The relationship between Threats, Soothers, and the Combination of both with Severity of Physical Symptoms in Rheumatoid Arthritis

Master Thesis Clinical Psychology

Name: Irene Subirats Alvarado

Student number: 4505670

Supervisor: Prof. Dr. R. Geenen

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Utrecht University

Abstract

Objective: Gilbert's affect regulation model describes the three unique systems of threats, soothers, and drives**.** This study aimed to examine which threats play a role in the severity of physical symptoms in patients with Rheumatoid Arthritis (RA). The first hypothesis was that psychological threats would be associated with the severity of physical symptoms. Secondly, we explored whether the potential association is buffered by soothers (i.e., social connectedness and therapy). **Methods:** This cross-sectional observational study included patients with RA (n=78) with symptoms of chronic pain, exhaustion, or other physical indications. For the threat and soothers questionnaires, factor analysis of 40 items was performed, respectively. A multiple regression analysis was carried out to examine whether the severity of psychological and physical threats was associated with somatic symptoms. We investigated the moderation effects of soother items on the threats. To measure the severity of somatic symptoms and mental and physical well-being, the PHQ-15 and the RAND SF-36 were used, respectively. Multiple linear regression was used to test if psychological threats and physical threats were associated with the severity of somatic symptoms. **Results:** The overall regression analysis was statistically significant (R^2 =0.46, F (2,64) = 27.03, p <.001). Physical threats significantly predicted the severity of somatic symptoms (β=.0242, p= <.001) and psychological threats did not significantly predict the severity of somatic symptoms (β=.007, p=.87). A moderation regression analysis was used to test if the previous association was buffered by the general soother factor. The overall interaction effect was significant (R^2 = 0.042, F (1,62) = 4.64, p. 0.04). **Conclusions:** This can serve as guidance for better understanding of the role of psychological and physical stress on the disease and for the development of more effective treatment options.

Keywords: psychological threats, rheumatoid arthritis, Gilbert's model of affect regulation, threats, soothers

Introduction

Rheumatoid Arthritis (RA) is a chronic, systemic, inflammatory, autoimmune disorder that affects the synovial membrane of multiple joints in a symmetrical manner (Spitzer et al., 2013). The nervous, endocrine, and immune systems are functionally inter-connected and disruptions in transmission between these systems perform a role in RA pathogenesis (Spitzer et al., 2013). It can cause joint impairment, disability, deterioration of quality of life, and cardiovascular and other comorbidities (Spitzer et al., 2013). Stress activates the hypothalamic-pituitary-adrenal (HPA) axis and the autonomic nervous system (ANS), which are also involved in inflammation. Thus, the threat system is linked to the activity of the HPA and the amygdala (Sousa et al., 2021). This indicates that stressful situations can influence rheumatoid arthritis chronic inflammation (RA). (Geenen et al., 2006). However, still the causes of RA are still not clearly understood, and there is no known cure for the disease (Astin et al., 2002). Therefore, it is important to know which threats are more clearly associated in the severity of physical symptoms to improve the psychological well-being of the patients.

According to research into the neurophysiology of emotion, there are at least three types of emotion regulation systems, described by Gilbert's affect regulation theory (Gilbert, 2009). These emotion regulation systems describe threats, soothers, and drives, in which neurophysiological circuits and neuromodulators/neurohormones are involved (Pinto et al., 2020). Those systems interact with one another and permit the individual to achieve biosocial goals (Pinto et al., 2020). Foremost, the *threat* system, which is characterized by negative affect (e.g., anxiety, anger, sadness, shame), is in charge of detecting threats quickly and promoting the activation of appropriate defensive strategies (e.g., fight, flight or freeze) (Sousa et al., 2021). The *drive* system is a positive affect regulation system that activates and mobilizes the organism in search of and acquisition of incentives and resources, as well as guiding the individual toward the satisfaction of biological needs (i.e., reproduction, food, shelter, social status) (Sousa et al., 2021). Finally, the *soothing* system, which is part of the rest and digest system and is also a positive emotion regulation system, is related with enhanced compassion, feelings of safety, attachment, and prosocial actions, all of

which can regulate the activation of both the drive and threat systems (Sousa et al., 2021). In this project the relationship between threats, soothers, and the combination of both with severity of physical symptoms in RA was examined.

Some physical continuous disease symptoms in patients with RA include chronic pain, fatigue, and stiffness (Żołnierczyk-Zreda et al., 2020). Chronic pain is one of the most common symptoms in RA (Seamus & McGuire, 2016), referring to pain that lasts longer than 12 weeks or 3 months (Du et al., 2021). The study of Geenen et al (2006) found a link between distant stressors and chronic pain in retrospective accounts, but it found no link prospectively; there are no prospective studies yet. In recent decades, various psychological models have postulated a range of beliefs and attributions to be precursors in the understanding of chronic pain systems; these include Gilbert's model of affect regulation.

Patients report not only physical symptoms but also psychological stress (Besirli et al., 2020). Accordingly, it has been found as a component that leads to disease activity in patients with RA (Davis et al., 2008) That is why it is important to take into account both physical and psychological threats. Psychological trauma could be an example of posible psychological threats in RA. Due to the fact that, research suggests that posttraumatic stress disorder (PTSD) can cause inflammatory damage by over-activating the hypothalamic-pituitary-adrenocortical and the sympathetic-adrenal-medullary stress axis, which can lead to hypocortisolism due to molecular down regulation of these systems (Boscarino et al., 2010). In retrospective self-report studies, maltreatment was more clearly linked with RA than other classifications of childhood trauma, specifically in women (Spitzer et al., 2013).

In addition, it is useful to know for clinical practice which soothers might help to alleviate symptoms in the RA population. On a neurobiological, psychological, and social level, links between pain and emotion have been established (Purdie et al., 2016). Pain anxiety, pain-related fear, and high arousal of negative emotions, according to Lumley et al., (2011), are linked to more pain and poorer adjustment and these emotional factors are indicated to occur "not only in response to pain but also cause, sustain, or intensify pain". The ability to more efficiently control the difficult feelings caused by pain-related difficulties by using a different way of responding to

those difficulties (self-compassion) tends to be important (Purdie et al., 2016). Self-compassion has been linked to a decreased degree of sadness, worry, and stress, as well as a greater acceptance of pain (Purdie et al., 2016). Thus, in this study we want to test which soothers alleviate the somatic symptoms in the RA population.

Taking these findings and considerations into account, individuals with rheumatoid arthritis were examined.

Explorative research questions:

1. Is the experience of threat associated with the severity of physical symptoms and is this association buffered by soothers?
2. Which threat factors are most clearly associated with severity of physical symptoms, psychological well-being, and functioning?

Expectations:

1. Based on previous findings it is hypothesized that the perception of past trauma is associated with the severity of physical symptoms. Accordingly, PTSD can produce inflammatory damage by over-activating the hypothalamic-pituitary-adrenal and sympathetic-adrenal-medullary stress axis, leading to hypocortisolism due to molecular down-regulation of these systems. There is clinical evidence that PTSD and RA are connected (Boscarino et al., 2010).
2. The previous association can be buffered by soothers as self-compassion therapy has been linked to a lower level of sadness, worry, and stress, as well as a higher level of pain acceptance (Purdie et al., 2016).
3. The threat factors that are more clearly associated with the severity of physical symptoms, psychological well-being and functioning are: physical and psychological threats. On the one hand, physical threats include: a physical symptom such as pain, fatigue or stiffness, a common physical activity such as walking or cycling, a social activity outside the home, holding a certain posture for long, physical effort and an inflammation, infection, flu or other disease activity. On the other hand, psychological threats include memory of a negative past event, a negative thought, having worries, being angry and feeling sad or helpless.

4. Soothers can help to alleviate physical symptoms in RA patients, such as social connectedness and therapy. Thus, a variety of negative mental and physical health outcomes have been linked to social isolation (Bannon et al., 2021).

Method

Design and Procedure

The research design is cross-sectional and observational. To collect data completely anonymously, an online questionnaire (Qualtrics) was used. Participants were recruited via social media sites such as Facebook and LinkedIn, as well as patient advocacy organizations' websites. The data collection started on September 2020 and ended on the 11th of November 2020. The study was approved by the Ethics Committee of the Faculty of Social and Behavioral Sciences of Utrecht University.

Participants

Participants were recruited in the public who presented chronic pain, exhaustion, or other recurring physical symptoms because the target of this study was to figure out what threats, soothers and drives affect these symptoms and syndromes. In all, 1021 people took part in the study, which included diseases such as: Fibromyalgia (FM), chronic fatigue syndrome (CFS), irritable bowel syndrome, and rheumatic illnesses. Since this study is only focused on RA patients, the total sample size was 78.

Measures

The PHQ-15 is a self-administered subscale of the Patient-Health-Questionnaire that measures somatic symptoms (Kocalevent, Hinz & Brähler, 2013). It's a fast test that assesses 15 somatic symptoms that account for more than 90% of physical problems seen in outpatient settings (excluding upper respiratory symptoms that are self-limited) (Kocalevent et al., 2013). The items contain somatic symptoms, which are the most common DSM-IV somatization disorder symptoms (Kocalevent et al., 2013). The severity of 15 symptoms was rated as 0 ("not bothered at all"), 1 ("bothered a little"), or 2 ("bothered a lot") by the participants (Kocalevent et al.,

2013). Answer choices for these two symptoms are marked as 0 (“not at all”), 1 (“several days”), or 2 (“more than half the days” or “nearly every day”) for scoring purposes (Kocalevent et al., 2013). Thus, the cumulative PHQ-15 score ranges from 0 to 30, with scores of 5, 10, and 15 denoting mild, moderate, and severe somatization, respectively. In clinical and occupational health care environments, the PHQ-15 has a high level of reliability and validity (Kocalevent et al., 2013). In the current study, the items of the questionnaire had a good internal consistency in assessing the construct of somatic symptoms (Cronbach’s α= .80).

The RAND SF-36 is a 36-item questionnaire used to measure mental and physical well-being. The RAND-36 is a profile-based questionnaire with many subscales: physical functioning, social functioning, role limitations due to physical health issues, role limitations due to personal or emotional issues, mental health, discomfort, stamina, and general health perception (Krops et al., 2018). The RAND-36 is made up of the same 36 questions as the 36-Items Short-Form Health Survey (SF-36) (Krops et al., 2018).

Finally, the threat and soother items were obtained in newly developed 40 items questionnaire each based on results of two previous studies (FERB 19-219 & 19-274). The response format was using a Likert scale ranging from 1-4 (1. None 2. A little 3. Moderate 4. A lot) indicating the strength of each item. The severity of threat and the soother strength was the mean of the items. The ‘threats' section of the questionnaire is about potential 'threats' to your symptoms and problems. 'Threats' elicit feelings of danger, harm, damage, or unsafety. Some examples of items are ‘Memory of negative past event’ or ‘Negative thought’. On the other hand, the section about 'soothers,' which may help to alleviate your symptoms and problems. A soother is a calming factor that can provide a sense of calm, well-being, safety, or social connectedness. Thus, a description of the effect on your life of the following threats and soothers was asked. Some examples of items are 'Good mood', 'Understanding my disease', or ‘Calm surrounding'. The variable ‘’experience of threat’’ is used as an operationalization to measure the perception of past trauma.

Data Analysis

Data analysis was conducted with IBM SPSS Version 25, using a $\alpha = 0.05$. We described sample characteristics of RA patients (i.e., gender, age) and severity of somatic symptoms (i.e., PHQ-15= Patient Health Questionnaire).

In SPSS, explorative factor analysis of 40 items was performed respectively: of each threat and soothers questionnaire. Since the questionnaire was recently developed. With oblimin rotation, a principal axis factoring analysis was performed. Factors with eigenvalues greater than one were extracted. Accordingly, items were omitted if the loading on the first factor was less than .45 (Comrey & Lee, 1992) or the loading on the subsequent factors was greater than .32 (Costello & Osborne, 2005). On the one hand, the remaining 35 items of the threat questionnaire loaded on one of the two factors: the first factor was labeled as psychological threat and the second as physical threats. On the other hand, the 29 items of the soother questionnaire loaded on one of the two factors: the first factor was labeled as social connectedness and the second as therapy.

Pearson correlation coefficients were computed to assess the linear relationship of the severity of physical symptoms between psychological threat severity, physical threat severity, social connectedness soother strength, and therapy strength soother strength. In addition, a multiple regression analysis was done to test whether the severity of somatic symptoms and psychological and physical threats were associated. Finally, to investigate the moderation effects of the soothers items on the threats we used the Process Macro (Hayes, 2013). The variables were centered and using 1000 bootstrap samples.

Results

Demographics

Table 1 shows the descriptive statistics of the participants. There was a sample of 78 participants with RA (Rheumatoid Arthritis), consisting of 68 women and 10 men. The PHQ-15 results for the RA patients presented a minimal score of 1 and a maximal score of 24. RA individuals with mild scores in the PHQ-15 were 9%, moderate 21.8% and severe somatic symptoms 57.7%. Among RA patients, the most frequent age range is (51-60) years, consisting of 41% of the sample (Cronbach's α= .80).

Table 1.

Demographics of participants with Rheumatoid Arthritis and Total PHQ-15= Patient Health Questionnaire

	Sample with Rheumatoid Arthritis (*N*=78)
Gender, n (%)	
Female	68 (87.2%)
Male	10 (12.8%)
Age group, n (%)	
21-30 years	2 (2.6%)
31-40 years	6 (7.7%)
41-50 years	14(17.9%)
51-60 years	32 (41%)
61-70 years	23 (29.5%)
71-80 years	1 (1.3%)
Total PHQ-15, n	69
Range (min-max)	23 (1-24)
Sample mean (SD)	12.14 (5.05) Cronbach's α .80

Factor analysis: Threat and Soothers Items

The scree plot of eigenvalues and the pattern of factor loadings after rotation indicated two factors for each questionnaire. Table 2 shows the results of factor analysis of threats. A two-factor solution was chosen: psychological threats (factor 1) and physical threats (factor 2). In Table 3, a factor analysis for soothers was completed with a two-factor solution, that includes: social connectedness (factor 1) and therapy (factor 2). For the threat questionnaire five of the 40 items were deleted and for the soothers questionnaire eleven of the 40 items were deleted. The threats factors that were most clearly associated with severity of physical symptoms were: a physical symptom such as pain, fatigue or stiffness, an abrupt change in weather, a common

physical activity such as walking or cycling, physical effort, a weather circumstance such as temperature or humidity, being out of energy, a change in daily routine, a social activity outside home, a task at work or household, or an administrative task, getting visitors at home, holding a certain posture, an expectation that I cannot live up to, being unable to keep up in the group activity, having multiple activities scheduled, using medication, an inflammation, infection, flue, or other disease, food that is not good for me and substances such as alcohol, cigarettes of softdrugs. Further, factors associated with psychological well-being were memory of negative past event, negative thought, having worries, being angry, a negative life event, feeling sad or helpless, an argument, getting negative judgments or comments, social pressure, being stressed or tense, feeling lonely, time pressure, a situation that triggers irritation or anger, being perfectionistic, lack of understanding from others, exceeding my limits and getting inadequate care.

Table 2.

Factor loadings of the threat items (n=40)

Items	Factor loadings	
	Factor 1	Factor 2
Psychological threats		
14. Memory of negative past event	**.94**	-.24
32. Negative thought	**.90**	-.26
12. Having worries	**.90**	-.15
24. Being angry	**.90**	-.14
23. A negative life event	**.87**	-.08
16. Feeling sad or helpless	**.84**	.01
27. An argument	**.81**	.03
18. Getting negative judgments or comments	**.76**	.06
17. Social pressure	**.71**	.12
02. Being stressed or tense	**.68**	.14
29. Feeling lonely	**.59**	.07
05. Time pressure	**.52**	.23
07. A situation that triggers irritation or anger	**.51**	.30
40. Being perfectionistic	**.49**	.20
19. Lack of understanding from others	**.48**	.36
26. Exceeding my limits	**.46**	.40
21. Getting inadequate care	**.46**	.25

10. Little time to rest	.44	.18
13. Poor sleep	.44	.25
11. Being physically not active	.42	.26
15. Stimuli, such as noises, scents, bright lights or radiation	.35	.33
31. Doing nothing	.20	.16
Physical threats		
38. A physical symptom such as pain, fatigue or stiffness	-.14	**.86**
06. An abrupt change in weather	-.32	**.78**
36. A common physical activity such as walking or cycling	-.07	**.76**
22. Physical effort	.02	**.76**
20. A weather	-.19	**.76**
Circumstance, such as temperature or humidity		
34. Being out of energy	.18	**.75**
35. A change in daily routine	.17	**.63**
01. A social activity outside home	.17	**.58**
30. A task at work or household, or an administrative task	.18	**.57**
39. Getting visitors at home	.18	**.52**
03. Holding a certain posture	.11	**.47**
33. An expectation that I cannot live up to	.35	**.47**
09. Being unable to keep up in the group activity	.26	**.45**
28. Having multiples activities scheduled	.34	**.44**
04. Using medication	.05	**.38**
25. An inflammation, infection, flue, or other disease activity	.32	**.36**
08. Food that is not good for me	.11	**.35**
37. Substances such as alcohol, cigarettes of softdrugs	.19	**.26**
Eigenvalue	15.18	3.75
% explained variance	37.95	9.37
Cronbach's alpha	0.95	0.91

Note. Items with bold factor loadings were included in the factor

Table 3.

Factor loadings of the soother items (n=40)

Items	Factor loadings	
	Factor 1	Factor 2
Social connectedness		
06. Surrounded by lovely people	**.76**	-.15
31. Good mood	**.74**	-.01
05. Leisure activity	**.71**	-.19
17. Good or positive conversation	**.70**	.16
33. Secure and trusted environment	**.69**	-.05
20. People in my environment are happy and healthy	**.69**	-.14
04. Doing a fun thing with family or friends	**.68**	-.18
24. Having a positive mindset	**.67**	.02
27. Receiving physical affection	**.58**	.13
37. Feeling recognized, understood, respected, loved, liked or important	**.57**	.19
32. Physical activity	**.56**	-.01
23. Intimacy	**.54**	.09
15. Calm surrounding	**.50**	.21
18. Healthy or good nutrition	**.49**	.16
28. Expressing myself to others and knowing that I'm not alone in all of this	**.48**	.26
16. Good balance between activities and relaxation	**.47**	.25
21. Having the freedom to do something in the way I want to do it myself	**.46**	.22
30. Comfortable posture		
Resilience		
38. Yummy beverage, eating a treat or smoking a cigarette	.44	-.10
34. My limits or boundaries	.42	.22
22. To take a rest or a break	.38	.31
35. Nicer weather	.37	.15
09. Consistency and structure	.33	.10
12. Understanding my disease	.33	.26
25. Sharing experiences with fellow sufferers	.30	.27
Therapy		
13. Getting a massage	-.06	**.61**
19. Alternative medicine	-.01	**.54**
29. Professional help	.03	**.52**
21. Relaxation or breathing exercise	.17	**.51**
14. Supplements	.01	**.50**
07. Warm temperature	.11	**.47**
02. Aids	.07	**.44**
39. Activity in water	.09	**.42**
36. Sleeping	.21	**.40**
03. Medication reducing symptoms	-.12	**.37**

01. Mindfulness	.24	**.37**
11. Help from other people	.23	**.36**
40. Spiritual or religious activity	.15	.23
10. Something cooling	-.04	.18
27. Pets	.12	.16
Eigenvalue	10.80	2.64
% explained variance	27.01	6.61
Cronbach's alpha	0.88	0.79

Note. Items with bold factor loadings were included in the factor

Pearson Correlation

Pearson correlation coefficients were computed to assess the linear relationship of the severity of physical symptoms between psychological threat severity, physical threat severity, social connectedness soother strength, and therapy strength soother strength. Concerning the severity of physical symptoms, psychological threat severity was found to correlate with a medium strength ($r = 0.493$, $n = 67$, $p = 0.000$), whereas for physical threat severity a large correlation was found ($r = 0.677$, $n = 67$, $p = 0.000$). On the other hand, no correlation was found between the severity of physical symptoms with social connectedness soother strength ($r = 0.010$, $n = 66$, $p = 0.938$) or therapy strength ($r = 0.099$, $n = 66$, $p = 0.428$). Thus, increases in the severity of physical symptoms were moderately correlated with increases in psychological threat severity and highly correlated with physical threat severity, but not related to changes in social connectedness soother strength or therapy strength (See Table 4).

Table 4.

Descriptive Statistics and Correlation Coefficients for Severity of Physical Symptoms (Total PHQ-15) between Threat and Soother Variables

Variable	M	SD	1
1.Total PHQ-15	12,1	5,1	
2.Therapy	30,4	7,3	0,099
3.Social Connectedness	48,7	10,0	0,01
4. Psychological Threats	40,3	13,8	,493**

5. Physical Threats	56,2	13,8	,677**

** $p < 0.01$; * $p < 0.05$ level (2-tailed); Threats *N*= 67; Soothers *N*= 66

Regression Analysis

Multiple linear regression was used to test if psychological threats and physical threats were associated with severity of somatic symptoms. The overall regression was statistically significant (R^2 =0.458, F (2,64) = 27.028, p <.001). It was found that physical threats were significantly associated with the severity of somatic symptoms (β=.0242, p= <.001). However, it was found that psychological threats did not significantly predict the severity of somatic symptoms (β=.007, p= .886).

Table 5.

Multiple Regression Analysis Model predicting the Severity of Somatic Symptoms (Total PHQ-15)

Model 1	*Unstandardized B*	*Coefficients Std. Error*	*Standardized Coefficients Beta*	*t.*	*Sig.*
(Constant)	-1.756	1.942		-0.904	0.369
Psychological Threats	0.007	0.048	0.019	0.144	0.886
Physical Threats	0.242	0.048	0.663	5.036	0.000

Dependent: Total PHQ-15

Secondly, to test if psychological threat severity was associated with the severity of physical symptoms and whether this association was buffered by the general soother factor, a moderation regression analysis was used. The overall interaction effect was significant (R^2 = 0.042, F (1,62) = 4.644, p. 0.04) and the moderator also respectively in the unconditional effects. Accordingly, the soothers did buffer the association of psychological threat severity and the severity of physical symptoms.

Table 6.

Model Moderation Regression Analysis

	Coeff	se	t	p	LLCI	ULCI
Constant	12.39	0.48	25.56	0.00	11.42	13.35
Threat	0.12	0.02	6.11	0.00	0.08	0.16

Soothers	-0.02	0.02	-0.93	0.36	-0.07	0.03
Interaction	-0.00	0.00	-2.15	0.04	-0.00	-0.00

Interaction: Threat x Soothers

Table 7.

Slopes for threats predicting severity of physical symptoms at each level of the soother variable

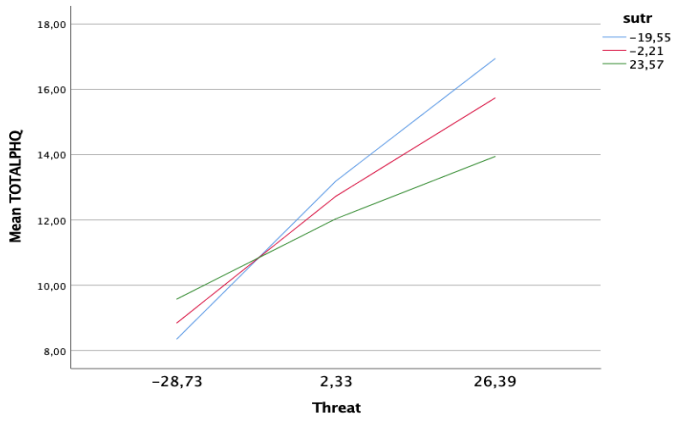
Soother	Effect (Slope for threats b)	se	t	p	LLCI	ULCI
-19.55	0.16	0.02	6.68	0	0.11	0.2
-2.21	0.13	0.02	6.38	0	0.09	0.16
23.57	0.08	0.03	2.64	0.01	0.019	0.14

Note. Soother (-19.55= low, -2.21= medium, 23.57= high).

The model shows a significant interaction between threat severity and soother strength on severity of physical symptoms (PHQ-15) (b= -0.00, SE= 0.00, $p < 0.05$). Figure 1 shows that the lower the soother strength (the blue line) had more severe physical symptoms with the more threat severity. However, had less severity in their physical symptoms on the average level of soother strength (the red line). Those who had more soother strength (the green line) had less severity of physical symptoms than average. The difference in the slopes for soothers shows that soothing strength moderates the relationship between threat severity and the severity of physical symptoms.

Figure 1.

Moderation by Soothers



Note. variable 'sutr'=soother

Discussion

The current study was to investigate the relationship between threats, soothers, and the combination of both with the severity of physical symptoms in RA. Based on Gilbert's model of affect regulation the questionnaire of threat and soothers was used. The results of the overall multiple linear regression that tested if psychological threats and physical threats were associated with the severity of somatic symptoms was significant. In addition, results indicated that physical threats were associated with the severity of physical symptoms in RA. However, psychological threats proved not to be significant. Pearson correlation coefficients were performed to assess the linear relationship of the severity of physical symptoms between psychological threat severity, physical threat severity, social connectedness soother strength, and therapy strength soother strength. Psychological threat severity and physical threat severity were associated to the severity of physical symptoms. Finally, the moderation analysis showed that the severity of physical symptoms was buffered by the perception of soothers.

The first expectation was that the severity of threats would be associated with the severity of physical symptoms. It was concluded that, the overall results of the multiple regression analysis indicated a significant result. Specifically, in the multiple regression analysis psychological threats did not show to be significant. However, Pearsons correlation was performed and indicated that psychological threat severity is associated with physical symptoms severity (an example of psychological threat severity e.g., psychological trauma). In this study, psychological threats included items that could reflect the perception of trauma and PTSD (e.g., 'memory of negative past event', e.g., 'negative thought', e.g., 'having worries', e.g., 'being angry', e.g., 'a negative life event', e.g., 'feeling sad or helpless', e.g., 'being stressed or tense', e.g., 'a situation that triggers irritation or anger'). Accordingly, the *DSM-5* (APA, 2013) PTSD Criteria includes definitions related to some of those items. In line with the hypothesis of Boscarino et al., (2010) there is clinical evidence that PTSD and RA are linked.

The second expectation was that the severity of physical symptoms would be buffered by soothers (e.g., different types of therapy has been associated with higher level of

pain acceptance) (Purdie et al., 2016). In our study it was found that soothers did work as a buffer to alleviate the severity of physical symptoms in the RA population. The two factors of soothers we used in our study were 'Social Connectedness' and 'Therapy'. Contrary to our results it is proven by literature that RA patients who reported more restrictions in social participation had more pain, fatigue, and lower functioning disability (Benka et al., 2016). Therefore, social connectedness can serve as help to improve the severity of physical symptoms such as pain and fatigue.

Concerning the 'Therapy' factor including professional help, relaxation or breathing exercise, supplements, warm temperature, aids, activity in water, sleeping, medication reducing symptoms, mindfulness and help from other people. Although therapeutic approaches for instance mindfulness have shown effectiveness for medical conditions with chronic pain (shown in symptom reduction and the improvement of emotional functioning) (Costa et al., 2019). In our study was found significant results in the moderation analysis concerning the general soother factor (that includes social connectedness and therapy). 'Therapy' and 'Social Connectedness' (the soother strength factor) served as a buffer to alleviate physical symptoms.

It was investigated which threat factors were more clearly associated with the severity of physical symptoms, psychological well-being, and functioning. Thus, two factors were identified: 'Physical' and 'Psychological' threats. Is in line with the finding of Davis et al. (2008) that disease activity is caused by psychological stress. On the other hand, 'Physical' threats such as e.g., chronic pain and fatigue are clearly associated with RA (Żołnierczyk-Zreda et al., 2020). Accordingly, physical symptoms such as chronic pain can be explained by Gilbert's model of affect regulation (Geenen et al., 2006). Thus, it was important to identify which soothers help to alleviate physical symptoms which were: 'Therapy' and 'Social Connectedness' as mentioned above. As mentioned in the findings of Bannon et al. (2021) social isolation has been related to several detrimental mental and physical health effects.

There are numerous limitations to our study, such as measurement of different therapeutic approaches it is not possible as the study is cross-sectional and observational. Also, the sample proportion of patients with RA was only 7.64%. (Although with a good sample size of 78 participants). In addition, the threats and

soother questionnaire were newly developed based on previous research. Therefore, there is insufficient research in the relationship between threats, soothers, and the combination of both with the severity of physical symptoms in RA. Future research should further test these questionnaires.

The strength of this study given its nature of a cross sectional design its that its relatively easy to conduct and not costly. It was done online through a questionnaire, so the participants had a more comfortable access to it. In addition, Gilberts model can serve as a guidance in understanding how the severity of physical symptoms is affected by psychological, physical threats and social connectedness and therapy soother.

To conclude, it has been recognized which threats were more clearly associated with the severity of physical symptoms in patients with RA. This can serve as guidance for better understanding of the role of psychological and physical stress on the disease and for the development of more effective treatment options. Gilbert's affect regulation model on RA.

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