

# Body appreciation as a protective factor in women with fibromyalgia: an examination of associations between pain perception, social comparison and psychological distress

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## Abstract

### Objectives

While symptoms of fibromyalgia (FM) and psychological distress are directly linked, indirect effects are also apparent. The aim of the present study was to develop an explanatory model for the effect of FM on women's psychological distress and identify possible protective and risk factors.

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### Methods

This study comprised of total of 293 women aged 20-68 ( $M=34.3$ ,  $SD=12.1$ ), of which 141 were women with FM and 152 healthy peers (HP), who completed questionnaires regarding demographic characteristics, anxiety (GAD-7), depression (PHQ-9), body appreciation (BAS-2), social comparison strategies, and pain assessment (SF-MPQ).

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### Results

FM patients demonstrated higher psychological distress, i.e. depression and anxiety and lower body appreciation. Body appreciation significantly correlated with social comparison coping strategies. Body appreciation and social comparison strategies mediated the link between FM and psychological distress. Among FM patients, body appreciation moderated the links between pain intensity and aspects of social comparison strategies, thus explaining the link between pain intensity and psychological distress.

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### Conclusion

Women with FM demonstrated higher levels of anxiety and depression symptoms and lower body appreciation compared to HP. The unique role of body appreciation in moderating the indirect link between pain and psychological distress appears to be protective.

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### Key words

fibromyalgia, body appreciation, pain, social comparison, psychological distress

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## Introduction

Fibromyalgia syndrome (FM) is a chronic rheumatologic condition, commonly occurring in women, portrayed by widespread chronic centralised pain (1). The pain is accompanied by other physical and psychological symptoms such as fatigue, muscle stiffness, sleep disruption, and functional symptoms (2), as well as the frequent comorbidities of anxiety and depression (3). This comorbidity is found to be more prevalent in FM than in other chronic pain conditions (e.g. 4) and healthy peers (HP) (5). Gracely *et al.* established that while FM and depression are directly linked, there are also indirect effects (6). Accordingly, we aim here to identify both factors that play a role in mediating the psychological impact of FMS and related protective and risk factors.

### Body image

Body image, defined as the multifaceted psychological experience of one's body-related self-perceptions and self-attitudes including thoughts, beliefs, feelings, and behaviours (7), has gained increasingly widespread attention among health researchers (8). They have stressed the need to relate to the lived-in experiences of the body, which incorporate experiences of pain and disability (9) and, in turn, contribute to the formulation of body image functionality (8). Women suffering from FM perceive their body as dysfunctional (10). Core problems of FM include distrust and non-acceptance of the body, significant functional impairment and disability (11), loss of vitality (12), and overweight and obesity (13). Although FM is not typically accompanied by body deformities, it is associated with low body image perception (appearance and functionality), and psychological distress (12, 14, 15).

In spite of the apparent potential significant allusions, there has been limited research examining the ways in which physical health problems could affect body image in general (16), and among women with FM in particular. Given the range of both visible and invisible problems associated with body image among FM women, recent studies on body image have suggested placing val-

ue not only on physical appearance but also on physical functionality (9, 16). The present study therefore employs a positive body image approach characterised by body appreciation that focuses on functionality and rejects the cultural emphasis on body aesthetics (8).

### Social comparison

Self-evaluations relative to others (*i.e.* social comparisons) have important implications for health and well-being (17). Generally speaking, all people turn to social comparisons to explain disconcerting symptoms and to make decisions about appropriate preventive behaviours (18). Yet, in states of chronic illness when objective reality is absent (19), individuals are even more motivated to search for relevant social information in others in order to assess their own situation or performance (20). It has therefore been suggested that patients such as women with FM, who suffer constant pain and functional restrictions as well as being exposed to social misunderstanding of the disease, might experience a high degree of stress and uncertainty which may result in continuous self-assessment and social comparison (21, 22).

The identification-contrast model (23) establishes four different social comparison coping strategies. Patients with chronic illness might compare themselves with those who are in a better situation and are considered as similar (upward identification) or different (upward contrast); on the other hand, they might also compare themselves with those who are in a worse situation by focusing on differences (downward contrast) or similarities (downward identification). This manner of comparison was also found related to illness adjustment (e.g. 18, 24). The two strategies that elicit positive affect such as hope, inspiration, or relief (upward identification and downward contrast) have mainly been associated with active coping strategies and better psychosocial adjustment (19, 25). The two strategies that elicit negative affect such as envy, frustration, fear, or worry (upward contrast and downward identification) have tended to be related to passive and avoidance strategies (26) and to higher depression

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and worse adjustment (22, 27). Correspondingly, empirical evidence on FM demonstrated that while better mood is related to upward identification or downward contrast strategies, higher levels of anxiety and depression are associated with upward contrast or downward identification (28, 29).

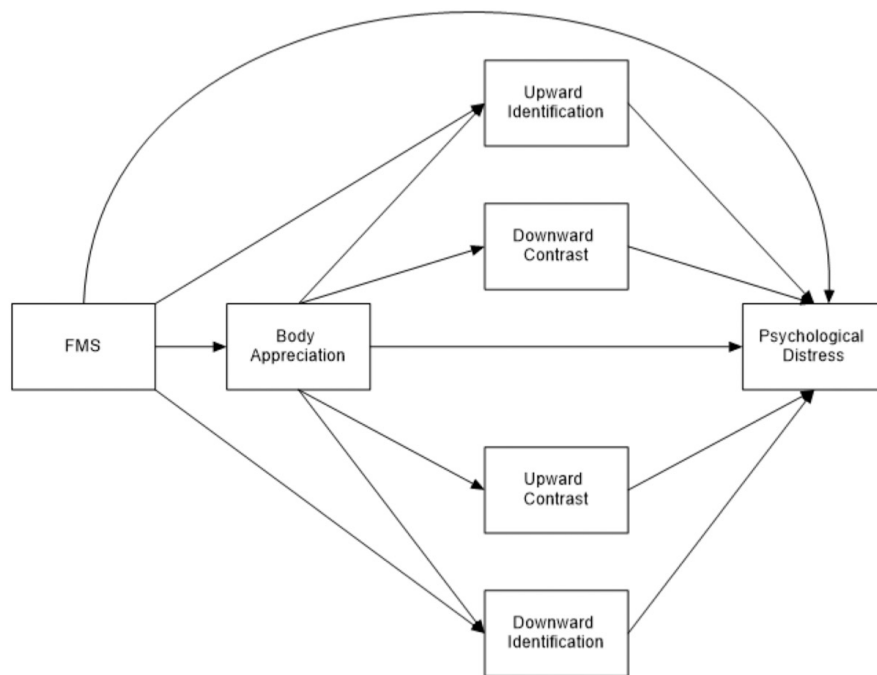
Lastly, lower body appreciation and body dissatisfaction among women with FM may be associated with the discrepancy between the current perceived body model (due to functional limitations) and the ideal body model (30, 31). While past research established that individuals with chronic illness tend to be engaged in appearance social comparisons (32, 33), which leads to higher body dissatisfaction, the link between body appreciation and illness severity and progress was not examined. Given the central role that both body image and social comparison processes play in health-related situations, we therefore suggest the need for a deeper understanding of this link.

**Pain**

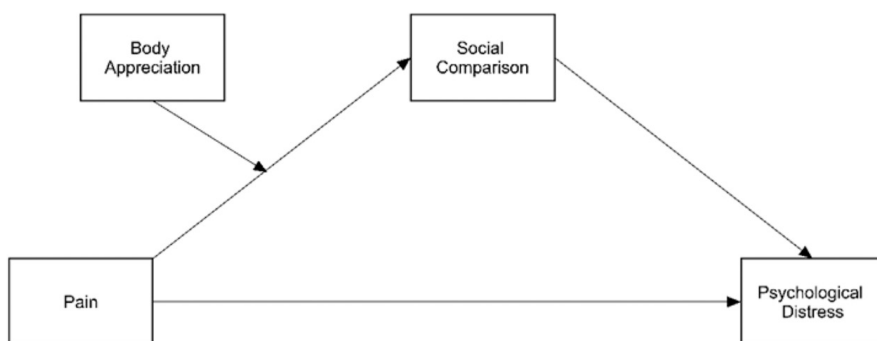
Chronic and diffuse pain is the core symptom of FM (3, 34), and heightened perception of pain has been found associated with high levels of anxiety and depression (35, 36). The developmental theory of embodiment suggests that individuals' lived experiences with pain may predict their body image (16, 37). Moreover, the literature has inferred a link between FM-associated pain and reduced body appreciation (38, 39). Social comparison is further posited to play a role in mediating the development of anxiety and depression in FM patients. Thus, the overarching goal of the current study is to identify the roles and the interplay between body appreciation, pain, and social comparison in the manifestation of psychological distress in FM patients.

Within this context, the hypotheses of our study are:

1. Differences will be found between HP and women with FM such that women with FM will present higher psychological distress (*i.e.* increased levels of depression and anxiety symptoms) and lower body appreciation.
2. Body appreciation will be positively



**Fig. 1a.** Hypothesised mediation model.



**Fig. 1b.** Hypothesised moderated-mediation model.

correlated with the positive affect of social comparison strategies and negatively correlated with the negative affect of social comparison strategies.

3. Both body appreciation and social comparison strategies will mediate the association between health status (HP vs. FM participants) and the psychological distress symptoms of depression and anxiety such that women with FM will present lower body appreciation which, in turn, will result in a more negative and less positive affect of social comparison strategies and lead to higher psychological distress.

4. Among women with FM, social comparison strategies will mediate the link between pain intensity perception and the psychological distress symptoms of depression and anxiety. Addition-

ally, body appreciation will moderate the association between pain and social comparison strategies. Specifically, increased pain in women with FM will be associated with a more negative and less positive affect of social comparison strategies and lead to higher psychological distress. The indirect effect will be moderated by lower body appreciation (Fig. 1a-b).

**Materials and methods**

This cross-sectional survey was carried out in Israel during 2020-2021 as part of a research project on FM and its association with psychological variables. Participants were recruited via two different methods: 1. relevant online forums, those who volunteered to participate in the study were given a link

**Table I.** Sample characteristics, group comparison in demographic variables, and Pearson correlations with the outcome variables of the study.

	Control (n=147)		FM patients (n=146)		Correlations		
	M (SD)	n (%)	M (SD)	n (%)	F/ $\chi^2$	Depression	Anxiety
Age	30.0 (9.4)		39.7 (12.9)		53.2**	0.14*	0.03
BMI	22.8 (4.8)		25.7 (6.6)		18.7**	0.11	0.07
Has children		35 (17)		99 (49)	50.6**	0.12*	0.07
Relationship status		81 (39)		109 (55)	10.2**	-0.01	0.03
Academic degree		180 (86)		123 (62)	30.4**	-0.34**	-0.33**

\* $p < 0.05$ , \*\* $p < 0.01$ . BMI: body mass index.

to a survey and asked to complete it electronically; 2. a snowball/convenience sample, research assistants approached potential participants among their acquaintances, who were, in turn, asked to help expand the sample. The study was approved by the institutional ethics committee (no. 2020216 30.11.2020). All participants signed an informed consent before taking part. Inclusion criteria were women aged over 20 who were fluent in Hebrew. Control and experimental groups were divided based on self-reports of existing medical conditions. Diagnosis was not corroborated by medical records. A total of 411 women comprised the sample, of whom 200 reported being diagnosed with FM. The final sample comprised 293 women, of whom 141 reported being diagnosed with FM and 152 were HP who completed the entire survey. Participants were aged 20-68 ( $M=34.3$ ,  $SD=12.1$ ).

### Measures

Demographic and personal information included weight (kg), height (m), age, education, marital status, and number of children. BMI was calculated by the researchers from participants' self-reported weight and height. Women who reported being diagnosed with FM also reported the duration of their illness. Depression was assessed using the 9-item Patient Health Questionnaire (PHQ-9) (40, 41 [Hebrew translation]). Each item ranges from 0 (not at all) to 3 (nearly every day). All scores are summed to obtain a global score, which ranges from 0 to 27 with higher scores indicating higher levels of depression. Internal consistency of the PHQ-9 in the current study was satisfactory ( $\omega=0.91$ ). The Generalised Anxiety Disorder

Scale (GAD-7) (42) is a 7-item generalised anxiety measure (panic disorder, social anxiety disorder, and post-traumatic stress disorder). Each item ranges from 0 (not at all) to 3 (nearly every day). All scores are summed to obtain a global score, which ranges from 0 to 21 with higher scores indicating higher levels of anxiety. Internal consistency of the GAD-7 in the current study was satisfactory ( $\omega=0.93$ ).

The Body Appreciation Scale-2 (BAS-2) (43, 44 [Hebrew translation]) is a 10-item measure that assesses acceptance of one's body, respect and care for one's body, and protection of one's body from unrealistic beauty standards. Each item ranges from 1 (never) to 5 (always). An overall score was computed as the mean of all items, with higher scores reflecting greater body appreciation. Internal consistency of the Bas-2 in the current study was satisfactory ( $\omega=0.93$ ).

The Short-Form McGill Pain Questionnaire (SF-MPQ) (45, 46 [Hebrew translation]) is a 15-item adjective checklist that assesses pain intensity perception. Each item ranges from 0 (none) to 3 (severe) as well as two single-item measures of present pain. Only the total score, *i.e.* the sum of the two scores mentioned above, was used for purposes of the present study, with higher scores reflecting greater pain perception. Internal consistency of the SF-MPQ in the current study was satisfactory ( $\omega=0.88$ ).

The Social Comparison Illness Scale (19, 47 [Hebrew adaptation]) is a 12-item scale that assesses social comparison strategy. Each item ranges from 1 (never) to 5 (very often). Three items were included (range 3-15) for each of the four subscales of social compari-

son strategies: upward identification, upward contrast, downward identification, and downward contrast. Higher scores indicate a greater frequency of each comparison strategy. In the current study McDonald Omega's of the sub-scales ranged between 0.77-0.89.

### Statistical analysis

Data are described as mean (standard deviation) for continuous data or count (percent) for nominal data. Group comparisons were done using one-way ANOVA for continuous variables and the  $\chi^2$  test for nominal ones. Correlations between variables were estimated using the Pearson correlation coefficient. The mediation hypotheses were tested using the Process macro (48) model 81 and the moderated-mediation hypothesis was tested using model 7 with 5000 bootstrap samples.

### Results

Sample demographics as well as the correlations between the socio-demographic and outcome variables are presented in Table I. As age, having children, and having an academic degree significantly correlated with the outcome variables, they were included as covariates in all mediation models. Additionally, BMI was correlated with body appreciation ( $r = -0.16$ ,  $p < 0.01$ ) and was therefore included in the model to rule out its possible confounding effect. Table II shows the group differences in the main study variables, and Table III shows the correlations among them.

### Factors involved in psychological distress: comparison between women with FM and HP

Hypothesis 1: Group differences

In accordance with hypothesis 1, as

seen in Table II we found that FMS patients presented higher levels of anxiety and depression symptoms and lower body appreciation.

**Hypothesis 2: Correlations**

As can be seen in Table III, body appreciation significantly correlated with the four social comparison strategies: for example, body appreciation was positively correlated with upward identification and downward contrast while being negatively correlated with upward contrast and downward identification. The hypothesis was thus supported by the data.

**Hypothesis 3: Mediation models (Fig. 2).**

**Depression**

The model testing whether body appreciation and social comparison mediate the relationship between FM and depression is shown in Figure 3. We found a significant direct effect (Beta=1.05,  $p<0.001$ ) indicating that women with FM report higher depression levels than HP. We also found indirect effects through body appreciation and downward contrast (Beta=0.03, 95% CI=[0.01, 0.06]), body appreciation and upward contrast (Beta=0.05, 95% CI=[0.02, 0.09]), and body appreciation and downward identification (Beta=0.02, 95% CI=[0.01, 0.05]). We learned that women with FM have lower body appreciation, leading to less downward contrast and more upward contrast and downward identification, and resulting in higher depression levels.

**Anxiety**

The model testing whether body appreciation and social comparison mediate the relationship between FM and anxiety is shown in Figure 3. We obtained similar results to those of the model predicting depression, namely, a significant direct effect (Beta=0.79,  $p<0.001$ ) indicating that women with FM report higher anxiety levels than the control group. We also found indirect effects through body appreciation and downward contrast (Beta=0.03, 95% CI=[0.01, 0.07]), body appreciation and upward contrast (Beta=0.07, 95% CI=[0.03, 0.012]), and body appreciation and downward identification

**Table II.** Group differences in the main study variables.

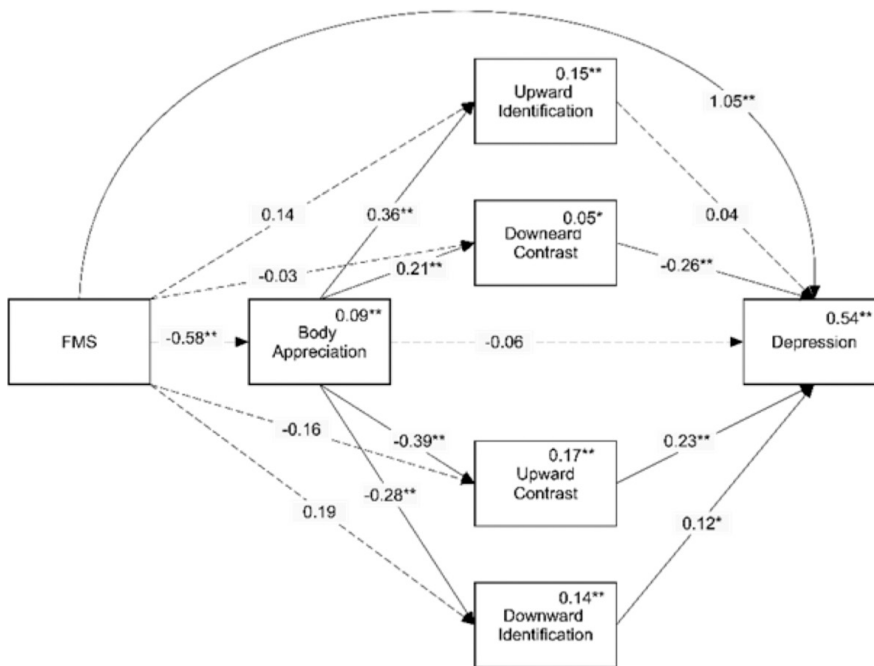
	Control (n=147) M (SD)	FM (n=146) M (SD)	F (1, 291)
Depression	7.4 (5.3)	15.8 (6.0)	161.8**
Body appreciation	3.6 (0.8)	3.2 (0.8)	22.4**
Anxiety	5.0 (4.7)	10.4 (5.6)	78.8**
Social comparison			
Upward identification	2.9 (0.9)	3.0 (1.1)	0.5
Downward contrast	2.9 (0.9)	2.8 (1.0)	0.9
Upward contrast	2.7 (1.1)	2.8 (1.2)	0.1
Downward identification	2.4 (1.1)	2.8 (1.2)	10.0**

\*\* $p<0.01$

**Table III.** Pearson correlations among the study variables.

	1	2	3	4	5	6
1. Depression						
2. Anxiety	0.80 **					
3. Body appreciation	-0.36 **	-0.34 **				
Social comparison						
4. Upward identification	-0.11	-0.09	0.32 **			
5. Downward contrast	-0.23 **	-0.20 **	0.21 **	0.44 **		
6. Upward contrast	0.31 **	0.38 **	-0.36 **	-0.19 **	0.15 **	
7. Downward identification	0.35 **	0.39 **	-0.31 **	0.03	0.14 *	0.56 **

\* $p<0.05$ , \*\* $p<0.01$



**Fig. 2.** Mediation model for testing the relationship between FM and depression. Numbers on the arrows are standardized coefficients. Numbers in the top-right corner of the endogenous variables are squared multiple correlations. While not shown on the graph, age, BMI, having children, and having an academic degree were included as covariates in this model.

(Beta=0.02, 95% CI=[0.01, 0.06]). We learned that women with FM have lower body appreciation, leading to less downward contrast and more upward contrast and downward identification, and resulting in higher anxiety levels.



*Factors involved in psychological distress: focus on women with FM*

Twenty-eight of the women with FM were diagnosed up to a year before participating in the survey; forty-four were diagnosed between 1 and 5 years before, 35 women were diagnosed 5–10 years before, and 34 women were diagnosed over 10 years before participating. Reported pain intensity ranged between 0.47–3.00 (M=1.99, SD=0.57). Pain intensity significantly correlated with depression ( $r=0.46, p<0.001$ ) and anxiety ( $r=0.38, p<0.001$ ). Pain also had significant correlations with two social comparison sub-scales: downward identification ( $r=0.19, p=0.025$ ) and downward contrast ( $r=-0.24, p<0.01$ ). No significant correlation between pain intensity and body appreciation was found. Considering these correlations, only downward identification and downward contrast were included as mediators in the moderated-mediation model.

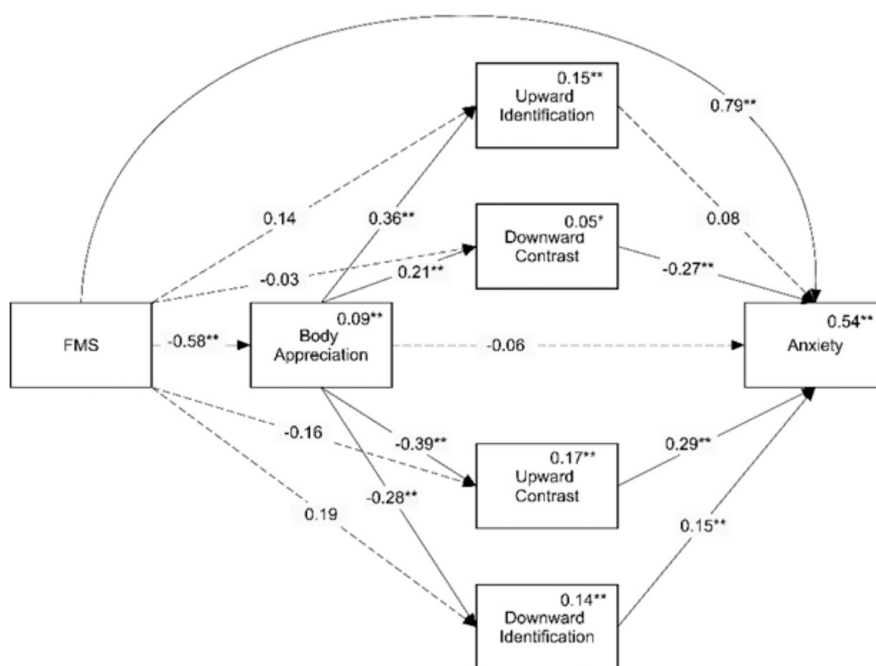
**Hypothesis 4:** Moderated-mediation models.

*Depression*

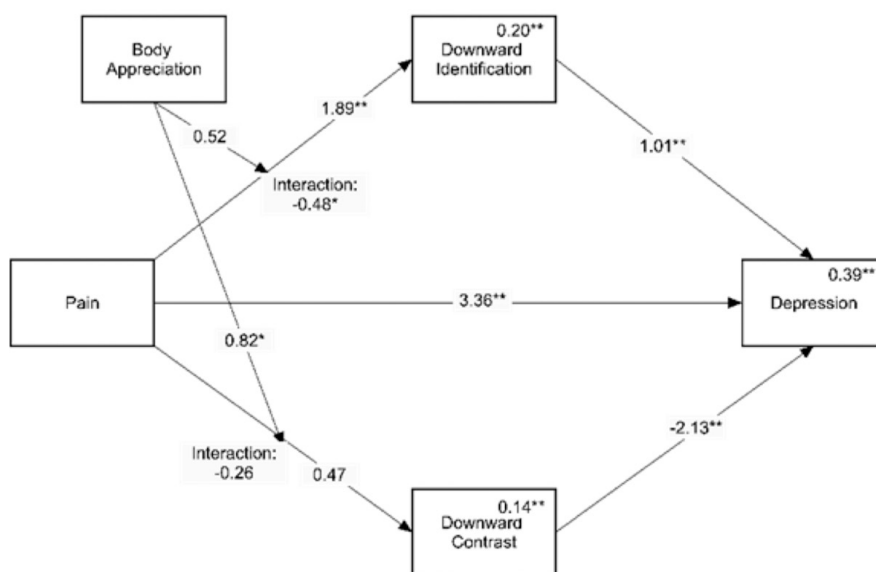
The model testing whether body appreciation moderated the indirect link between pain intensity and depression through social comparison is presented in Figure 4. We found a direct effect of pain on depression ( $B=3.36, p<0.01$ ). We also found a significant pain by body appreciation interaction affecting downward identification and a significant moderated-mediation effect (index of moderated mediation= $-0.49, 95\% CI=[-1.13, -0.01]$ ). Simple effects analysis, shown in Table IV, showed that the link between pain and downward identification and, consequently, the indirect link between pain and depression weakens as body appreciation increases. We found no moderated mediation through downward contrast.

*Anxiety*

The model testing whether body appreciation moderated the indirect link between pain intensity and anxiety through social comparison is presented in Figure 5. Results were consistent with those of the model predicting depression. We found a direct effect



**Fig. 3.** Mediation model for testing the relationship between FM and anxiety. Numbers on the arrows are standardised coefficients. Number in the top-right corner of the endogenous variables are squared multiple correlations. While not shown on the graph, age, BMI, having children, and having an academic degree were included as covariates in this model.



**Fig. 4.** Moderated-mediation model for testing the relationship between pain and depression. Numbers on the arrows are unstandardised coefficients. Numbers in the top-right corner of the endogenous variables are squared multiple correlations. While not shown on the graph, age, BMI, having children, and having an academic degree were included as covariates in this model.

of pain on anxiety ( $B=2.25, p<0.01$ ). We also found a significant pain by body appreciation interaction affecting downward identification and a significant moderated-mediation effect (index of moderated mediation= $-0.49, 95\% CI=[-1.29, -0.02]$ ). Simple effects analysis, shown in Table V, showed that the link between pain and down-

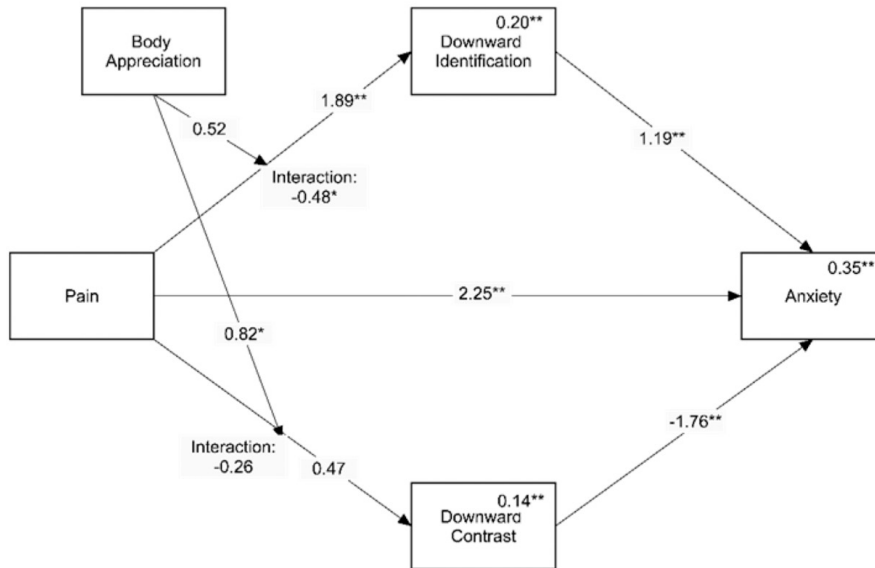
ward identification and, consequently, the indirect link between pain and anxiety weakens as body appreciation increases. We found no moderated mediation through downward contrast.

**Discussion**

This cross-sectional study aimed to develop an explanatory model for the ef-

**Table IV.** Simple effects analysis of the indirect link between pain and depression through body appreciation. Indirect effects were estimated at M-SD, M and M+SD values of the moderator.

Moderator value	Indirect effect (S.E.)	95% CI
2.39	0.75 (0.37)	(0.13, 1.58)
3.18	0.36 (0.22)	(0.01, 1.87)
3.89	-0.03 (0.26)	(-0.57, 0.53)



**Fig. 5.** Moderated-mediation model for testing the relationship between pain and anxiety. Numbers on the arrows are unstandardised coefficients. Numbers in the top-right corner of the endogenous variables are squared multiple correlations. While not shown on the graph, age, BMI, having children, and having an academic degree were included as covariates in this model.

**Table V.** Simple effects analysis of the indirect link between pain and anxiety through body appreciation. Indirect effects were estimated at M-SD, M and M+SD values of the moderator.

Moderator value	Indirect effect (S.E.)	95% CI
2.39	0.86 (0.40)	(0.20, 1.75)
3.18	0.42 (0.24)	(0.02, 0.97)
3.89	-0.04 (0.30)	(-0.62, 0.58)

fect of FM on women’s psychological distress. More specifically, it sought to further identify the roles and the interplay between body appreciation, pain, and social comparison in the manifestation of psychological distress, *i.e.* depression and anxiety, in FM patients. The current study demonstrated higher levels of anxiety and depression symptoms (12) and lower body appreciation (14, 15, 36, 39) among FM participants than HP. Our findings further indicated a novel association between body appreciation and the various strategies of social comparison that resemble those attained when assessing appearance comparison. Consequently, the positive

affect of social comparison was positively correlated with body appreciation (*e.g.* 49) and the negative affect of social comparison was negatively correlated with body appreciation (50). Examination of the possible mechanisms mediating the development of psychological distress in FM patients revealed that women with FM tend to show lower body appreciation than HP. This leads to less adaptive social comparison strategies (less downward contrast and more upward contrast and downward identification) which, in turn, leads to higher anxiety and depression levels. These findings coincide with past studies according to which women with FM

more frequently use negative interpretation or less favourable comparisons (upward contrast and downward identification) that have been linked to higher depression and anxiety (29) and thus identify and emphasise the unique role of body appreciation.

Examination of the role of pain intensity in the development of psychological distress revealed that, in accordance with previous findings, increased pain in women with FM was associated with less adaptive social comparison strategies (more downward identification), resulting in higher levels of anxiety and depression symptoms (22, 29). Interestingly, body appreciation played a protective role in moderating the indirect link between pain and psychological distress by weakening the link between pain and downward identification (which, in turn, reduced both depression and anxiety). This novel finding corresponds with previous research which suggested that individuals who maintain a relatively positive body image that focuses on functionality (8) exhibit an acceptance of their perceived physical imperfections (51) and are less affected by the pain they experience. They are, therefore, less inclined to downward identification comparison strategies and reduced psychological distress (16, 22).

Taken together, these results suggest that uncertainty as a dimension of both lower body appreciation (31) and more pain perception may determine social comparison processes as a coping strategy used by patients with FM. These results correspond with previous studies showing that higher use of downward identification, which is known to lead to helplessness (20), is related to higher perceptions of stress and psychological distress and a worse quality of life and overall adjustment (28). Likewise, in line with Orfgen and Dijkstra’s findings (52), the unique role of positive body image may be exemplified in a complementary direction, namely, less downward identification is significantly related to higher affective acceptance of chronic pain.

Finally, while COVID-19 has been associated with a notable increase in psychological distress worldwide (53),

women with FM have been found to suffer additional distress (54). The mandatory self-isolation may have imposed negative psychological effects, which patients with FM are more prone to. Furthermore, new obstacles emerged due to limited access to complementary treatments, difficulty acquiring necessary medications, and decreased perceived social support (54). It is possible that this additional burden added to the distress of the participants in our study, meaning that the level of psychological distress they reported was higher than it might have been otherwise.

The primary limitation of the current study is its cross-sectional design which constrains causal conclusions. Our promising findings from the path analysis should encourage the design of longitudinal intervention studies that investigate body image, social comparison, and pain perception in women suffering from FM. A second limitation concerns the validity of the model, which might be increased by controlling appearance comparison, social comparison targets, body functionality, and different facets of participants' chronic pain. Third, illness status was reported by our participants and their health status was not directly assessed. An additional examination by a medical professional would provide direct information for the association between illness and psychological distress. Fourth, the study was conducted during the COVID 19 pandemic, which possibly influenced the observed results.

This study aimed to develop an explanatory model for the effect of FM on women's psychological distress. Based on our findings, future studies should further investigate the association between functionality and functionality appreciation among women suffering from FM, in order to develop tailored psychological interventions. Specifically, women with FM may benefit from treatments encouraging a holistic focus on body functionality (55, 56). Addressing the various domains of body functionality as a possible protective factor against societal pressures (8) may not only improve body image but also, ultimately, reduce symptoms of depression and anxiety among these patients.

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