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BMI AS A MODERATOR OF THE RELATIONSHIP BETWEEN GLOBAL SELF-ESTEEM OR SELF-PERCEIVED PHYSICAL ATTRACTIVENESS AND JEALOUSY AMONG WOMEN

Abstract

Objectives: The aim of the study was to determine whether global self-esteem and physical attractiveness related self-esteem are predictors of jealousy intensity, and whether body mass index moderates the relationship between these aspects of self-esteem and jealousy.

Material and methods: The study involved 264 women aged 19 to 65 years ($M = 35.24$; $SD = 9.18$), who were in romantic relationships. Participants were divided into a group with normal body mass index and a group with above-normal body mass index. The Multidimensional Self-Esteem Inventory and Multidimensional Jealousy Scale were used.

Results: The analysis showed that only global self-esteem is a predictor of emotional jealousy intensity within the entire group of women. Body mass index moderated the relationship between the two aspects of self-esteem and emotional as well as behavioral jealousy. Specifically, more significant relationships were found in the group of women with above-normal body mass index. The results also showed that self-evaluation of one's physical attractiveness could act as a predictor for romantic jealousy, and this effect is particularly visible in overweight or obese women.

Conclusions: This study suggests that the relationship between self-esteem and jealousy may be different in women with a normal body mass index and those who are overweight or obese. The results of the study are in line with earlier research indicating an association between global self-esteem and jealousy, but the present study adds some important information about body mass index as a moderator between those variables. Furthermore, this study demonstrates that self-perceived physical attractiveness is also related to the experience and expression of jealousy.

Keywords: *women's self-esteem; women's jealousy; BMI and self-esteem; BMI and jealousy; self-esteem and jealousy; physical attractiveness and jealousy*

Introduction

Jealousy is a complex of interconnected emotions, beliefs, and behaviors that result from threats to self-esteem and/or the quality or existence of a relationship (Pfeiffer, Wong, 1989, p. 183; Welpinghus, 2017, pp. 322-323; White 1981, p. 296). Building upon White's definition (1981, p. 296), Pfeiffer and Wong (1989, p. 183) distinguished emotional, cognitive, and behavioral components of jealousy. The typology proposed by Pfeiffer and Wong (1989, pp. 183-186) corresponds to the assumption that jealousy is manifested by emotions, thoughts, and actions. Emotional jealousy encompasses a range of negative emotions that

arise in various jealousy-inducing situations. It is an emotional reaction triggered by specific circumstances that pose a threat to the relationship. Cognitive jealousy involves worrying about a potential romantic connection between one's partner and a rival. It is a tendency to experience jealousy regardless of the existing evidence and it manifests in rumination linked to the possible partner betrayal. Behavioral jealousy comprises actions undertaken by an individual and aimed at uncovering the relationship between their partner and a rival, as well as actions intended to protect the relationship, like verbally attacking the rival.

Jealousy and self-esteem

From the literature, it is evident that jealousy-inducing situations, such as the appearance of a rival, lead to a decrease in self-esteem (DeSteno et al., 2006, p. 628). Conversely, self-esteem as a trait is linked to the intensity of jealousy experienced (e.g., Chin et al., 2017, p. 28; Seeman, 2016, p. 383; Radev, Hedrih, 2017, pp. 530-531), although the strength of this relationship is typically low to moderate (Radev, Hedrih, 2017, p. 531), and the association has not been consistently confirmed in all the types of jealousy corresponding to the Pfeiffer and Wong's typology (Karakurt, 2012, p. 340). Low self-esteem increases the perception of a partner's engagement in life activities, hobbies, or interactions with others as threatening to the relationship's existence (DeSteno, Salovey, 1996, p. 921). DeSteno and Salovey (1996, p. 921) suggest that jealousy is one of the processes maintaining high self-esteem. In this perspective, jealousy is a negative emotion arising from a threat to self-esteem, stemming from a specific triadic relationship. Some studies suggest that this relationship manifests differently in women and men (Stieger et al., 2012, p. 53).

Physical attractiveness and jealousy

Existing research suggests that the physical attractiveness of a rival is associated with the intensity of jealousy experienced (Dijkstra, Buunk, 2002, pp. 832-845; Pollet, Saxton, 2020, pp. 1435-1436), this tendency being more pronounced in women than men (Dijkstra, Buunk, 2002, pp. 844-845; Pollet, Saxton, 2020, p. 1435-1436). However, there is a lack of research investigating

the relationship between self-perceived attractiveness and jealousy within a romantic relationship. It seems that low self-perceived attractiveness intensifies jealousy, leading to a sense of personal inadequacy. Furthermore, studies show that jealousy is also amplified by the discrepancy in the partners' attractiveness (Sidelinger, Booth-Butterfield, 2007, pp. 216-218). Individuals less attractive than their partners tend to be more jealous (Sidelinger, Booth-Butterfield, 2007, p. 217). Other research (Arnocky, Locke, 2020, pp. 4-6) suggests that upward physical appearance comparisons increase jealousy in women. Women who unfavorably compare their physical appearance (e.g., with magazine models) tend to be more jealous of their partners.

It seems, however, that one of the main factors affecting one's self-evaluation of physical attractiveness, especially concerning attractiveness to a potential romantic partner, is body mass, specifically the ratio of body mass to height (Han et al., 2016, p. 354; Hochgraf, McHale, 2020, pp. 875-876). Western beauty standards emphasize the importance of low body fat in assessing physical attractiveness (Brierley et al., 2016, p. 2). Physical attractiveness is more closely related to body mass in women (Hochgraf, McHale, 2020, pp. 875-876; Kościński, 2013, pp. 921-922). Body mass index is even twice as important for both men and women in evaluating female body attractiveness, compared to waist-to-hip ratio (Kościński, 2013, p. 921). It also affects the assessment of facial attractiveness in women (Han et al., 2016, p. 354) and holds more significance than muscle mass percentage in attractiveness evaluations (Brierley et al., 2016, pp. 8-9). Both men and women perceive potential partners as less attractive if they are overweight. However, in actual relationships, excess body mass seems to be more significant for relationship quality for women (Hochgraf, McHale, 2020, pp. 875-876).

Recent studies (Hochgraf, McHale, 2020, pp. 875-876) indicate that conflicts and lower marital satisfaction emerge only when husbands perceive their wives as overweight. Moreover, women with higher body mass indexes tend to date less frequently and have fewer sexual partners (Arnocky et al., 2014, p. 125). The internalization of the Western beauty standards is also evident in the difference between the assessment of an attractive female body and a healthy female body. Women evaluated as healthy have a body mass close to the physiologically healthy range, while those rated as most attractive have a body mass that is lower than the physiologically healthy range (Brierley et al., 2016, p. 9).

Purpose of the present study

Earlier research on the association between self-esteem and jealousy in romantic relationships had primarily focused on global self-esteem (Chin et al., 2017, pp. 23-28; Radev, Hedrih, 2017, pp. 530-531; Stieger et al., 2012, pp. 52-53). However, jealousy, as a response to perceived relationship threats, may stem not only from a general sense of inadequacy but also from feelings of inadequacy in specific life domains. Physical appearance seems to be one of such domains (Arnocky, Locke, 2020, p. 4; Dijkstra, Buunk, 2002, p. 832; Pollet, Saxton, 2020, pp. 1435-1436), yet there is lack of research investigating this subject matter. One factor closely related to attractiveness is body mass index (BMI; Brierley et al., 2016, pp. 8-9). From the viewpoint of woman's attractiveness, above-normal BMI seems to be definitely more problematic than below-normal BMI (Arnocky et al., 2014, pp. 123-126; Brierley et al., 2016, pp. 8-9; Hochgraf, McHale, 2020, pp. 875-876). Therefore, this study aims to include women with normal and above-normal BMI.

The current study has two main purposes. Firstly, it is designed to determine whether global self-esteem and physical attractiveness related self-esteem predict the intensity of romantic jealousy. The study focuses on the types of jealousy identified by Pfeiffer and Wong (1989, p. 183), which by some studies have been shown to correlate with global self-esteem (e.g., Chin et al., 2017, p. 28; Karakurt, 2012, p. 340; Radev, Hedrih, 2017, pp. 530-531). Based on earlier studies (Arnocky, Locke, 2020, pp. 4-6; Buunk et al., 2008; Chin et al., 2017, pp. 23-28; Seeman, 2016, p. 383; Sidelinger, Booth-Butterfield, 2007, pp. 216-218; Stieger et al., 2012, pp. 52-53; Radev, Hedrih, 2017, pp. 530-531), two hypotheses have been formulated. Hypothesis 1: Higher global self-esteem corresponds to lower intensity of cognitive, emotional, and behavioral jealousy in women. Hypothesis 2: Higher self-perceived physical attractiveness corresponds to lower intensity of cognitive, emotional, and behavioral jealousy in women.

The second purpose of the present study is to determine whether BMI interacts with global self-esteem and self-perceived physical attractiveness, thus moderating the relationships between self-esteem and jealousy. BMI is linked to perceptions of attractiveness, this relationship being more evident in women (Brierley et al., 2016, pp. 8-9; Hochgraf, McHale, 2020, pp. 875-876;

Kościński, 2013, pp. 921-922). Overweight or obesity, adversely affecting self-evaluation of body and facial attractiveness in women (Han et al., 2016, p. 354; Kościński, 2013, pp. 921), are likely to intensify the overall sense of unattractiveness and, consequently, feelings of inadequacy in relationships. Considering global self-esteem, its level may also interact with BMI. Women with low global self-esteem but normal body mass may exhibit lower jealousy. Elevated BMI, however, may amplify one's feelings of inadequacy as a partner in the relationship. The following hypotheses were formulated: BMI moderates the relationship between global self-esteem and the intensity of cognitive, emotional, and behavioral jealousy in women (Hypotheses 3), and BMI moderates the relationship between physical attractiveness related self-esteem and the intensity of cognitive, emotional, and behavioral jealousy in women (Hypotheses 4).

Method

Measures

The Multidimensional Jealousy Scale (MJS) developed by Pfeiffer and Wong (1989) was applied to assess the levels of cognitive, emotional, and behavioral jealousy. Each component is measured by eight statements. Participants respond on a scale of 1 to 7. The MJS is one of the most commonly used scales to measure jealousy, with numerous studies confirming its psychometric properties in various populations (e.g., Radev, Hedrih, 2017, pp. 523-532). Cronbach's *alpha* in the original study by Pfeiffer and Wong (1989, p. 188) was high for each subscale, ranging from 0.80 to 0.92 depending on the study. The reliability measured using the stability method was 0.75, 0.82, and 0.34 respectively. Factor analysis confirmed the three-factor structure of the scale (Pfeiffer, Wong, 1989, p. 189). In the current study, Cronbach's *alpha* for the cognitive jealousy subscale was 0.87, also with the value of 0.87 for the emotional jealousy subscale, and 0.85 for the behavioral jealousy subscale. Results for each subscale in the current study were calculated by averaging the scores from individual questions in each subscale.

The Multidimensional Self-Esteem Inventory (MSEI), developed by O'Brien and Epstein (1988) and adapted into Polish by Fecenec (2016), was used to

measure two aspects of self-esteem. This questionnaire was selected because it can measure both global self-esteem and physical attractiveness related self-esteem, which are two aspects of self-esteem that may be related to jealousy (Arnocky, Locke, 2020, pp. 4-6; Chin et al., 2017, p. 28; Radev, Hedrih, 2017, pp. 530-531). Global self-esteem is understood as the most fundamental and general indicator of evaluative feelings towards one's own self, while physical attractiveness related self-esteem is limited to self-evaluation of one's appearance, including sexual attractiveness (Fecenec, 2016, p 23). The MSEI consists of 116 items, to which participants respond on a 5-point scale. The MSEI measures global self-esteem, eight temporal self-esteem domains, identity integration, and intensity of self-esteem defense mechanisms.

Because of the research objective, only two subscales were used (i.e., Global Self-Esteem and Body Appearance). In the original Polish population study (Fecenec, 2016, pp. 26-28), both scales showed high indices of reliability (both internal consistency and absolute stability), ranging from 0.80 to 0.90. The MSEI validity has been confirmed by correlations with mood, temperament, and anxiety (Fecenec, 2016, pp. 30-48). In the current study, Cronbach's *alpha* of 0.92 was identified for both the Global Self-Esteem subscale and the Body Appearance subscale. Results for each subscale in the current study were calculated by averaging the scores for the specific questions in each subscale.

Participants and procedure

This study was approved by the Ethics Committee of XXXX (ethics approval number: XXXX). Participants were recruited from a Center of Dietetics and Nutrition XXXX. The study was conducted in Polish language and participants were of Polish nationality. The participants received neither financial compensation nor other material gains for participating in the study. A total of 285 women participated in the initial recruitment procedure, whereas the final research group consisted of 264 women in heterosexual relationships, aged 19-65 ($M = 35.24$; $SD = 9.18$), after those with below-normal BMI and those not in a romantic relationship were excluded. In that group, 160 women (60.6%) were married, and 104 women (39.4%) were in informal relationships. The average relationship duration was 11.90 years ($SD = 8.86$). BMI was calculated using

the formula: BMI = weight (kg)/height squared (m^2), based on the self-reported weight and height values. Participants were categorized into two groups: BMI within the normal range (18.5 to 24.9) and above-normal BMI (equal to or above 25.0) according to the World Health Organization (2010) recommendations.

Results

The analysis was conducted using SPSS version 27 for Windows. Means and standard deviations were calculated for the measured variables and the correlations between them (Table 1). A significance level of $p < 0.05$ was adopted.

Table 1. *Descriptive statistics and correlations*

variable	*min*	*max*	*M*	*SD*	1	2	3	4	5
1. cognitive jealousy	1.00	7.00	2.50	1.12	-				
2. emotional jealousy	1.25	7.00	4.63	1.26	0.29***	-			
3. behavioral jealousy	1.00	5.63	2.07	0.98	0.48***	0.47***	-		
4. global self-esteem	1.00	5.00	3.03	0.83	-0.04	-0.33***	-0.17**	-	
5. physical attractiveness	1.30	5.00	3.01	0.84	0.02	-0.29***	-0.12*	0.75***	-
6. BMI	18.49	47.27	26.10	5.75	-0.04	0.01	0.02	-0.04	-0.37***

*significant at 0.05; ** significant at 0.01; *** significant at 0.001; the BMI values are presented in kilograms per square meter (kg/m^2)

Source: own research

The components of jealousy showed significant and positive correlations with each other. A highly positive correlation was observed between global self-esteem and self-perceived physical attractiveness. BMI was found to be significantly correlated only with self-perceived physical attractiveness. Global self-esteem and self-perceived physical attractiveness were negatively correlated with emotional and behavioral jealousy.

Participants were divided into two groups: those with BMI within the normal range and those with BMI above the norm. The moderation analysis was conducted using the PROCESS Procedure in version 4.2 for SPSS (Hayes, 2022). No significant effects were obtained for cognitive jealousy. However, in the

case of emotional and behavioral jealousy, BMI was found to be a significant moderator in the relationship between these variables and global self-esteem (Table 2) as well as self-perceived physical attractiveness (Table 3).

Table 2. *Results of moderation analysis of the relationship between global self-esteem and jealousy*

jealousy	explanatory variable	coefficient		*t*	*p* value	*95% CI*
		b	*st. error*			
cognitive	self-esteem	-0.01	0.11	-0.13	0.895	-0.24; 0.21
$R = 0.07$;	BMI	-0.10	0.14	-0.75	0.452	-0.38; 0.17
$R^2 = 0.00$	self-esteem*BMI	-0.08	0.17	-0.48	0.630	-0.41; 0.25
emotional	self-esteem	-0.26	0.12	-2.23	0.027	-0.50; -0.03
$R = 0.37$;	BMI	-0.03	0.14	-0.19	0.848	-0.31; 0.26
$R^2 = 0.13$	self-esteem*BMI	-0.51	0.18	-2.90	0.004	-0.86; -0.16
behavioral	self-esteem	-0.03	0.09	0.30	0.761	-0.16; 0.22
$R = 0.28$;	BMI	0.09	0.12	0.79	0.430	-0.14; 0.32
$R^2 = 0.08$	self-esteem*BMI	-0.51	0.14	-3.63	0.000	-0.79; -0.23

Note. BMI: 0 – normal; 1 – above-normal

Source: own research

Table 3. *Results of moderation analysis assessing the relationship between self-perceived physical attractiveness and jealousy*

jealousy	explanatory variable	coefficient		*t*	*p* value	*95% CI*
		b	*st. error*			
cognitive	physical attractiveness	0.11	0.12	0.97	0.332	-0.12; 0.34
$R = 0.10$;	BMI	-0.11	0.15	-0.76	0.447	-0.40; 0.18
$R^2 = 0.01$	physical attractiveness*BMI	-0.26	0.18	-1.45	0.147	-0.61; 0.09
emotional	physical attractiveness	-0.20	0.12	-1.68	0.094	-0.44; 0.04
$R = 0.37$;	BMI	-0.30	0.15	-1.94	0.053	-0.60; 0.00
$R^2 = 0.13$	physical attractiveness*BMI	-0.65	0.18	-3.53	0.000	-1.02; -0.29
behavioral	physical attractiveness	0.15	0.10	1.55	0.121	-0.04; 0.34
$R = 0.30$;	BMI	-0.00	0.12	-0.04	0.972	-0.25; 0.24
$R^2 = 0.09$	physical attractiveness*BMI	-0.68	0.15	-4.57	0.000	-0.97; -0.38

Note. BMI: 0 – normal; 1 – above-normal

Source: own research

The results of the multiple regression analysis showed a non-significant effect of BMI on emotional jealousy and a significant effect of global self-esteem on emotional jealousy, indicating that higher self-esteem was associated with lower jealousy. Those effect were moderated by a significant interaction between BMI and global self-esteem. The effect of global self-esteem on emotional jealousy varied depending on BMI. Specifically, global self-esteem had a stronger negative effect on emotional jealousy for women with above-normal BMI ($b = -0.77$; $se = 0.13$; $p = 0.000$; *95% CI* [-1.03; – 0.52]) than for women with normal BMI ($b = -0.26$; $se = 0.12$; $p = 0.027$; *95% CI* [-0.50; – 0.03]).

The results also showed a non-significant effects of global self-esteem and BMI on behavioral jealousy. However, those effects were moderated by a significant interaction between BMI and global self-esteem. Specifically, global self-esteem had a negative effect on behavioral jealousy in women with above-normal BMI ($b = -0.48$; $se = 0.10$; $p < 0.001$; *95% CI* [-0.69; – 0.28]) but not those with normal BMI ($b = -0.03$; $se = 0.09$; $p = 0.761$; *95% CI* [-0.16; 0.22]).

The results of multiple regression analysis showed non-significant effects of BMI and self-perceived physical attractiveness on emotional jealousy. However, those effects were moderated by a significant interaction between BMI and self-perceived physical attractiveness. The effect of self-perceived physical attractiveness on emotional jealousy varied depending on BMI. Specifically, self-perceived physical attractiveness had a negative effect on emotional jealousy in women with above-normal BMI ($b = -0.86$; $se = 0.14$; $p < 0.001$; *95% CI* [-1.13; – 0.58]) but not in women with normal BMI ($b = -0.20$; $se = 0.12$; $p = 0.094$; *95% CI* [-0.44; – 0.04]).

The results also showed non-significant effects of self-perceived physical attractiveness and BMI on behavioral jealousy. However, these effects were moderated by a significant interaction between BMI and self-perceived physical attractiveness. Self-perceived physical attractiveness had a negative effect on behavioral jealousy in the case of women with above-normal BMI ($b = -0.53$; $se = 0.11$; $p < 0.001$; *95% CI* [-0.75; – 0.31]) but not in women with normal BMI ($b = 0.15$; $se = 0.10$; $p = 0.121$; *95% CI* [-0.04; 0.34]).

Summary

Global self-esteem was a significant predictor of the emotional component of jealousy in the entire group of women; it was also a predictor of the behavioral component, however that was only observed in the group of women with excessive body mass. As expected, higher global self-esteem was associated with lower levels of these jealousy components. Furthermore, there was a similar relationship between self-perceived physical attractiveness and jealousy components, but again this was observed only in the group of women with above-normal BMI. No significant effects of either aspect of self-esteem were found in relation to cognitive jealousy. Thus, Hypotheses 1 and 2 were partially confirmed.

The study found that BMI moderates the relationships between global self-esteem and jealousy, as well as self-perceived physical attractiveness and jealousy, but only for the emotional and behavioral components. More significant associations and stronger relationships were observed in the group of overweight and obese women compared to those within a normal BMI range. Therefore, Hypotheses 3 and 4 were partially confirmed. Although BMI itself was not directly related to the intensity of jealousy, the results of this study are consistent with earlier findings on the significance of BMI for evaluating the attractiveness of women's physique (Brierley et al., 2016, p. 9; Kościński, 2013, pp. 921-922). Because of the internalization of Western beauty standards, individuals with overweight or obesity tend to present more pronounced feelings of inadequacy as a partner, especially if there is interaction with low global self-esteem and low physical attractiveness related self-esteem, which leads to stronger jealousy. Moreover, because a higher body mass makes it more difficult to engage in dating (Arnocky et al., 2014, p. 125), women with excess weight or obesity might perceive fewer alternative relationship options if the current partnership ends. This, combined with lower global self-esteem, could result in heightened jealousy-related emotional responses and a greater inclination towards partner control.

Based on the obtained results, it can be concluded that the investigated aspects of self-esteem impact the intensity of emotional experiences in situations when an actual rival appears, as well as the frequency of actions aimed at detecting the partner's relationship with the rival and those aimed to protect the

relationship. The results are largely in line with previous findings (Chin et al., 2017, p. 28; Karakurt, 2012, p. 340; Seeman, 2016, p. 383; Radev, Hedrih, 2017, pp. 530-531). Higher global self-esteem is a factor that reduces the experience of jealousy. The findings are also largely consistent with studies indicating the importance of physical attractiveness for perceived jealousy (Dijkstra, Buunk, 2002, pp. 832-845; Pollet, Saxton, 2020, pp. 1435-1436). However, this study shows that these relationships are particularly noticeable in women with excess weight or with obesity. In this group, lower self-esteem increases the perception of the partner's involvement in various activities as threatening to the relationship (DeSteno, Salovey, 1996, p. 921), which may lead to a greater desire for partner control and more pronounced emotional response to jealousy-inducing situations. These findings open up new avenues for research into the complex relationship between self-esteem and jealousy.

In this study, BMI was applied as it appears to be a key determinant of physical attractiveness in women. In the future, research could also take into account other factors related to physical attractiveness, such as waist-to-hip ratio (Kościński, 2013, p. 915). It would also be worthwhile to explore these relationships in men. Additionally, further investigations into self-esteem and jealousy could focus on other specific domains, such as lovability and likability (Fecenec, 2016, p. 23). This study specifically focused on self-perceived physical attractiveness, given its particular relevance to jealousy. However, other areas of self-esteem may also be associated with jealousy. Furthermore, these associations might present differently among women and men.

It should be noted that BMI itself was not directly associated with jealousy or global self-esteem; it only correlated with self-perceived physical attractiveness. A direct effect of BMI on jealousy might become significant when including underweight women. The most attractive female body shape is one with a BMI below the norm (Brierley et al., 2016, p. 9). Thus, a low BMI might be linked to a lower sense of inadequacy as a partner and to weaker feelings of jealousy. However, further research is needed to explore this. Studies also indicate that the difference in BMI between partners is directly related to jealousy, particularly in the case of women with a higher BMI than their partner (Salwen et al., 2016, p. 116). Therefore, future research should consider including partner weight and height as well.

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