

The Relationship between Premenstrual Syndrome and Temperament and Character Dimensions: The Mediating Role of Difficulty in Emotion Regulation

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ABSTRACT

Objective: Premenstrual syndrome (PMS) is among the most prevalent disorders experienced by women of reproductive age, and it can greatly interfere daily activities. Therefore, this study aimed to investigate the relationship between PMS and temperament and character dimensions, with a focus on the mediating role of difficulty in emotion regulation.

Methods: This research employed a descriptive correlational design and utilized path analysis. The statistical population consisted of all female students studying at Mohaghegh Ardabili University in the 2022-2023 academic year. A convenience sampling method was used to pick a sample of 300 individuals, from which 271 were diagnosed with PMS. Data collection tools included the Premenstrual Symptoms Screening Tool, the Temperament and Character Inventory, the Difficulty in Emotion Regulation Scale. The data were analyzed using path analysis in AMOS-24.

Results: The results revealed that self-directedness, cooperativeness, mediated by difficulty in emotion regulation, had a significant negative indirect effect on PMS, while harm avoidance had a significant positive indirect effect.

Conclusion: These findings suggest that lower levels of self-directedness, cooperativeness, along with higher levels of harm avoidance, can lead to PMS by disrupting emotion regulation. Paying attention to these dimensions, mechanisms can be effective in developing preventive, therapeutic interventions for PMS.

Keywords: Character dimensions, emotion regulation, premenstrual syndrome, temperament.

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Introduction

Women have long experienced cyclic fluctuations in both physiological and psychological states, though few initially recognized their connection to the menstrual cycle (Cacciatore and Pritchard, 2021). In the past few years, there has been an increasing understanding and pursuit of interventions to address these often-debilitating effects (Houghton and

Muir, 2020). Previously attributed to various psychosocial stressors, these experiences are now understood to constitute a distinct syndrome: Premenstrual Syndrome (PMS) (Schmitt & Huber, 2020).

Premenstrual Syndrome (PMS) characterized by a range of physical, emotional, and behavioral symptoms Which is experienced in the week leading up to menstrual period (late luteal phase), that typically subside within a few days of menstruation (Callovin et al., 2024). Common emotional symptoms include depression, irritability, anxiety, and social withdrawal, while physical symptoms may include breast tenderness, bloating, headaches, and fluid retention (Yonkers et al., 2020). The severity of PMS symptoms can vary widely, with some women experiencing mild discomfort and others suffering from significant distress that interferes with their daily lives (Callovin et al., 2024). In its most severe form, PMS can manifest as Premenstrual Dysphoric Disorder (PMDD), affecting approximately 3% to 8% of women and leading to marked functional impairment (Callovin et al., 2024).

While hormonal fluctuations during ovulation play a key role in the pathogenesis of Premenstrual Syndrome (PMS), hormone levels alone do not fully explain the variability in symptom severity among women (Halbreich & Borenstein, 2019). Treatments targeting hormonal imbalances often fail to provide complete symptom relief, suggesting that additional factors contribute to PMS manifestation (Schmitt & Huber, 2020). Emerging research has indicated that individual differences in personality can influence the manifestation of PMS symptoms and coping styles (Schmitt and Huber, 2021). Indeed, variations in vulnerability to PMS can be attributed to underlying personality traits. One such variable that has been shown to predict the severity of PMS symptoms is the concept of temperament and character (Berenbaum and Raghavan, 2019; Morishita et al., 2022).

Temperament and character dimensions, as defined by Cloninger's psychobiological model of personality, provide a framework for understanding individual differences in emotional and behavioral responses (Fountoulakis & Gonda, 2019; Matiz et al., 2025). Temperament traits, including Novelty Seeking (NS), Harm Avoidance (HA), Reward Dependence (RD), and Persistence (P), are considered to be

largely heritable and reflect automatic emotional responses to environmental stimuli (Godefroy et al., 2016). Character traits, including Self-Directedness (SD), Cooperativeness (C), and Self-Transcendence (ST), reflect an individual's conscious goals, values, and beliefs, and are influenced by learning and social experiences (Matiz et al., 2025). The interplay between temperament and character is thought to shape an individual's overall personality and influence their vulnerability to various psychological disorders (Lee et al., 2016). For instance, high HA and low SD have been linked to increased psychopathology, including PMS severity, while higher SD and C may mitigate psychological symptoms during the late luteal phase (Kumasi et al., 2022; Telek et al., 2010).

As previously mentioned, hormonal fluctuations during the menstrual cycle can impact various aspects of physical and mental health. However, not all women experience these effects to the same extent. Some women employ maladaptive coping strategies in response to these cyclical changes. Many psychologists argue that difficulty in emotion regulation are a primary factor in psychopathology (McRae and Gross, 2020). Consequently, difficulty in emotion regulation may elucidate the differences experienced by women during menstrual phases (Garrison and Henneman, 2020).

Difficulties in emotion regulation (DER) encompass a range of deficits, including impaired awareness, acceptance, and modulation of emotions, as well as limited access to effective emotion regulation strategies (Mestre-Bach et al., 2022). DER has been implicated in the development and maintenance of various mental health conditions, including mood disorders, anxiety disorders, and personality disorders (Matiz et al., 2025). Research indicates that women with PMS often exhibit higher suppression and lower reappraisal, emotional clarity, and repair compared to those without PMS, contributing to heightened symptom severity (Nasiri et al., 2019). Moreover, DER has been shown to mediate the relationship between psychological factors, such as childhood trauma, and premenstrual symptoms, potentially intensifying mood disturbances during the menstrual cycle (Kanari et al., 2024; Meers et al., 2020; Wu et al., 2016).

Despite the growing body of literature on PMS, temperament, character, and emotion regulation, several important research gaps remain.

First, most studies focus on biological factors, neglecting psychological mechanisms. Older sources (e.g., Freeman et al., 2007) dominate, and few incorporate updated diagnostic criteria or comprehensive models of personality. Further research is needed to elucidate these mechanisms and inform targeted interventions. Also, considering the

traumatic and transdiagnostic role of difficulty in regulating emotions in the formation and persistence of most mental disorders and the importance of this variable in predicting most symptoms of premenstrual syndrome (Matiz et al., 2025), it seemed necessary to examine it simultaneously with other psychological variables in predicting symptoms of PMS.

Second, the specific relationships between different temperament and character dimensions and the various emotional symptoms of PMS have not been fully elucidated (Yoleri, 2018). Additionally, the mediating role of emotion regulation difficulties in these relationships requires further investigation, particularly in diverse populations and across different age groups (Choi & Jung, 2022). Addressing these gaps will enhance our understanding of the underlying mechanisms contributing to PMS and inform the development of more targeted and effective interventions and treatment strategies (Prochwicz et al., 2018).

Given these considerations and the significant impact of PMS on female university students, including class absenteeism, social withdrawal, reduced quality of life, and diminished academic performance (Gholami and Khosravi, 2021), this study investigates the mediating role of difficulties in emotion regulation in the relationship between PMS and Cloninger's temperament and character dimensions. By examining these interactions, the research aims to clarify the psychological factors contributing to PMS severity and inform the development of personalized intervention strategies.

Methods

Study Design

This study utilized a descriptive correlational design with path analysis to investigate the mediating role of difficulty in emotion regulation (DER) in the relationship between temperament, character, and Premenstrual Syndrome (PMS). Path analysis was chosen for its ability to model complex multivariate relationships and quantify direct and indirect effects, offering a robust framework for mediation analysis (Kanari et al., 2024; Mestre-Bach et al., 2022). This approach allowed simultaneous assessment of multiple variables, aligning with the study's aim to explore the interplay of personality traits and DER in PMS severity.

Population and Sample of the Study

The target population comprised female students at Mohaghegh Ardabili University during the 2022–2023 academic year. A minimum sample size of 200 was initially targeted, based on guidelines recommending 10–20 participants per parameter for path analysis (Loehlin, 2004). To account for potential non-response and ensure sufficient

PMS cases, the sample size was increased to 300. Convenience sampling was employed in university dormitories due to accessibility, yielding 271 women meeting PMS diagnostic criteria via the Premenstrual Symptoms Screening Tool (PSST). This sample size supports reliable model estimation, though convenience sampling may limit generalizability.

Tools

Premenstrual Symptoms Screening Tool (PSST): Developed by Steiner et al., (2003), the PSST comprising nineteen items distributed across two sections. The initial fourteen items systematically explore the physical and emotional symptoms commonly linked with PMS, while the subsequent five items gauge the extent to which these symptoms impinge upon an individual's daily functioning. A four-point Likert scale, spanning from "not at all" to "severe," is employed to quantify the severity of each symptom. To establish a diagnosis of moderate or severe PMS, a composite score is calculated based on three stringent criteria: (a) at least four items from the initial fourteen must exhibit a moderate or severe severity rating; (b) an aggregate of at least four items from the entire nineteen-item scale must manifest moderate or severe symptoms; and (c) at least one item from the section assessing the impact on daily life must indicate a moderate or severe level of interference. Psychometric properties of the PSST have been robustly established in both original and translated versions. Yen et al. (2012) reported commendable Cronbach's alpha coefficients of 0.96 and 0.91 for the first and second sections of the scale, respectively, underscoring its internal consistency.

Temperament and Character Inventory (TCI): created by Cloninger et al. (1994), this questionnaire consists of 125 items with binary responses (true/false). The TCI posits a hierarchical model of personality, delineating four dimensions of temperament—novelty seeking, harm avoidance, reward dependence, and persistence—and three dimensions of character—self-directedness, cooperativeness, and self-transcendence. A study carried out by Alonso et al. In 2008, a study found a reliable Cronbach's alpha coefficient of over 0.68, demonstrating the strong internal consistency of the tool.

Difficulty in Emotion Regulation Scale (DERS): The 36-item DERS, developed by Gratz and Roemer (2004), examine individual differences in difficulties with emotion regulation. Each item is rated on a 5-point scale ranging from 1 (almost never) to 5 (almost always). High scores on the scale indicate more challenges in managing emotions. The DERS includes a composite score, as well as six subscale scores that evaluate: challenges in acknowledging negative emotions,

struggles in pursuing goals when facing emotional difficulties, difficulties with impulsivity, a lack of emotional understanding, restricted use of effective emotion regulation techniques, and unclear emotional clarity. The developers reported internal consistency reliability (Cronbach's alpha) of 0.93 for the total score and subscale reliabilities ranging from 0.80 to 0.89. The test-retest reliability for the total score, evaluated over a period of 4 to 8 weeks, was determined to be 0.88, while subscale reliability varied from 0.57 to 0.89.

Procedure

The researcher distributed questionnaires to 300 female students in the university dormitories. Participants were included if they met the inclusion criteria (e.g., being of reproductive age, willing to participate) and excluded if they did not complete the questionnaires or did not meet the diagnostic criteria for PMS based on the PSST. Ultimately, 271 participants were included in the study.

Ethical Considerations

Ethical approval (Date: January 24, 2024, Ethical code: IR.UMA.REC.1402.098) was obtained from UMA. After

explaining the research objectives and procedures, Verbal consent was obtained from the participants. Every stage of the study was conducted in accordance with the Declaration of Helsinki.

Data Analysis

Descriptive statistics (mean, standard deviation) were used to summarize the data. Correlation analyses and path analysis using SPSS-26 and AMOS-24, respectively, were conducted to test the research hypotheses.

Results

The study included women aged 18–50 years ($M=23.4$, $SD=5.1$), with 88.6% aged 18–28, 10% aged 29–39, and 1.4% aged 40–50. Education levels comprised 70.8% undergraduates, 25.5% master's students, and 3.7% doctoral students. Regarding marital status, 90.4% were single, and 9.6% were married. These demographics reflect a predominantly young, single, and university-educated sample, consistent with populations vulnerable to PMS-related academic challenges.

Table 1.
Correlation Matrix Between Research Variables

	NS	RD	P	SD	ST	HA	C	PMS
NS	1	-	-	-	-	-	-	-
RD	-0.06	1	-	-	-	-	-	-
P	-0.15*	0.03	1	-	-	-	-	-
SD	-0.48**	0.20**	0.21**	1	-	-	-	-
ST	-0.03	0.27**	0.23**	0.22**	1	-	-	-
HA	0.30**	-0.17**	-0.15*	-0.57**	-0.21**	1	-	-
C	-0.32**	0.34**	0.04	0.34**	0.27**	-0.18**	1	-
PMS	0.19**	0.01	-0.08	-0.27**	0.06	0.24**	-0.04	1
Difficulty in emotion regulation	0.39**	-0.16**	-0.06	-0.61**	-0.09	0.47**	-0.33**	0.33**

*Correlation is significant at the 0.05 level (2-tailed) **Correlation is significant at the 0.01 level (2-tailed).

Based on Table 1, the hypothesized model, including only significant paths from temperament (Harm Avoidance, HA), character (Self-Directedness, SD; Cooperativeness, C), and difficulty in emotion regulation (DER) to PMS. Based on

Table 2, All fit indices met or exceeded recommended thresholds ($\chi^2/df < 3$, GFI/CFI/NFI/IFI > 0.90 , RMSEA ≤ 0.05), confirming robust model validity.

Table 2.
Goodness-of-Fit Indices of the Hypothetical Model

Indicator	χ^2/DF	GFI	CFI	NFI	IFI	RMSEA
Model	1.81	0.99	0.99	0.99	0.99	0.05

χ^2/DF = Chi-Square/Degrees of Freedom Ratio, GFI=Goodness of Fit Index, CFI=Comparative Fit Index, NFI=Normed Fit Index, IFI=Incremental Fit Index, RMSEA=Root Mean Square Error of Approximation

According to Table 3, SD has a significant negative direct effect on difficulty in emotion regulation ($\beta=-0.43$, $p=.001$). HA has a significant positive direct effect on difficulty in

emotion regulation ($\beta=0.17$, $p=.001$). Additionally, C has a significant negative direct effect on difficulty in emotion regulation ($\beta=-0.12$, $p=.03$). Furthermore, difficulty in emotion regulation has a significant positive direct effect on PMS ($\beta=0.24$, $p=.001$). Moreover, SD has a significant

indirect negative effect on PMS through its influence on difficulty in emotion regulation ($\beta = -0.10$, $p = .001$). The indirect effect of HA on PMS through difficulty in emotion regulation is also significant and positive ($\beta = 0.04$, $p = .001$).

The indirect effect of C on PMS through difficulty in emotion regulation is also significant and negative ($\beta = -0.03$, $p = .009$). The total effect of self-directedness on PMS ($\beta = -0.15$, $p = .03$) and C on PMS ($\beta = -0.03$, $p = .009$) is also significant.

Table 3.
Path Coefficients of the Research Model

Predictor Variable	Criterion Variable	Direct Effects		Indirect Effects		Total Effects	
		β	p	β	p	β	p
NS	Difficulty in emotion regulation	0.09	.11	-	-	0.09	.11
	PMS	0.05	.50	0.02	.06	0.07	.33
RD	Difficulty in emotion regulation	0.003	.97	-	-	0.003	.97
	PMS	-	-	0.001	.96	0.001	.96
SD	Difficulty in emotion regulation	-0.43	.001	-	-	-0.43	.001
	PMS	-0.05	.50	-0.1	.001	-0.15	.03
HA	Difficulty in emotion regulation	0.17	.001	-	-	0.17	.001
	PMS	0.09	.26	0.04	.001	0.13	.09
C	Difficulty in emotion regulation	-0.12	.03	-	-	-0.12	.03
	PMS	-	-	-0.03	.009	-0.03	.009
Difficulty in emotion regulation	PMS	0.24	.001	-	-	0.24	.001

NS=Novelty Seeking, RD= Reward Dependence, SD=Self-Directedness, HA=Harm Avoidance, C=Cooperativeness

Based on table 4, the model explained 41% of the variance in DER ($R^2 = 0.41$), driven by SD, HA, and C, and 12% of the variance in PMS ($R^2 = 0.12$), influenced by SD, HA, C, and DER. These moderate effect sizes highlight the significant roles of personality traits and emotion regulation in PMS severity.

Discussion

This study investigated the relationship between Premenstrual Syndrome (PMS), temperament, character, and difficulty in emotion regulation (DER), revealing significant effects of Harm Avoidance (HA), Self-Directedness (SD), and Cooperativeness (C) on PMS through DER. High HA ($\beta = 0.17$, $p = .001$, Cohen's $d = 0.35$) increased DER, exacerbating PMS symptoms, while high SD ($\beta = -0.43$, $p = .001$, Cohen's $d = 0.92$) and C ($\beta = -0.12$, $p = .03$, Cohen's $d = 0.25$) reduced DER, mitigating PMS severity. DER mediated these relationships, explaining 41% of the variance in DER and 12% in PMS.

The results corroborate prior research linking personality traits to PMS severity. High HA is a risk factor for severe PMS symptoms, while high SD and C serve as protective factors (Morishita et al., 2022; Telek et al., 2010). Komasi et al. (2022) similarly found that high HA and low SD contribute to psychopathology, supporting the observed effects on DER and PMS. Regarding DER, Nasiri et al. (2020) reported that women with PMS exhibit higher emotional suppression and

Table 4.
R² Coefficients

Variable	R ²	Result
Difficulty in emotion regulation	0.41	Average
PMS	0.12	Weak

lower reappraisal, consistent with our finding that DER mediates personality-PMS relationships. Additionally, Meers et al. (2020) noted that poor emotion regulation exacerbates premenstrual mood symptoms, potentially leading to mood disorders, which aligns with our mediation model ($\beta = 0.24$ for DER on PMS).

To explain these findings, research indicates that personality traits influence the usage of various emotion regulation strategies (Izadpanah et al., 2016). For instance, individuals who score high on the HA are inhibited and avoid experiencing negative emotions. By suppressing negative emotions, they increase physiological arousal during the premenstrual period. Suppression of emotions may also lead to reduced emotional awareness, causing individuals to feel confused and disoriented in emotionally arousing situations, resulting in sudden outbursts of suppressed emotions and destructive behaviors, all of which predispose individuals to experiencing PMS symptoms (Hofmeister & Bodden, 2016). On the other hand, individuals high in HA are anxious and fearful, reacting strongly to daily stressors and

unable to reappraise situations. As a result, they engage in catastrophic thinking and anticipate negative events, leading to constant worry and tension (Shirahama et al., 2018), which are all symptoms of PMS.

Individuals with high levels of SD have an internal locus of control, are highly capable of coping effectively with life's challenges, and through effective emotion regulation strategies such as problem-solving and cognitive appraisal, they can pursue their goals despite experiencing negative emotions. By preserving, managing, and increasing the experience and expression of emotions, they enhance their adaptability and experience more positive emotions and well-being (Fouladchang, 2014). These individuals who possess emotional awareness and clarity recognize their emotions, understand their underlying meanings, and cope more effectively with negative emotional experiences, demonstrating good adjustment to their environment and others (Eckland & Berenbaum, 2021). Consequently, they experience milder PMS symptoms. However, individuals with low SD are weak, fragile, and blaming, lack effective emotion regulation strategies, and have a rigid approach when experiencing negative emotions. Instead of accepting their shortcomings, they always blame others for environmental deficiencies, resulting in a passive and immature approach to life, difficulties in social and occupational functioning, low life satisfaction, and negative and ineffective emotions (Bandura & Wood, 2020), making them prone to experiencing PMS symptoms.

In terms of C, individuals with high scores are friendly, patient, and compassionate. As a result of their social skills, they can share their emotions with others in stressful situations, receive social support, experience less distress (Kessler and Wang, 2019), and have milder PMS.

Study limitation and Future Directions

Sample Specificity: The use of a relatively small and convenient sample of adult female volunteers from a single university population may limit the generalizability of the results to different age groups and other populations. Future studies with a larger and randomized sample from other groups of patients with PMS/PMDD could enhance our understanding of this relationship.

Methodological Considerations: The premenstrual symptoms of the participants may not have been accurately assessed, because the PSST scale, a self-report questionnaire, was administered only once and retrospectively, and diagnostic interviews were not conducted. In future studies, it would be better to conduct similar research on a clinical population diagnosed with this disorder or its severe form, PMDD, by a psychiatrist or psychologist.

Conclusion and Recommendations

Based on the research findings, cyclical changes in mood, affect, and cognition, which occur monthly, may be more challenging for women with high HA and low SD and C, who have difficulties in effectively processing and managing emotions. This makes them more susceptible to PMS. The contribution of our study to the management of premenstrual syndrome includes the following:

Clinical Implications: These findings suggest that interventions targeting emotion regulation (e.g., cognitive-behavioral therapy, mindfulness training) could reduce PMS symptom severity, particularly for women with specific temperament profiles. Integrating personality assessments into clinical practice may enhance personalized treatment plans (Yonkers et al., 2020).

Theoretical Contribution: The study contributes to a more nuanced understanding of the biopsychosocial factors contributing to PMS. By integrating personality traits and emotion regulation, it offers a comprehensive framework for future research (Morishita et al., 2022).

Public Health Perspective: Given that 3% to 8% of women of fertile age are thought to have premenstrual dysphoric disorder (PMDD), regarded as a serious form of PMS (Morishita et al., 2022), the findings have implications for public health strategies. Early identification of women with specific personality profiles and difficulties in emotion regulation could facilitate timely intervention and support (Morishita et al., 2022).

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of UMA (Date: 24.01.2024, Ethical code: IR.UMA.REC.1402.098).

Informed Consent: Verbal informed consent was obtained from all participants who participated in this study.

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