

Temperament traits and severity of depressive symptoms in women

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Abstract

Introduction: Depression has been called the pandemic of the 21st century. The relationships between temperament traits and the occurrence and development of depression are complex. Personality traits, including temperament traits, may predispose an individual to depression and modify the clinical picture of a depressive disorder.

Aim of the research: The aim of this study was to analyse associations between temperament traits and the severity of depressive symptoms in women.

Material and methods: This study involved women in the general population. The following tools were used: a sociodemographic inquiry form designed by the present authors, the Buss and Plomin Temperament Questionnaire (EAS-D), and the Beck Depression Inventory (BDI-II).

Results: The results showed that temperament traits were statistically significantly correlated with the severity of depressive symptoms in the women surveyed. Women with different temperament types/profiles differed significantly in the severity of depressive symptoms and the frequency of their occurrence.

Conclusions: The severity of depressive symptoms was statistically significantly predicted by the following temperament traits: a heightened tendency to react with distress and a low level of activity. Women whose dominant temperament traits were low activity and increased negative emotionality had significantly more severe depressive symptoms than women who were more active and much less likely to react with distress, fear, and anger.

Introduction

Depression is categorised as a lifestyle disease and has been called the pandemic of the 21st century. According to the World Health Organisation (WHO), 100 million people suffer from depression. In Poland, it is diagnosed in 5–11% of the population. Twice as many women suffer from depression as men, with the peak incidence occurring between the ages of 40 and 50 years. The main symptoms of depression are low mood, loss of satisfaction and interests, and reduced energy levels or lack of vitality. People with depression may report feelings of guilt, low self-esteem, eating disorders, sleep disorders, suicidal ideation, suicidal plans, concentration disorders, and memory disorders [1].

Some researchers [2] believe that symptoms of depression and anxiety occur in people who have very similar temperament patterns. Tylka and Szyntar [3] emphasised that both clinical practice and research findings indicate that there is a relationship between depression and characteristics of personality, including temperament. The relationships between temperament traits and the occurrence and development of depression are complex. Personality traits, including tem-

perament traits, may predispose an individual to depression, but they may also result from it and modify the clinical picture of a depressive disorder [4].

Strelau [5] defines temperament as a set of relatively stable features of an organism, which are manifested in such behavioural properties as energy level (strength, intensity) and briskness (speed, tempo, and mobility). Temperament is determined by innate physiological mechanisms, and it changes slowly under the influence of factors associated with the process of maturation and certain environmental factors. Strelau [5] distinguished the following temperament traits: briskness, perseverance, sensory sensitivity, emotional reactivity, endurance, and activity. The dimension of temperament, which refers to automatic emotional reactions to experiences, is hereditary and stable throughout life [6]. Buss and Plomin [7, 8] define temperament as a set of genetically determined personality traits that become manifest early on in an individual's life. They have identified three basic traits that underlie the structure of temperament: emotionality, activity, and sociability. Emotionality is the tendency to easily become strongly aroused and to express negative emotions. Activity is associated

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with gross motor movements, and sociability is connected with extraversion and a preference for being in the company of other people [7, 8].

Tylka and Szyntar [3] found in their study that women with depression are characterised by the following temperament traits: low levels of briskness, endurance, and activity, a tendency to ruminate over the past, and increased fear, anxiety, and reactivity. Temperament traits such as prematurely anticipating difficulties, responding to new situations with anxiety and tension, and struggling to cope with excessive stimulation are cited as factors that predispose individuals to the development of depressive symptoms [9, 10]. Zawadzki and Strelau [11] pointed out that people with depression characteristically show limited activity, low endurance, high emotional reactivity, and perseverance. Similarly, Sławińska *et al.* [12] described women with depression as passive, socially withdrawn, showing low resilience to everyday difficulties, struggling to maintain work pace, and having difficulty coping with adverse environmental stimuli. Jylhä and Isometsä [13], who conducted a study of a Finnish-population-based cohort using Cloninger's Temperament and Character Inventory (TCI-R), found that harm avoidance was positively correlated, and self-direction negatively correlated, with symptoms of both depression and anxiety. Bould *et al.* [14] reported that temperament traits, especially negative emotionality (a high tendency to show anxiety) may be a risk factor for developing depression. Temperament is, to some degree, a diathesis for psychopathology, but other factors must be present before depression develops [14, 15]. Researchers [16–18] agree that the temperament trait of high negative emotionality measured with the Buss and Plomin EAS may be associated with the development of depression in adulthood. Karevold *et al.* [18] stated that high scores on the EAS shyness scale are also a risk factor for developing depression in adulthood. Masi *et al.* [19] reported that anxiety co-occurring with depression in adolescents was statistically significantly associated with increased negative emotionality and shyness measured with EAS-C. By contrast, the temperament traits of activity and sociability did not differentiate the diagnostic group from the control group [18]. Statistically significant correlations between temperament type and the severity of depressive symptoms were reported in studies by Bartosik *et al.* [20], Toyoshima *et al.* [21], Orsolini *et al.* [22], Miola *et al.* [23], and de Aguiar *et al.* [24].

Aim of the research

Because literature data indicate that temperament traits and their type play an important role in the development of depressive symptoms, we aimed to examine the relationship between temperament traits and the occurrence and severity of depressive symptoms in women.

The following research questions were developed for the present study:

1. Are there relationships between temperament traits and the severity of depressive symptoms in women, and if so, what are they?
2. Is the study group differentiated by temperament profile/type, and if so, do women with different temperament types/profiles differ in the severity and frequency of occurrence of depressive symptoms?

Material and methods

Participants and procedures

The study involved 111 women. The mean age of the participants was 32.88 years. A total of 19 (17.12%) participants lived in cities of up to 50 thousand inhabitants, 16 (14.41%) lived in cities of 50 thousand to 200 thousand inhabitants, and 47 (42.34%) lived in cities of over 200 thousand inhabitants. Twenty-nine of the women (26.13%) lived in the countryside. One (0.90%) participant had primary education, 2 (1.80%) had vocational education, 60 (54.05%) had secondary education, and 48 (43.24%) had higher education. With regard to occupational status, 64 (57.66%) women were employed, 1 (0.90%) was unemployed, 39 (35.14%) were students, and 7 (6.31%) were receiving a disability pension. In terms of marital status, 54 (48.65%) women were single, 37 (33.33%) were married, 4 (3.60%) were divorced, 14 (12.67%) were cohabiting, and 2 (1.80%) were widowed. Forty-two (37.84%) of the women were mothers.

The study was conducted using Google Forms surveys. First, the survey questionnaires were distributed electronically via the Messenger platform. The survey was also distributed on Facebook. It was open for responses from 10 March to 30 May 2025. The exclusion criterion was age under 18 years. The respondents were informed that participation was anonymous and voluntary and that the objective of the survey was to assess temperament traits and the severity of depression symptoms. All the women gave their consent to be included in the study. The average questionnaire completion time was about 30 minutes.

Ethical issues

The study did not require consideration by the Bioethics Committee. Completion of the questionnaire implied consent to participate in the study, and in addition, all responses were anonymous – the instruments used and the way the study was conducted did not allow for identification of the respondent. Furthermore, only adults participated in the study.

Methods

The following measures were used to find answers to the research questions: a sociodemographic inquiry form designed by the present authors, the Buss

and Plomin EAS-D Temperament Questionnaire, and the Beck Depression Inventory BDI-II.

1. The sociodemographic inquiry form included questions regarding gender, age, place of residence, marital status, level of education, job, and parental status.
2. The Buss and Plomin Questionnaire EAS-D was used to measure temperament. The Polish version of the questionnaire had been translated and adapted by Oniszczenko [7, 8]. EAS measures three basic components of temperament identified by Buss and Plomin [7]: emotionality (distress, fear, anger), activity, and sociability. The questionnaire consists of 20 statements. Respondents rate the extent to which the statements are true for them on a five-point scale [8], from *definitely not* to *definitely*. EAS for Adults consists of the following subscales: distress, fearfulness, anger, activity, and sociability. High scores on the distress subscale indicate a pronounced tendency to become intensely distressed, difficulty maintaining calm, and heightened sensitivity to distress-inducing stimuli. The internal consistency coefficient for the distress subscale is 0.74. A high fearfulness score points to a strong tendency to react with fear, to escape from danger, or to avoid situations or people perceived as threatening. The internal consistency coefficient for the fearfulness subscale is 0.70. A high score on the anger subscale is associated with a strong proclivity towards angry and aggressive behaviour, including instrumental aggression. The internal consistency coefficient for the fearfulness subscale is 0.59. A high score on the activity subscale reflects a strong tendency toward motor activity characterised by high tempo (speed of action) and vigour (strength or intensity of response). The internal consistency coefficient for the activity subscale is 0.67. A high score on the sociability subscale reflects a strong tendency to seek social interaction and companionship, while avoiding loneliness. The internal consistency coefficient for the sociability subscale is 0.57.
3. The Beck Depression Inventory (BDI-II) is a self-report measure consisting of 21 items with assigned response scales ranging from zero (the symptom does not occur) to 3 points (the highest severity level of the symptom). This version of the questionnaire assumes, in accordance with the original data, that scores in the range of 14–19 points represent mild depression, 20–28 represent moderate depression, and above 29 points represent severe depression. BDI-II should be used as a screening measure for the initial assessment of the severity of the depressive symptoms being examined. According to Zawadzki *et al.* [25], BDI-II demonstrates high accuracy in diagnosing depressive disorders while also allowing assessment of their severity. The internal consistency coefficients for the entire scale are 0.93 (control group) and 0.95 (clinical group) [25].

Statistical analysis

Spearman's rho was used to assess the relationship between the participants' level of depression and their temperament traits: sociability, activity, distress, fear, and anger. Progressive stepwise linear regression was employed to identify the variables (temperament traits) that most strongly and statistically significantly explained the severity of depressive symptoms in the study group of women. Temperament types in the sample were distinguished based on non-hierarchical cluster analysis, which allows objects to be grouped together based on their mathematically defined similarity. K-means clustering was used in this study. In this method, clusters are formed in such a way as to minimise the mean distance between all the cases in the cluster. In other words, the method aims at maximising similarity among the objects that form a cluster, minimising intragroup variance and maximising distances among clusters, i.e. minimising intra-cluster variance and maximising inter-cluster variance [26]. Two groups of women with different temperament trait profiles were compared with respect to the study criterion (EAS temperament traits) using Student's *t*-test. Chi-squared (χ^2) test comparisons were conducted in the two temperament profile groups between the number of women who did not report symptoms of depression and those who reported mild, moderate, or severe depressive symptoms [26].

Results

Temperament traits and depressive symptoms

To answer the research question of whether there are relationships between temperament traits and the severity of depressive symptoms among the women studied and what these relationships are, Spearman's rho correlation coefficients were computed between EAS- D and BDI-II scores (Table 1).

The results indicated that depressive symptoms were statistically significantly negatively correlated with activity and positively with the tendency to react with distress, fear, and anger. These findings demonstrate that increased depressive symptoms in the women studied were associated with the follow-

Table 1. Correlation coefficients between EAS- D and BDI-II

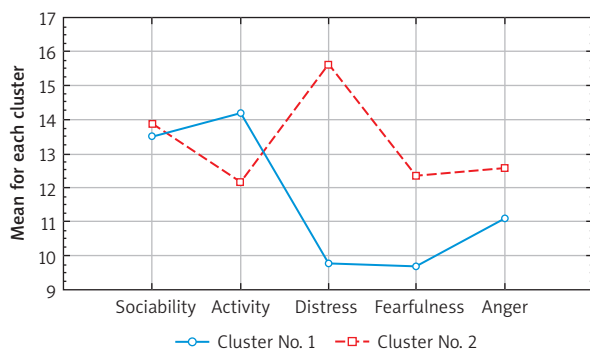
EAS	Spearman's rho
Sociability	0.09
Activity	-0.24*
Emotionality: distress	0.63***
Emotionality: fearfulness	0.44***
Emotionality: anger	0.22*

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 2. Results of forward stepwise linear regression for the dependent variable – BDI II depression severity level

EAS	Step +in/-out	Multiple R	Multiple R ²	F – to entr/rem	BETA	B	t
Distress	1	0.61	0.37	65.00***	0.59	1.92	7.86***
Activity	2	0.63	0.40	4.14*	–0.15	–0.54	–2.03*

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Regression summary for the dependent variable – depression (BDI): $R = 0.63$; $R^2 = 0.40$; Adjusted $R^2 = 0.39$; $F(2,108) = 35.50$; $p < 0.001$; Std. error of estimate: 9.27.

**Figure 1.** Mean EAS scores for temperament profile/type clusters

ing temperament traits: slow response rate, low activity, increased fatigue and lack of energy, a heightened tendency to react with frustration, anxiety, irritability, fear, panic, insecurity, anger, and dissatisfaction. Low levels of depressive symptoms among the women surveyed were associated with a greater sense of energy, vigour, and high activity. Individuals from this latter group rarely reacted with stress, frustration, anxiety, fear, panic, nervousness, uncertainty, wrath, dissatisfaction, or verbal aggression. They tended to be calmer, more composed, and more self-confident. No statistically significant correlations were observed between the temperament trait of sociability and the severity of depression symptoms in the women surveyed.

Next, an attempt was made to single out temperament traits (independent variables) that statistically significantly explained the severity of depression symptoms in the study sample. Forward stepwise linear regression was used to this end. Table 2 shows the results of forward stepwise linear regression for the dependent variable – BDI depression severity level.

The severity of depression symptoms was statistically significantly predicted by the following temperament traits: a heightened tendency to react with distress, frustration, anxiety, and low activity, low energy, and reduced speed and strength of response. Distress explained 37% of the variance in the dependent variable, and low physical activity explained an additional 3% of the variance in depressive symptoms. Together, these two independent variables explained 40% of the variance in depressive symptoms.

Temperament type/profile and depressive symptoms

In the next study step, we used the analytical method of non-hierarchical cluster analysis. Considerable heterogeneity in temperament traits was observed within the sample of women. Based on cluster analysis, two subgroups with characteristic EAS: sociability, activity, distress, fearfulness, and anger score profiles were distinguished in the entire group of 111 women. The division into the two subgroups was justified both statistically and substantively: the size of the subgroups allowed us to compare them in terms of specific variables, and the temperament profiles/types identified were psychologically interpretable (Figure 1).

The two groups of women with different temperament profiles/types were compared using Student's t -test with respect to the criterion variables – EAS scales and the severity of depression symptoms (Table 3).

Women with type 1 temperament ($N = 57$) obtained significantly higher scores than women with Type 2 temperament on the activity scale, and significantly lower scores on the distress, fearfulness and anger scales. Women with type 1 temperament, who were characterised by high activity, speed of action, and intensity of reaction had significantly lower levels of BDI depressive symptoms than women with type 2 temperament, who showed low activity and reaction speed, and who often reacted with anger, fear, and distress. At the same time, it should be emphasised that the two groups of women did not differ statistically significantly in the temperament trait of sociability, understood as the tendency to seek social interaction and avoid loneliness.

To ascertain whether the two groups of women with different temperament traits differed in terms of the frequency of BDI-II depressive symptoms, we ran a χ^2 test (Table 4).

Women with type 1 temperament, who were highly active and did not tend to react with negative emotions, were less likely to report depressive symptoms ($N = 7$) than women with type 2 temperament ($N = 38$), whose reactions were slow and weak and who showed increased negative emotionality. Mild depressive symptoms were observed in 5 women with type 1 temperament and 13 women with type 2 temperament. Symptoms of moderate depression were re-

Table 3. Comparison of EAS and BDI scores between women with type 1 and type 2 temperament profiles/types

EAS	Type 1 (N = 57)		Type 2 (N = 54)		t
	M	SD	M	SD	
Sociability	13.51	1.992	13.87	2.340	−0.88
Activity	14.18	3.219	12.17	3.190	3.30***
Emotionality: distress	9.77	2.345	15.63	1.926	−14.34***
Emotionality: fearfulness	9.68	1.734	12.33	2.137	−7.19***
Emotionality: anger	11.09	2.073	12.57	2.211	−3.66***
BDI-II	7.09	6.07	20.28	12.65	−7.06***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 4. Distribution of BDI-II depression severity levels among women in each temperament profile group

BDI-II Depression severity	Type 1 temperament	Type 2 temperament	Entire sample
No symptoms of depression	50 (45.00%)	18 (16.00%)	68 (61.26%)
Mild depression	5 (4.50%)	13 (11.71%)	18 (16.22%)
Moderate depression	1 (0.90%)	8 (6.31%)	8 (7.21%)
Severe depression	1 (0.90%)	17 (14.41%)	17 (15.32%)
Sample total	57 (51.35%)	54 (48.65%)	111 (100.00%)

$\chi^2 = 36.30$, $df = 3$; $p < 0.001$.

ported by one woman from the type 1 temperament group and 8 from the type 2 temperament group. Severe depressive symptoms were reported by one individual with type 1 temperament and 17 with type 2 temperament. Most women with type 2 temperament reported symptoms of severe and mild depression.

Discussion

The conducted statistical analyses provided answers to the research questions posed in this study. Specifically, the correlation analyses indicated the presence of statistically significant associations between increased symptoms of depression and the following temperament traits: low motor activity and a higher tendency to react with negative emotions, such as distress, anger, and fear. No statistically significant correlations were found between the level of depression and the desire for companionship and sociability. The results described above are in line with the opinion of researchers [19] who point to significant correlations between depressive symptoms and negative emotionality, defined by Buss and Plomin as a tendency to react with distress, anger, aggression, and fear. The relationships we observed between depressive symptoms and a heightened tendency to react with strong arousal and to express negative emotions – such as anger, dissatisfaction, and fear – as well as low levels of activity and endurance were also described by Tylka and Szyntar [3], Habrat and Wójcik [9], Habrat [10], and Zawadzki and Strelau [11]. Tylka

and Szyntar [3] emphasised that temperament traits may predispose a person to depression but may also be an outcome of depression or a factor that modifies the clinical picture of this disorder.

Our results did not confirm the relationship between avoidance of social interactions and depressive symptoms. Similarly, Masi *et al.* [19] found no statistically significant differences in the temperament traits of activity and sociability between a group of people with symptoms of depression and a control group. Contradictory results were obtained by Karevold *et al.* [18], who demonstrated that increased shyness in interpersonal relationships may be associated with the occurrence of symptoms of depression.

In our cohort of women, statistically significant correlations were found between depressive symptoms and increased distress, fearfulness, anxiety, and a sense of threat. These results correspond with literature reports. Kessler *et al.* [27] described the occurrence of anxiety symptoms in 45.7% of patients with depressive disorders. Kalin [28] reported that anxiety and depressive symptoms often co-occurred in the same period, and 41.6% of individuals with major depression also had one or more anxiety symptoms. Data from the Sequenced Treatment Alternatives to Relieve Depression (STAR*D) study indicated that 53% of patients with major depression experienced significant anxiety and fear [29].

In the present study, regression analysis showed that increased distress, low activity, and slow motor

reaction time were significant predictors of the severity of depressive symptoms. Together, the above-mentioned temperament traits explained 40% of the variance in the severity of depressive symptoms, measured with the BDI. Our results suggest that lowering the intensity of negative emotionality may decrease the risk of developing depressive symptoms. The findings described above are consistent with the opinions of other authors. Bould *et al.* [14], who investigated the relationship between EAS temperament traits and depression in 18-year-olds, emphasised that temperament traits, especially negative emotionality, may be risk factors for depression. They reported that 6-year-old children characterised by severe negative emotionality were 20% more likely to be diagnosed with depression in adulthood. Similarly, according to Rende [16], Gjone and Stevenson [17], and Karevold *et al.* [18], high negative emotionality, as measured with EAS, may be associated with the development of depression in adulthood. Nigg [15] and Bould *et al.* [14], drawing on the depression vulnerability model, concluded that individuals with high negative emotionality were more likely to develop depression, but only in the presence of high-risk conditions. Temperament traits determine a certain degree of vulnerability to the development of depressive symptoms.

The results of the statistical analyses allowed us to answer the second research question posed in this study. The findings indicate that groups of women representing different temperament profiles differ significantly in their levels of depressive symptoms. Women who are highly active, quick to act, and display heightened intensity of reactions but rarely respond with anxiety, aggression, anger, distress, fear, or a sense of threat have significantly lower levels of BDI depressive symptoms than women with low reaction times, who show low activity, and often react with anger, fear, and distress. The present findings indicate that individual temperament differences play a significant role in the mental functioning of women, especially with regard to emotion regulation. It can be hypothesised that a specific type of temperament marked by strong negative emotional responses to stimuli may increase an individual's vulnerability to the development of depression or aggravate its course. Other authors also reported significant correlations between temperament type and the severity of depressive symptoms [20–24]. Miola *et al.* [23] and de Aguiar *et al.* [24] emphasised that the assessment of the temperament profile may be a valuable tool supporting the diagnosis of depressive symptoms and suicide risk. These authors [23, 24] stated that temperament traits may not only be a risk factor for the development of depressive symptoms but also a predictor of the therapeutic response.

Research on the relationship between depression and temperament traits and types may contribute to

a better understanding of the psychological processes that play a significant role in the development of depressive symptoms [3]; it can also be used in clinical practice to improve therapy outcomes and provide guidance in the choice of preventive interventions.

The main limitation of the present study is the small sample size. Therefore, the results should be regarded as preliminary, and they require confirmation in future research conducted with a larger sample.

Conclusions

The severity of depressive symptoms was statistically significantly predicted by the following temperament traits: a heightened tendency to react with distress and a low level of activity. Women whose dominant temperament traits were low activity and heightened negative emotionality had significantly more severe depressive symptoms than women who were more active and much less likely to react with distress, fear, and anger.

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Ethical approval

Not applicable.

Conflict of interest

The authors declare no conflict of interest.

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