in this case in regard to a person's somatic symptoms (Kool et.al., 2009). Kool and colleagues (2013) found that social support and invalidation are separate concepts, not two sides of the same coin. In line with Lincoln's additive model of social support (2000), both concepts were additively associated with patients' mental health.

Invalidation on the other hand produces negative thoughts and feelings, and patients experiencing this are more likely to distance themselves socially (Asbring & Narvanen, 2002). Unfortunately, the social context of fibromyalgia patients is often characterized by invalidation, social distance and distress (Wolf & Davis, 2014). Although invalidation has been studied and the construct well defined by for example Kool and colleagues (2009), knowledge on the importance that people with fibromyalgia themselves place in invalidation

could add to this research by providing a patient based insight on it's value to the disease experience.

In the current research, soothers and threats from Gilbert's model of affect regulation are used as a basis to create an understanding of the associations between the perceived (by patients) importance of social support, invalidation and their impact on the severity of physical symptoms. According to Gilbert's model, people are driven towards basic biopsychosocial goals that ultimately lead them toward the ultimate goal of survival and reproduction. These actions are regulated and supported by the interaction of threats, soothers and drives. Using the concept mapping study by Geenen and colleagues (2020) that identifies the soothers, threats and drives for patients with somatic symptoms, the association between social threats (invalidation), social soothers (social support), and their interaction with symptom severity is examined. The research by Geenen and colleagues is based on qualitative data received from participants with various somatic symptoms. These data were structured using a quantitative technique: cluster analysis. The current research aims to further explore the association between the importance placed in social support and in invalidation, and physical symptoms for women with fibromyalgia.

The research questions are: what is the association between the importance placed in social support and invalidation and the severity of physical symptoms for female participants with fibromyalgia? Does higher importance placed in social support lessen the severity of physical symptoms? Does higher importance placed in invalidation heighten the severity of psychical symptoms? It was hypothesized that participants who regarded social support as an important soother, experience less severe symptoms than patients who regarded social support as unimportant. Furthermore, it was predicted that participants who regarded invalidation as an important threat would experience more severe symptoms than participants who regarded invalidation as unimportant. Lastly, it was predicted that participants with low importance in social support and high importance in invalidation would experience particularly severe physical symptoms.

Method

2.1. Procedure and design

This study that focuses on the clusters of social support and invalidation builds on a concept mapping done by a project group at Utrecht University (Geenen et al., 2020). Through the concept mapping technique, all qualitative information on all threats, soothers and drives was

systematically quantified. Participants completed an online questionnaire where a large set of soothers, drives and threats were accrued. A hierarchical cluster analysis was done to produce a structured overview of all clusters, from which the social support cluster emerged in soothers, and invalidation emerged from threats. Forty representative statements from each category (soother, threat, drive) were selected by the research team and printed on cards. These statement cards were sorted by another group of patients to fit self-named subcategories. Additionally, statements were hierarchically sorted based on 5 piles of 8 statements each, based on their perceived influence on somatic symptoms (for the threats and soothers). The design of this study is cross-sectional and observational. The study was approved by the Ethics Committee of the Faculty of Social and Behavioural Sciences of Utrecht University (19-219).

2.2. Participants

Participants of the concept mapping study were patients with persistent physical symptoms. Although both male and female participants were invited to participate, the current study incorporates only the 64 female fibromyalgia patients sampled from the larger group of participants. This is largely because only 2 male patients were recruited, including them could negatively impact the homogenity of the sample. All participants had to be 18 years or older. Recruitment was done over the internet, using social media as well as websites of regional and national patient organisations. Participants gave informed consent and could withdraw from the study at any point without a statement of reasons. The research team consists of eight master students and Prof. Dr. Geenen.

2.3. Data collection

The study started with an online questionnaire in LimeSurvey that participants filled in, taking about 5-10 minutes. Information about the study and its general purpose was provided on the opening page of the online survey. Here participants provided informed consent. The online questionnaire was anonymous and available in Dutch, English, Greek, Spanish and Brazilian Portuguese. Participants demographics, personal threats, soothers, drives, and somatic symptoms were collected.

The personal soothers, threats and drives were all screened, translated and systematically selected by the research group. Statements with overlapping constructs within soothers, threats and drives were grouped and named as subcategories. Chosen statements were kept as close as possible to their original. Next, representative statements were selected on the basis

of four criteria: (1) all researcher in the group would need to agree to admit a statement to the construct (eg. all agree that 'social support' is a soother), (2) the statement had to be possible for all participants, (3) matching statements were combined and those containing multiple constructs were split, (4) the statements should not be too abstract nor specific. The precise procedure of selection of items was described by Overgaauw (2020). There were 40 final statements per construct: threats, soothers and drives.

Through social media and patient organization website's, a new group of participants was assembled for the cart sorting task. An envelope with the cards and an instruction book that included the Patient Health Questionnaire-15 and questions about demographics, was sent to the participants who gave informed consent. They could fill in the questionnaires and do the card sorting task at home, which takes about 2 hours, and send them back to Utrecht University. The card sorting was done for threats, soothers and drives, each sorted in two ways. The results were written down by participants in the instruction booklets. The task was divided into three parts, allowing participants the possibility to fill in parts of the task and send these in, for example when they did not have the energy to do the entire task. For the first sorting, patients could choose and name their own subcategories to pile in, as long as each statement was used once, in 4-12 piles, each containing 1-15 statements. For the second sorting, statements were hierarchically sorted on 5 piles of 8 statements, based on their potency to soothe or alleviate somatic symptoms (soothers), to increase or intensify somatic symptoms (threats), and based on how much they drive or don't drive the participant *towards personal goals ?* (drives). All statements had to be placed and could only be placed once.

2.4. Instruments

Somatic symptom severity was measured using the PHQ-15 (Kroenke, Spitzer, & Williams, 2002). Evidence supports PHQ-15 validity (Kocalevent, Hinz, & Brähler, 2013) and reliability, with a test-retest of $\alpha= 0.80$ (Van Ravesteijn et al., 2009). Participants rated 15 somatic symptoms experienced in the past 4 weeks on a Likert Scale ranging from 1-3 (not bothered at all, bothered a bit, bothered a lot). The total score ranges from 0 to 30. The cut-off scores for the PHQ-15 are set at 5- low severity, 10- medium severity, and 15- high severity (Kroenke et al., 2002). All participants with a score of >10 were included in the current study, reflecting medium to high symptom severity. Cronbach's α coefficients was .69 in the present study, indicating acceptable internal consistency.

2.5. Data Analysis

All data was analyzed with the Statistical Package for Social Sciences (SPSS version 25). Before the analysis, missing values were dealt with in the following ways: the data of participants who had misunderstood the card sorting task was deleted, participants with missing values in the invalidation or social support cluster were deleted, statements that were not piled or double-piled were given a separate, numbered pile. Descriptive statistics were computed. Hierarchical cluster analysis was done to reveal the hierarchical structure of soothers and of threats, which were sorted according to their overlap in content. Using dendrograms, a cut-off point was chosen by the researchers to decide on the number of clusters. The researchers named each cluster according to their content, revealing the social support cluster in soothers and the invalidation cluster in threats. Means for the Social support cluster, Invalidation cluster and PHQ-15 scores were computed.

To test the hypothesis that high importance of social support, low importance of invalidation, and their interaction are associated with less severe somatic symptoms, multiple hierarchical regression analyses were performed for social support importance and invalidation importance, including the covariates age, marital status and years since diagnosis. The PROCESS macro with centering of continuous moderator variables was used to analyze the interactions (Hayes, 2016). Two levels were created within social support and invalidation to generate a better understanding in the scores. The cut off point for 'low' and 'high' importance in social support as soother and in invalidation as a threat was set at ½ of the response scale. Significance levels were set at $p < .05$. Assumptions were checked.

2.6. Results

Patient Characteristics

A total of 64 participants with a fibromyalgia diagnosis from the larger sample of participants with enduring physical symptoms were selected for the analysis. The demographic characteristics of participants are shown in table 1. The mean PHQ-15 score was 13.42 ($SD = 3.9$), which is in between medium and high severity (Kroenke et al., 2002). Age and education level were not correlated to social support nor invalidation. Relationship status was significantly correlated with social support ($p = .026$). Table 2 shows the level of social support for single and married participants separately. 92.16% of married participants had high value scores in social support as soother, whereas 44.44% of single participants had high value scores in social support as soother. Therefore, relationship status was entered as a

covariate in the regression analysis. This did not significantly change regression outcomes (F= 1.533, p= .22, R^2 $adj.$=.0246). No significant results were found between relationship status and invalidation.

Table 1

Characteristics of participants (*N*=64)

Age, mean (*SD)* years	47.64	(11.02)
Years since diagnoses, mean (*SD*)	9.73	(8.92)
Relationship status, *n*, *%*		
In a relationship	51	(79.7)
Single	13	(20.3)
Social support value		
Low soother n, %	8	(12.5)
High soother n, %	56	(87.5)
Invalidation value		
Low threat n, %	23	(35.9)
High threat n, %	41	(64.1)
PHQ-15 score*, mean (*SD*)	13.42	(3.9)

* Patient Health Questionnaire.

* The cut off point for 'low' and 'high' importance in social support and invalidation was set at ½ of the response scale.

Social support and invalidation value scores were neither associated with age nor the amount of years since patients received the diagnosis.

Table 2

The level of social support for each relationship status (N=64)

	Relationship status	
Social support level	Single	In a relationship
Low	4	4
High	9	47

Social Support and Invalidation cluster

The items included in the social support and invalidation cluster within soothers and threat respectively are shown in table 3, describing the mean and standard deviation of their perceived importance. Cronbach´s alpha for the social support cluster was α =.536. For the invalidation cluster Cronbach alpha was α =. 601. These Cronbach's alphas indicate that the internal consistency is low.

Table 3

Items included in Social Support, a cluster in Soothers (N=8), and the items included in Invalidation, a cluster in Threats (N=6)

		Mean	SD
Social support		3.16	*(.54)*
Item 4	Doing a fun thing with family or friends	3.02	*(1.12)*
Item 6	To be surrounded by lovely people	3.63	*(1.05)*
Item 17	Having a good or positive conversation	3.05	*(.96)*
Item 20	Seeing that the people around me are happy and healthy	2.50	*(1.21)*
Item 23	Intimacy	2.77	*(1.33)*
Item 26	Being accompanied by or caring for pets	3.38	*(1.28)*
Item 28	Expressing myself to others, knowing that I'm not alone in this	3.16	*(1.14)*
Item 37	Feeling recognized, understood, respected, loved, liked or important	3.80	*(1.03)*
Invalidation		2.82	*(.74)*
Item 5	Time pressure	3.06	*(1.19)*
Item 9	Being unable to keep up in a group activity	2.20	*(1.21)*
Item 17	Social pressure	2.70	*(1.39)*

Item 18	Getting negative judgments or comments	3.06	(1.48)
Item 19	Lack of understanding from others	2.95	(1.20)
Item 33	An expectation that I cannot live up to	2.92	(1.23)

Table 4 shows the results of the regression analysis. The raw table can be found in appendix A. This analysis examines whether social support, invalidation and the interaction between social support and invalidation values are associated with PHQ-15 scores. Following conventional statistical guidelines, no significant association was found. The severity of physical symptoms was not significantly associated with the interaction between social support and invalidation, *F =1.565, p =.22, R2 adj.=.0254* The main effect of social support on symptom severity was not significant (*p =.40*). The main effect of invalidation on symptom severity was not significant (*p =.19*). The latter effect was contradicting the hypothesis, with the main effect being *t= -1.32*.

Table 4

Association of the severity of physical symptoms (PHQ-15) with the importance of social support as a soother and the importance of invalidation as a threat, and the interaction of social support with invalidation, controlling for relationship status.

Variable	T	p	B
Social support	-.84	.40	-3.96
Invalidation	-1.32	.19	-8.61
Interaction	1.25	.22	4.28
Relationship status	-.53	.60	-.68

In figure 1, the regression analysis is visualized, no interaction was found between low and high value in social support and low and high value in invalidation with PHQ-15 scores. The graph cannot be interpreted due to the lack of significant associations. The graph suggests that participants who indicated social support as an important soother had a lower PHQ-15 score then those who indicated it as a less important soother. The graph also shows that participants

who indicated invalidation as an important threat had higher PHQ-15 scores then those who indicated it less of a threat.

Figure 1. *The interaction between social support value and invalidation value in predicting PHQ-15 scores.*
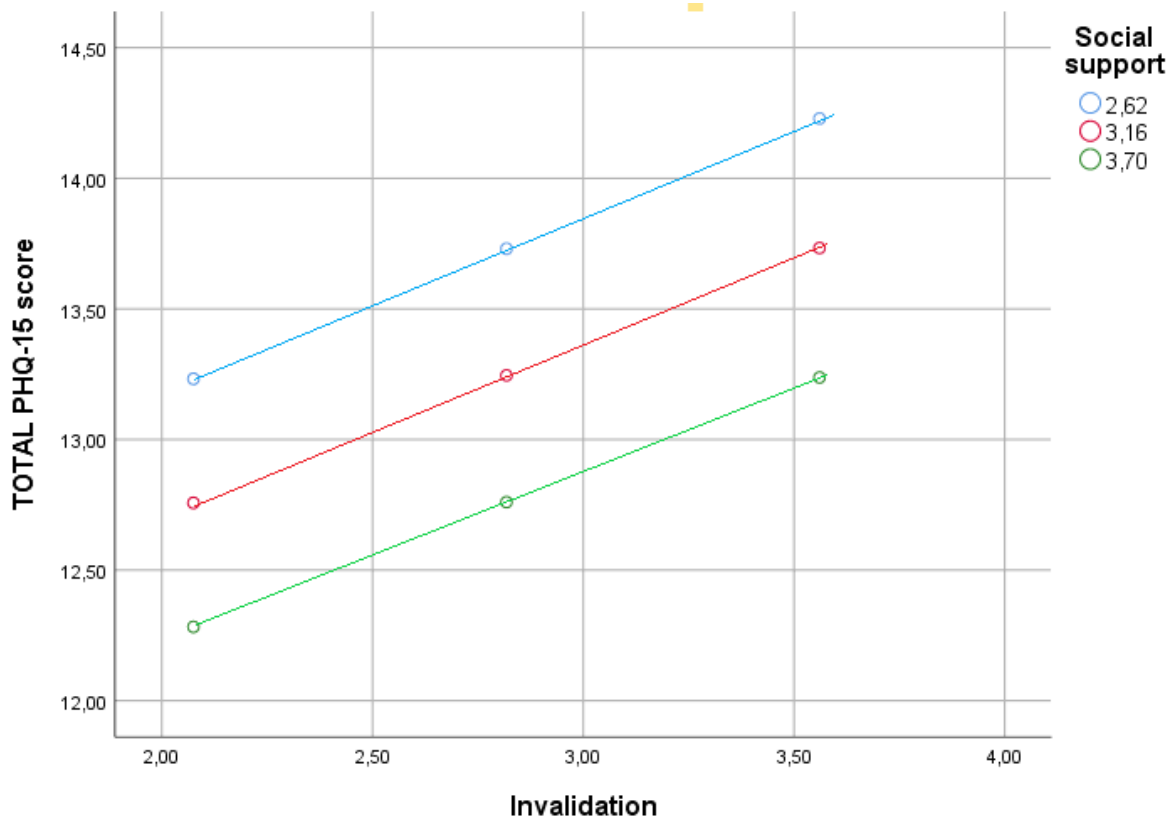
* *The interaction was not significant.*

* *The blue line represents -1 SD from the mean, the red line represents the mean, and the green line represents +1 SD from the mean of social support value.*

* *The graph suggests that participants who place low importance in invalidation and high importance in social support have a lower PHQ-15 score than participants who high importance in invalidation and low importance in social support.*

Ad-hoc analyses

Table 3 indicates that the items in the invalidation cluster do not all address the same concept. Items 5, 9, 17 and 33 could also be conceptualized as pressure, where items 18 and 19 do seem to well within 'invalidation'. For this reason, an ad-hoc analysis was done where the invalidation cluster consists only of item 18 and 19. The Cronbach's alpha for this

invalidation cluster is α = .561. The mean score of the new invalidation cluster is 6.02 (*SD* =2.24).

Table 5 shows the results of the regression analysis. The raw table can be found in appendix B. The severity of physical symptoms was again not significantly associated with the interaction between social support and invalidation, *F =.4048, p =.81, R2 adj.=.0031.* The main effect of social support on symptom severity was not significant (*p =.99)*. The main effect of invalidation when consisting of item 18 and 19 on symptom severity was not significant (*p =.55)*.

Table 5

Association of the severity of physical symptoms (PHQ-15) with the importance of social support and the importance of item 18 and 19 as invalidation, and the interaction of social support with item 18 and 19 as invalidation, controlling for relationship status.

Variable	t	p	B
Social support	-.01	.99	-.03
Invalidation	.61	.54	.83
Interaction	-.43	-.99	-.18
Relationship status	-.06	.95	-.07

Figure 2. *The interaction between social support value and item 18 and 19 as invalidation value in predicting PHQ-15 scores.*
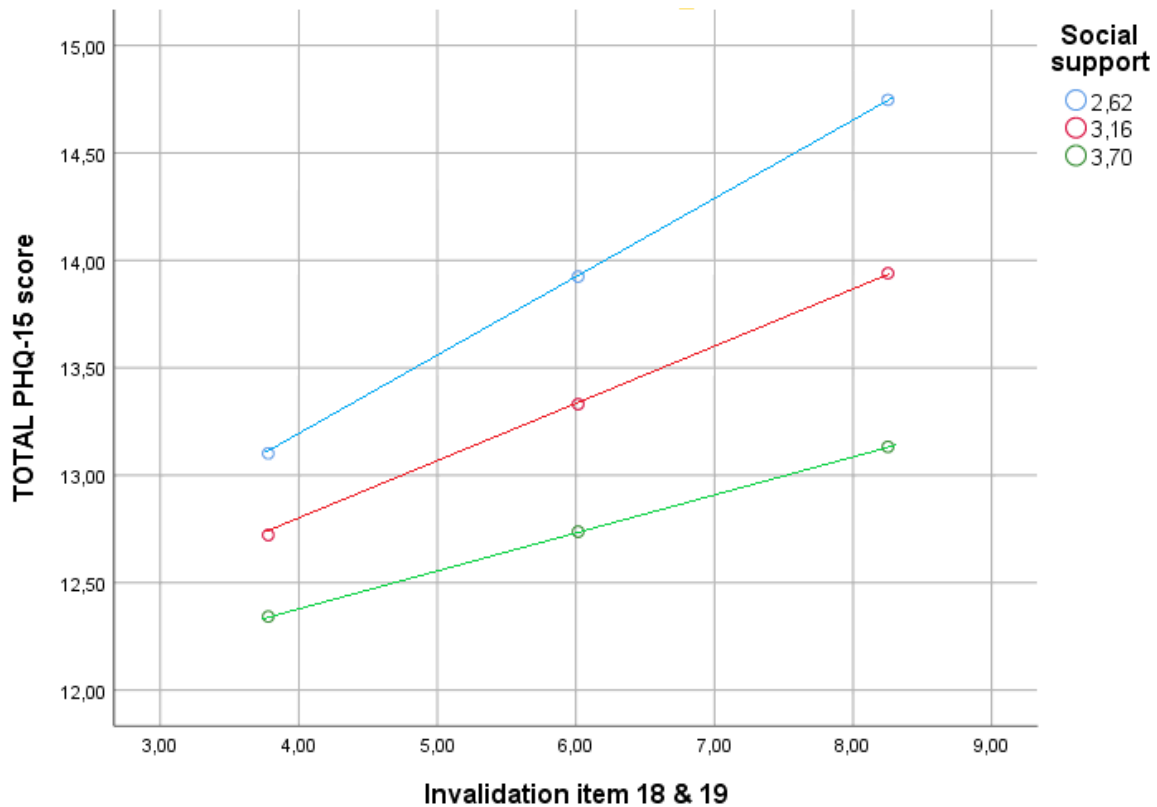
The interaction was not significant.

The blue line represents -1 SD from the mean, the red line represents the mean, and the green line represents +1 SD from the mean of social support value.

The graph shows the same effect as with the previous invalidation cluster. Participants who place low importance in invalidation and high importance in social support have a lower PHQ-15 score than participants who high importance in invalidation and low importance in social support.

2.5. Discussion

The current study examined whether the importance of social support and of invalidation, and the interaction between the importance of social support and invalidation was associated with physical symptoms in female fibromyalgia patients. No significant association was found. The analysis shows a possible association between higher importance of social support as soother and less severe physical symptoms, and between higher importance in invalidation as threat and more severe physical symptoms. But, as this effect was not significant, the aforementioned hypothesis is rejected. Possible reasons for this result are discussed below.

The influence of psychosocial threats and soother on the symptoms of chronic pain diseases has been researched and established in previous studies (see for example Gatchel

et.al., 2007; Kool et.al., 2010; Eisenberger, 2013; Cameron et.al., 2018). Most of this research focuses on rheumatic disease, but recent efforts have found similar results for fibromyalgia patients (Kesmen & Bilgici, 2019). These studies all used a pre-existing questionnaire to test the amount of social support received, and/or the amount of invalidation received. The current study evaluates not the quantity of social support or invalidation and its association to physical symptoms through pre-existing measures, but examines the importance or value that participants placed in the soother 'social support', and in the threat 'invalidation'. It is possible that this measure of importance, rather than quantities, explains the difference in results from previous research that examined similar hypotheses, such as Kesmen and Bilgici (2019).

Other research on psychosocial influences for fibromyalgia patients that focuses more on the quality of social support or invalidation, such as the research by Cooper and Gilbert (2016), has found that the ways in which support is provided and by whom shapes the outcome of the illness experience. Their findings suggest that support from family and spouses play a large role in the experience of fibromyalgia, more than for example the support from medical specialists. Although the current study did not differentiate in who gave the social support or the invalidation, relationship status was filled in by all participants. 79.7% of participants turned out to be in a relationship. When examining the association between relationship status and the value placed in social support, it became evident that participants who were in a relationship more often valued social support than did single participants. Because so many participants were in a relationship, the amount of people in the category that placed lower value on social support was only 8. Smaller sample sizes generally need larger effects before results are significant (Fritz & MacKinnon, 2007). It is plausible that for this reason, no good comparison could be made between participants who put relative low value in social support and those who put relative high value in social support as a soother, as the sample for the low category was only 13, 8 of which single.

Another reason that may have had an impact on the results is the forced sorting task. When sorting the statements based on the value that participants placed in them, how soothing or threatening they were, all statements had to be placed and could only be placed once in 5 piles. This means that even if a participant regarded all social support soothers as equally soothing, she still had to hierarchically sort them on a scale of 1 to 5, from least to most soothing (or threatening). This may have caused a distorted view of the importance that participants placed in the social support or invalidation statements.

It may have also caused a low internal consistency within the social support and invalidation constructs, which is reflected by the low Cronbach Alpha's for both. When looking at the individual items in table 3, it becomes apparent that social support items have clear overlap in content. For invalidation, the items are overlapping less in content, with only items 18 (´getting negative judgments or comments´) and 19 (´Lack of understanding from others´) fitting well within the construct of invalidation. This may be the reason for lower internal consistency. Ad hoc analysis using only item 18 and 19 as invalidation did however not yield different results ($F = .4048, p = .81$).

Other limitations include the relative heterogeneousness of participants. It contained both newly diagnosed patients and patients with a long-term diagnosis of fibromyalgia, which could impact illness experience (Gündüz et.al., 2019). Although the amount of years since the diagnosis was found to not significantly impact the effect of social support and invalidation on physical symptoms, this might change when the sample becomes larger, as a smaller effect size might then generate significant results.

In conclusion, although research indicates a relationship between social support and invalidation with symptom severity, the current study did not find this relationship when looking at the importance that people with fibromyalgia place in social support as a soother and in invalidation as a threat. Non the less, it becomes clear that more research on the value that patients themself place in these constructs is necessary to understand fibromyalgia's multiplicity. Future research on fibromyalgia in women would benefit from larger sample sizes, without losing the possibility to differentiate between the different factors influencing the disease.

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Appendix A.

```
OUTCOME VARIABLE:
 TOTAL_PH

Model Summary
          R          R-sq         MSE            F          df1          df2            p
      ,2084        ,0434      15,5591        ,6697       4,0000      59,0000        ,6156

Model
            coeff          se           t            p         LLCI         ULCI
constant   22,6483      8,9245      2,5378        ,0138       4,7903      40,5062
Invalida   -8,6135      6,5440     -1,3162        ,1932     -21,7081       4,4811
Socialsu   -3,9632      4,7173      -,8401        ,4042     -13,4027       5,4762
Int_1       4,2802      3,4214      1,2510        ,2159      -2,5660      11,1264
RECODED_     -,6789      1,2853      -,5282        ,5993      -3,2509       1,8931

Product terms key:
 Int_1    :         Invalida x         Socialsu

Test(s) of highest order unconditional interaction(s):
      R2-chng          F          df1          df2            p
X*W       ,0254      1,5650      1,0000      59,0000        ,2159
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```

Appendix B.

```
Sample
Size:   64

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OUTCOME VARIABLE:
 TOTAL_PH

Model Summary
          R         R-sq         MSE           F         df1         df2           p
      ,1634        ,0267     15,8311        ,4048      4,0000     59,0000        ,8045

Model
            coeff          se           t           p         LLCI         ULCI
constant   11,9297      8,1226      1,4687        ,1472      -4,3236      28,1830
invalida     ,8301      1,3626       ,6092        ,5447      -1,8965       3,5567
Social_s    -,0336      2,4795      -,0135        ,9892      -4,9950       4,9278
Int_1       -,1765       ,4058      -,4349        ,6652       -,9885        ,6355
RECODED_     -,0728      1,2671      -,0574        ,9544      -2,6081       2,4626

Product terms key:
 Int_1    :           invalida x         Social_s

Test(s) of highest order unconditional interaction(s):
      R2-chng           F         df1         df2           p
X*W       ,0031       ,1892      1,0000     59,0000        ,6652
```