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The possible protective role of personality dimensions against premenstrual syndrome

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ABSTRACT

Previous studies suggest that women with premenstrual syndrome (PMS) differ from those without PMS in personality dimensions, but it is not clear what role personality plays in the background of premenstrual symptomatology. Our purpose was to examine personality dimensions measured by the Tridimensional Character Inventory (TCI) in psychiatrically healthy women not suffering from premenstrual dysphoric disorder (PMDD) in relation to the severity of distressing and impairing mental and physical symptoms experienced in the late luteal phase of the menstrual cycle. Forty healthy women completed the prospective record of the Impact and Severity of Menstrual Symptoms (PRISM) calendar every evening through three consecutive menstrual cycles and were assigned into LPS (luteal phase symptom) vs. non-LPS groups. Our grouping did not reflect categorization according to the presence of PMS, since we investigated healthy women. Personality characteristics were evaluated using the TCI. LPS subjects scored significantly higher in subscales associated with novelty seeking (NS), self-directedness (S), cooperation (C) and self-transcendence (ST), and lower in the harm avoidance (HA) scale. Elevated scores of women with higher symptom severity in the late luteal phase in NS, S, ST and C scales and lower HA scores are in contrast with previous results on personality traits associated with PMS. However, we investigated psychiatrically healthy women. Therefore, our results suggest that this personality profile is a protective factor against developing serious psychiatric symptoms when experiencing a distressing and more marked symptomatology associated with the late luteal phase of the reproductive cycle.

1. Introduction

Premenstrual syndrome (PMS) is a combination of mental and physical symptoms arising in the luteal phase of the menstrual cycle. The cyclical nature of the symptom variations is characteristic of the syndrome (Halbreich, 2004; Halbreich et al., 2007). The lack of a commonly accepted definition and method to diagnose PMS has led to contradictory results in the search for its aetiology and treatment (Frank, 1931; Halbreich, 2003); however, empirical observations, based on women's daily rating of symptoms have demonstrated the existence of a menstrual-related disorder (Hasin et al., 1988; Steiner, 1997). Common symptoms of PMS include physical (e.g., swelling, breast tenderness, aches), behavioural (sleep disturbances, appetite changes, poor concentration, decreased interest and social withdrawal) and mood (irritability, mood swings, anxiety/tension, depression and feeling out of control) symptoms (Halbreich et al., 1982; APA, 1994; Deuster et al., 1999). Although many women recognise a premenstrual increase in physical and psychological symptoms, the majority of women do not experience these symptoms as distressing (Ramcharan et al., 1992). PMS, however, may have a severe impact on everyday well-being (Weissman and Bothwell, 1976; Kuczmierczyk et al., 1992; Campbell et al., 1997; Hylan et al., 1999).

The term, premenstrual syndrome, is a broad category, and therefore better categorised diagnostic categories were derived to assess the clinical significance of premenstrual symptomatology. The International Classification of Diseases (ICD)-10 premenstrual tension syndrome category contains no requirement for a minimum number of symptoms or for functional impairment for the diagnosis. Late luteal phase dysphoric disorder (LLPDD) was introduced in the Diagnostic and Statistical Manual of Mental Disorders, third edition, revised (DSM-III-R) with definite criteria and requirements. In DSM-IV, another item was added to the list of criteria and the name was changed to premenstrual dysphoric disorder (PMDD). These diagnostic categories are based on the presence of a given number of symptoms and also require the

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symptoms to interfere with work and social functions, as opposed to the more broadly used PMS term (APA, 1994).

Essential components of a PMS diagnosis are the timing and severity of the PMS symptoms, the degree of disruption in functioning, and the differentiation of the disorder from other physical or psychiatric conditions (Endicott and Harrison, 1990; Barnhart et al., 1995; Freeman, 2003). The diagnosis of PMS should be based on prospective daily ratings of symptoms (Hart et al., 1987). A number of instruments have been developed for rating PMS symptoms (Moos, 1968), but information on the relationship among the scales, or with other standard mood measures, is limited (Endicott and Harrison, 1990). The widely cited 30% criterion for marked change between postmenstrual and premenstrual symptom levels established by the National Institute of Mental Health (1983; Hamilton et al., 1984) fails to cover a significant portion of syndromes associated with luteal phase worsening of symptoms or differentiate between them.

In an attempt to delineate its aetiology, several researchers have attempted to clarify the psychological background factors of premenstrual symptomatology. The results of this research are often hard to interpret, because different studies apply different diagnostic criteria for inclusion (i.e., presence of either PMS, PMDD or LLPDD); therefore, it is confusing to compare results of these studies. Research has earlier focussed on identifying personality dimensions associated with premenstrual symptomatology; results, however, have been inconsistent (Bancroft, 1995; Freeman et al., 1995; Ross et al., 2001; Halbreich et al., 2007). Considerable differences between PMS patients and controls were found, with PMS patients scoring significantly higher regarding somatic anxiety, muscular tension, indirect aggression, verbal aggression and neuroticism and lower regarding socialisation compared with controls (Hallman et al., 1987). In previous studies, the Tridimensional Personality Questionnaire (TPQ) (Cloninger et al., 1991) dimensions of harm avoidance (HA) and novelty seeking (NS) were modestly correlated with the premenstrual symptom scores. Elevations of scores in the HA and NS dimensions were associated with a tendency for PMS to present with specific symptom patterns: depressive symptoms for the HA factor and food cravings and mood swings for the NS factor (Freeman et al., 1995). In another study, only HA was found to be elevated in PMDD women compared to controls (Hsu et al., 2007).

The aim of our study was to investigate the personality associations of luteal phase symptom worsening in healthy young women without any DSM-IV axis I psychiatric disorders or any menstrual cycle-related psychiatric and somatic disorders. We sought to establish the relationship between personality dimensions as measured by the Temperament and Character Inventory (TCI) and experiencing more severe symptoms associated with the female reproductive cycle in a population of healthy women.

2. Subjects and methods

2.1. Participants

A total of 40 women aged between 18 and 45 years (mean age: 27.4 ± 0.66 years) were included in our sample. All participants went through physical and psychiatric examination. The M.I.N.I. Neuropsychiatric Interview was administered by a psychologist (Balazs et al., 1998; Sheehan et al., 1998). None of our participants met DSM-IV criteria for PMDD, or any other current or lifetime psychiatric disorder. We conducted a detailed interview based on PMDD criteria prior to inclusion and after completion of the research to exclude women suffering from symptoms meeting diagnostic criteria. Anyone experiencing a marked fluctuation of symptoms during the menstrual cycle, or anyone who said these symptoms interfered with her social, interpersonal or work functioning was excluded from the sample.

All participants had regular menstrual cycles, were sexually active during the study and in the 3 months before the experiment, and were using non-hormonal contraceptive methods. All participants were living in stable relationships with a steady partner, and none had children or were pregnant. Mean cycle length was 28 ± 5.8 days (range: 18.67–32.00 days).

At the initial phase we included 44 women. One declined participation after learning the details of the study. Two dropped out because the Prospective Record of the Impact and Severity of Menstrual Symptoms (PRISM) calendar in month 3 was incomplete. One had a major family tragedy and was excluded.

The investigation was carried out in accordance with the latest version of the Declaration of Helsinki (www.wma.net/e/ethicsunit/helsinki.htm). The study was approved by the Scientific and Research Ethics Committee of Scientific Health Council in Hungary in charge of experimentation with human subjects. All subjects were given a thorough explanation of the procedures of the study and all participants gave informed consent before participating in the study.

2.2. Measures

Participants completed the PRISM calendar (Reid and Fretts, 1995) to assess fluctuation of everyday psychological and physical symptoms throughout the reproductive cycle. The PRISM calendar was developed in 1985 (Reid, 1985) as a clinical tool to assess pattern, severity and impact of physical and psychological symptoms during the female reproductive cycle. The PRISM calendar shows a high correlation with the self-rating scale designed by Steiner et al. (Steiner et al., 1980; Casper and Powell, 1986). Both measures are widely used in clinical and research studies concerning women with PMS. The PRISM calendar demands the daily recording of 23 items referring to symptoms, 11 items referring to function and influence on life, and four items to assess other independent life events. Of the 23 symptoms, 12 refer to physical symptoms (insomnia, mastalgia, oedema, fatigue, abdominal bloating, headaches, craving and nausea, scored 0–3; and change in bowel function, appetite, sex drive and chill/sweat episodes scored 0 if absent and 1 if present) and 11 refer to psychological symptoms (irritability, mood lability, anger, depression, anxiety, restlessness, feeling unattractive, lack of control, unreasonable behaviour, low self-image, scored 0–3). Symptoms are scored according to the following instruction: 0–absent, 1–noticeable but not disturbing, 2–interferes with normal activity, 3–temporarily incapacitating) (Hahn et al., 1998). The maximum daily symptom score in the PRISM calendar is 61. The PRISM allows for the visual evaluation of the pattern, severity and lifestyle impact of the recorded symptoms over each reproductive cycle, useful in both everyday clinical work and in research (Reid, 1985).

Participants filled out the PRISM calendar every night through three consecutive menstrual cycles. Since the cycle length of participants in the study differed, scores in case of each participant were transformed to a 28-day cycle keeping in mind the different phases of the cycle. Late luteal phase PRISM score was calculated based on the last 7 days of the cycle (7 days preceding the onset of the next menstruation), and late follicular phase scores were based on the 7 days between 21–14 days before the onset of the next menstruation. Based on their PRISM scores, participants were assigned into two groups according to whether their increase in scores on the PRISM calendar was higher or smaller than 30% when the late follicular phase and late luteal phase scores were compared. We named our groups LPS (luteal phase symptoms) and non-LPS (no luteal phase symptoms); however, we would like to emphasise that our grouping did not reflect categorisation according to presence of PMS, since we investigated healthy women not meeting diagnostic criteria for any menstrual cycle related disorders.

Personality was assessed using the TCI (Cloninger et al., 1993; Rozsa et al., 2004). The TCI measures four dimensions of temperament and three dimensions of character. The temperament dimensions measure individual differences in emotional responses to associatively conditioned stimuli. The four temperaments are novelty seeking (NS, i.e., impulsive versus rigid), harm avoidance (HA, i.e., anxious versus risk-taking), reward dependence (RD, i.e., approval seeking versus aloof) and persistence (P, i.e., overachieving versus underachieving). The character dimensions measure individual differences in higher cognitive processes that modulate emotional conflicts to satisfy a person's goals and values. The character dimensions quantify the three branches of mental self-government: self-directedness (S, executive functions, such as being responsible, purposeful and resourceful), cooperativeness (C, legislative functions, such as being tolerant, forgiving and helpful) and self-transcendence (ST, judicial functions, such as being intuitive, judicious and aware) (Cloninger et al., 1993). Each temperament and character dimension, except persistence, consists of further subdimensions. The TCI consists of 240 items each scored yes or no. The subjects completed the TCI in the first cycle during the late follicular phase on days 8–10, which is symptom free and considered the baseline for comparing symptom augmentation in the late luteal phase.

To avoid depression and anxiety interfering with our personality measures, we measured anxiety and depression concurrently with TCI. The current level of anxiety was assessed using the State Anxiety scale of the State-Trait-Anxiety Inventory (STAI) (Spielberger, 1970; Sipos et al., 1998). Depressive symptoms were measured with the Zung Self-Rating Depression Scale (Zung, 1965; Simon, 1998).

2.3. Data analysis

Data were analysed using Statistica 7 for Windows. $P<0.05$ was accepted as the level of significance. Our study was exploratory; therefore we did not adjust for multiple comparisons. This should also be taken into account when interpreting our results.

3. Results

Our sample was divided according to increase of PRISM scores from the late follicular to the late luteal phase of the menstrual cycle. Subjects with a 30% or higher increase in symptoms were assigned to

Table 1
Comparison of age, PRISM scores, state anxiety and depression scores of subjects in the LPS and non-LPS groups in the follicular phase of the cycle.

	LPS ($n=22$) mean ± S.D.	NonLPS ($n=18$) mean ± S.D.	*dF*	*t*	*P*
Age	27.3 ± 4.7	27.5 ± 6.9	38	0.0725	0.9426
Mean cycle length	28.2 ± 2.1	29.1 ± 1.7	38	1.1798	0.2454
PRISM score of late follicular phase	24.5 ± 16.6	58.6 ± 43.5	38	3.3887	0.0016
PRISM score of late luteal phase	70.0 ± 67.4	42.8 ± 26	38	−1.6218	0.1131
ZSDS	38.2 ± 6.7	42.7 ± 7.7	38	1.9766	0.5540
STAI State Anxiety	41.2 ± 13.7	44.6 ± 14.3	38	0.7623	0.4506

the LPS (luteal phase symptoms) group, while subjects with less than 30% increase were assigned to the non-LPS group (no luteal phase symptoms). This division reflects the NIMH guidelines, which demand an at least 30% change between the severity of follicular and late luteal symptoms (National Institute of Mental Health, 1983). Please note, however, that these categories do not refer to diagnostic categories; they were created in this study for research purposes. A total of 22 (55%) out of our participants fell into the LPS group, while 18 (45%) fell into the non-LPS group.

We found no significant differences between age, mean cycle length, PRISM score of late luteal phase, State Anxiety and depression scores in the LPS and non-LPS groups. There was a significant difference between the two groups in the PRISM score of the late follicular phase (Table 1). The STAI State Anxiety score showed no significant difference from the healthy Hungarian female average score (42.8 and 41.5 respectively, $P=0.5585$). In case of the Zung Self-Rating Depression Scale, all participants scored below 53, which is accepted as the level indicating depression.

We found significant differences between LPS and non-LPS groups in several TCI scales. Subjects in the LPS group scored significantly higher on the NS scale and the NS1 and NS3 subscales. LPS subjects also scored significantly higher on the S1 and S3 subscale of the S scale. LPS subjects had a significantly higher score on the C scale as well as on its C1, C2 and C4 subscales. LPS subjects scored significantly higher on the ST scale and its ST2 subscale. LPS subjects had a significantly lower score on the HA scale and the HA1 subscale (Table 2).

4. Discussion

Although results of previous studies suggest that women with PMS differ from those without PMS in several personality dimensions (Bancroft, 1995; Freeman et al., 1995; Ross et al., 2001), these studies are inconsistent not only in their findings but also in the studied populations. In our study using the TCI, we have managed to identify several personality correlates of late luteal premenstrual symptomatology in healthy women whose symptoms are not serious enough to meet diagnostic criteria for premenstrual disorders.

Our results contradict to a great extent the personality dimensions anecdotally associated with tendency for somatisation, and the personality dimensions so far identified in women suffering from premenstrual psychiatric disorders such as PMDD. The reason for this may be that we investigated women who do not meet diagnostic criteria for premenstrual disorders. It is therefore possible that the personality dimensions we detected in women with more expressed late luteal symptomatology are those characteristics which are protective, and which keep them from manifesting such menstrual cycle-associated disorders as PMDD. The subgroup of women with similar or more serious late luteal symptoms but without protective personality characteristics are likely to be PMDD patients and therefore are not represented in our sample.

We found significant differences between LPS and non-LPS women in both temperament and character dimensions of the TCI.

The temperament dimensions of the TCI measure individual differences in emotional responses to associatively conditioned stimuli. Of the four major temperament dimensions of TCI, we found significant differences in case of NS and HA, but not in case of RD or P. We have found that women who experience a more marked increase in their physical and psychological symptoms towards the late luteal phase of the cycle (LPS group) are characterized by significantly higher NS scores, especially higher exploratory excitability (vs. stoic rigidity NS1) and extravagance (vs. reserve NS3), indicating intolerance for routine and monotony but also being more interested and thus more perceptive concerning changes. This may mean that they are more sensitive towards physical changes they experience as a natural phenomenon accompanying their cycle. Our results may also suggest that they report more late luteal physical symptoms compared with woman who experience the same amount of physical changes in the luteal phase but are characterised by a lower NS score.

Subjects in the LPS group also scored significantly lower on the HA scale as well as its anticipatory worry/pessimism (vs. uninhibited optimism, HA1) subscale, which contradicts earlier study results and also our prior knowledge on the association of premenstrual syndromes with neuroticism and tendency for affective illness, both of which are associated with higher HA scores (Bancroft, 1995;

Table 2
Comparison of PMS and nonPMS groups concerning temperament and character (TCI) scores.

TCI scale	PMS ($n=22$) mean ± S.D.	nonPMS ($n=18$) mean ± S.D.	*dF*	*t*
Novelty Seeking(NS)	23.9 ± 5.9	19.3 ± 7.4	38	−2.19*
NS1: exploratory excitability vs. stoic rigidity	8.4 ± 1.7	6.3 ± 2.9	38	−2.71**
NS2: impulsiveness vs. reflection	4.5 ± 2.8	4.2 ± 2.6	38	−0.35
NS3: extravagance vs. reserve	5.8 ± 2.2	4.0 ± 2.4	38	−2.47*
NS4: disorderliness vs. regimentation	5.1 ± 1.8	4.8 ± 2.5	38	−0.66
Harm Avoidance(HA)	14.9 ± 5.6	19.2 ± 5.2	38	2.46*
HA1: anticipatory worry/pessimism vs. uninhibited optimism	4.1 ± 1.8	5.8 ± 1.5	38	3.01**
HA2: fear of uncertainty vs. confidence	3.3 ± 1.2	4.1 ± 2.0	38	1.39
HA3: shyness with strangers vs. gregariousness	3.6 ± 2.1	4.8 ± 2.1	38	1.69
HA4: fatigability and asthenia vs. vigour	3.8 ± 2.3	4.6 ± 1.8	38	1.19
Reward dependence(RD)	17.6 ± 3.7	16.7 ± 2.7	38	−0.82
RD1: sentimentality vs. insensitivity	7.4 ± 1.9	7.2 ± 1.7	38	−0.24
RD2: attachment vs. detachment	6.3 ± 1.6	5.7 ± 1.6	38	−1.03
RD3: dependence vs. independence	3.9 ± 1.5	3.8 ± 1.4	38	−0.37
Persistence (P)	4.0 ± 2.1	5.1 ± 2.1	38	1.65
Self-directedness (S)	29.3 ± 6.9	26.7 ± 5.9	38	−1.34
S1: responsibility vs. blaming	6.2 ± 1.4	4.7 ± 2.4	38	−2.52*
S2: purposefulness vs. lack of goal directions	5.4 ± 1.7	4.9 ± 1.8	38	−0.72
S3: resourcefulness vs. inertia	3.7 ± 1.2	2.8 ± 1.5	38	−2.20*
S4: self-acceptance vs. self-striving	7.3 ± 2.0	7.5 ± 2.5	38	0.24
S5: congruent second nature vs. incongruent habits	6.7 ± 2.4	6.8 ± 2.0	38	0.20
Cooperativeness (C)	34.6 ± 5.0	28.4 ± 6.9	38	−3.26**
C1: social acceptance vs. social intolerance	7.1 ± 1.1	5.5 ± 2.4	38	−2.60*
C2: empathy vs. social disinterest	5.9 ± 0.8	4.7 ± 1.4	38	−3.21**
C3: helpfulness vs. unhelpfulness	6.4 ± 1.4	5.9 ± 1.3	38	−1.07
C4: compassion vs. revengefulness	8.0 ± 2.2	6.0 ± 2.6	38	−2.60*
C5: pure-hearted principles vs. self-advantage	7.2 ± 1.6	6.2 ± 1.9	38	−1.78
Self-Transcendence (ST)	18.0 ± 7.0	13.2 ± 6.5	38	−2.23*
ST1: self-forgetful vs. self-conscious	6.5 ± 2.4	5.7 ± 2.4	38	−1.05
ST2: transpersonal identification vs. self-differentiation	4.2 ± 2.0	2.4 ± 1.8	38	−2.94**
ST3: spiritual acceptance vs. rational materialism	7.3 ± 3.3	5.1 ± 3.4	38	−2.00

* Statistically significant ($P<0.05$).
** Statistically significant ($P<0.01$).

Freeman et al., 1995). Low HA scores in general indicate carefree and relaxed people, who are confident, composed and optimistic, have a high level of energy, and give a dynamic and lively impression. This again may serve as an important protective factor when experiencing distress resulting from increased symptoms in the late luteal phase.

In case of the character dimensions, which measure individual differences in higher cognitive processes modulating emotional conflicts to satisfy the person's goals and values, we also found significant differences between LPS and non-LPS women. Furthermore, significant differences appeared in case of all three character dimensions. We found that the group experiencing more pronounced late luteal symptomatology (LPS group) scored significantly higher on the responsibility (vs. blaming, S2) and the resourcefulness (vs. inertia, S3) subscales of the S dimension. These two scores mean a tendency to take a more active role in the face of experienced changes, that is, taking responsibility instead of blaming outer circumstances. The higher score on the responsibility scale again contradicts our expectations and knowledge concerning premenstrual symptomatology based on studies with PMDD women, since women with premenstrual syndromes were thought to be characterised by a more "outer control" attitude and as people feeling themselves to be victims. Our results, on the other hand, again suggest that these women may be protected by their responsible attitude from developing more serious premenstrual-related pathology. In line with this, the high resourcefulness score means good coping and problem solving abilities, which again may be considered as a protective factor against developing psychological reactions when experiencing distress related to premenstrually manifesting physical symptoms.

Women in the LPS group scored significantly higher also on the C Scale and on its social acceptance (vs. social intolerance, C1), empathy (vs. social disinterest, C2) and compassion (vs. revengefulness, C4) subscales. Higher cooperativeness in general means more empathy, tolerance, compassion and support. This, on the other hand, may mean that these women are more sensitive to generally accepted ideas and beliefs concerning how women should feel in the premenstrual period. It has been demonstrated by several studies that culturally held stereotypes and widely accepted beliefs and attitudes concerning premenstrual symptomatology may play a stronger role in the emergence of premenstrual symptoms than actual physical changes associated with the reproductive cycle (Marvan et al., 1998; Woods et al., 1998; Marvan and Cortes-Iniestra, 2001) and that these are so important that even prepubertal girls and prepubertal boys have stereotypes concerning the premenstrual syndrome (Marvan and Escobedo, 1999).

Subjects in our LPS group also scored significantly higher on the ST scale, as well as its transpersonal identification (vs. self-differentiation, ST2) subscale. The higher ST score indicates more patience, self-fulfillment, creativity and selflessness, which are again evidence for protective factors. The higher transpersonal identification score indicates that the person tends to experience being part of a higher unity and a connection to nature. This also indicates a higher acceptance towards naturally occurring phenomena such as changes associated with the menstrual cycle.

As we described above, we found significant differences in LPS and non-LPS women in both temperament and character dimensions. Our results indicate that the protective role of the personality dimensions against the development of serious premenstrual symptomatology is manifested in two mutually related levels. Physical changes associated with the luteal phase of the menstrual cycle present distress. Protective temperamental dimension determine the emotional responses arising in the face of these stimuli, and may prevent a negative response or a conflict from arising. If there is an emotional problem or symptom as a reaction to these stressful stimuli, protective character dimensions and cognitive processes modulate these reactions such that they protect against the development of serious premenstrual symptomatology. The fact that we found significant differences in the case of all the three character dimensions emphasises the profound role of modulating cognitive processes in the emergence of premenstrual symptoms.

In our study, we also found that the non-LPS group has a higher PRISM score compared with the LPS group in the follicular phase. This again is in contradiction with our previous expectation, but is in line with our findings. In contrast to the LPS group, which has a sharp increase in their PRISM score from the follicular to the luteal phase, the score is high even in the non-LPS group. It is higher in the follicular phase and lower in the luteal phase compared with the LPS group. This indicates that it is not the higher PRISM (or general symptom) score in itself that causes problems, but the recurring sharp increase in symptoms. This symptomatic increase occurring every month happens in a relatively short time, and makes adaptation to changed physical and psychological conditions difficult, which is probably a crucial factor in premenstrual symptomatology. The fact that the LPS group has a significantly lower score in the follicular phase of the menstrual cycle again indicates that women in this group are manifesting less physical and psychological problems in general, which may again be related to a protective personality profile.

In our study, the group that experiences a more marked symptom increase in the late luteal phase as compared to the follicular phase shows the personality profile of an open, tolerant, accepting, confident and optimistic, responsible and resourceful person with good problem solving and coping abilities and good empathy. This contradicts the results of earlier studies concerning the association of premenstrual syndromes with personality dimensions. The main difference between our study and previous studies is that we investigated a sample of healthy women, and none of our subjects met diagnostic criteria for established premenstrual disorders such as PMDD. Although our LPS subgroup had a more marked increase in late luteal symptoms compared with our non-LPS group, symptom severity in the LPS groups did not reach the diagnostic level. Our results suggest that it is their personality which protected women in our LPS group from developing diagnosable premenstrual phase-related disorders. The personality profile of our LPS group matches more closely the healthy personality than that associated with affective disorders or neuroticism. Therefore, it seems that personality has a profound role in influencing the manifestation of late-luteal phase psychiatric pathology, and it can play a role both as a risk factor, but also as a protective factor.

Our results and findings promote the understanding of premenstrual symptomatology and premenstrual phase-related disorders from several aspects. On one hand, further insight into the aetiology of premenstrual syndromes is offered by extrapolating clinical symptoms to a healthy population and to expanding our scope to the healthy phenomena, which are the bases of symptoms. Further, as opposed to previous studies, which have investigated the characteristic personality profile of women suffering from PMS or PMDD, our study tries to explain the emergence of PMS from the other direction, by pointing out those personality characteristics that protect some women who experience distressing fluctuations of symptoms parallel to the menstrual cycle from developing PMS or PMDD. This new approach helps us further delineate the personality differences between women who develop and do not develop clinical level premenstrual symptoms when experiencing distress.

In interpreting our results, we must mention several limitations of our study. Our sample was relatively small, given the burden of participation on our subjects, who had to fill out a questionnaire every night for 3 months. . Further studies with bigger samples are needed to confirm our findings. We did not control for major life events when assessing daily mood. Further, we did not measure hormonal levers to determine menstrual cycle phase. We must also emphasise that our study was exploratory, and therefore we did not adjust for multiple

comparisons. A further limitation of our study is that we did not investigate other factors, which also have a possible contributing role in the emergence of premenstrual symptoms such as genetic factors, age, presence of children, trauma history, etc.

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