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Schizotypy, affective temperaments and anhedonia in bipolar depression

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Summary

Aim. "Schizotypy" is a term describing personality traits reflected in emotional, perceptual and cognitive styles. Affective temperaments are trait-like features which were observed to be stable in time and predispose to mood disorders. The purpose of this study was to examine relationship between schizotypal features, affective temperaments and anhedonia in patients with bipolar depression.

Material and methods. 54 patients with bipolar depression were included in the study. Participant were administered the following psychometric tools: *Dimensional Anhedonia Rating Scale* (DARS), *Snaith-Hamilton Pleasure Scale* (SHAPS), *Oxford-Liverpool Inventory of Feelings and Experiences* (O-LIFE), *Temperament Evaluation of Memphis, Pisa, Paris, and San Diego Autoquestionnaire* (TEMPS-A), and *Quick Inventory of Depressive Symptomatology – Self-Report* (QIDS-SR). Correlations between the variables were calculated and linear regression models were built.

Results. Only hyperthymia (affective temperament) and introvertive anhedonia (schizotypal domain) were statistically significantly correlated with anhedonia. In regression models, introvertive anhedonia predicted higher whereas hyperthymic features lower severity of anhedonia (measured by the SHAPS scale).

Conclusions. Hyperthymic features are protective and introvertive anhedonia is a risk factor for consummatory anhedonia.

Key words: bipolar disorder, anhedonia, mood disorders

Introduction

"Schizotypy" is a complex term describing personality traits reflected in emotional, perceptual and cognitive styles [1]. Spectrum of schizotypal features can be present in the general population, but this phenomena has been most commonly linked to the

symptoms of schizophrenia [2]. Studies have demonstrated higher scores of schizotypy in bipolar patients compared to healthy controls [3, 4]. The *Oxford-Liverpool Inventory of Feelings* and *Experiences* (O-LIFE) is one of the tools measuring schizotypy in four dimensions: unusual experiences, cognitive disorganization, introvertive anhedonia, and impulsive nonconformity [5]. All of these dimensions were observed to be correlated with greater disturbances of biological rhythms in bipolar patients [6].

The concept of affective temperaments was introduced by Kraepelin and later developed by Akiskal [7]. It refers to trait-like expressions of affect which were observed to be stable in time and predispose to mood disorders [8, 9]. The *Temperament Evaluation of Memphis, Pisa, Paris, and San Diego Autoquestionnaire* (TEMPS-A) is a tool developed by Akiskal which includes five affective temperaments: depressive, cyclothymic, hyperthymic, irritable, and anxious [10, 11]. Bipolarity has been linked to hyperthymic, cyclothymic and irritable temperaments [12–16]. Affective temperaments can be predictors of treatment adherence, response to lithium or clinical course of illness [17–19]. For example, cyclothymic and irritable temperaments have been linked with worse prognosis (higher number of episodes, more suicide attempts) whereas hyperthymic temperament seemed to be protective for severity of depressive symptoms [19].

Anhedonia, defined as a markedly reduced interest or pleasure in everyday activities, is one of the core depressive symptoms and has been associated with worse prognosis in patients with major depressive disorder (MDD) [20–23]. Neurobiological studies indicate that anhedonia is a complex construct which reflects different deficits in reward processing: anticipation, motivation, interest, and consummatory pleasure [24, 25].

The effect of schizotypal dimensions or affective temperaments (which are features considered to be relatively stable in time [8, 26]) on the level of anhedonia in bipolar depression remains unknown. Therefore, the purpose of our work was to examine the relationship between these variables. We hypothesized that: 1) level of the schizotypal "introvertive anhedonia (IA)" dimension is positively correlated with reward dysfunctions in an acute bipolar depressive episode; 2) hyperthymic temperament may by protective for anhedonia severity, while other types of affective temperaments constitute risk factors for reward deficiencies.

1. Materials and methods

1.1. Participants

Participants were recruited among in – and outpatients of the Department of Adult, Child and Adolescent Psychiatry, University Hospital in Krakow. The following inclusion criteria were applied: DSM-5 diagnosis of bipolar disorder (BD) in depressive episode; age 18–65 years; no unstable or severe medical illness; no substance use disorder (apart from nicotine or caffeine) during the last 12 months. Additional psychiatric diagnoses (anxiety disorders, personality disorders, eating disorders, attention deficit hyperactivity disorder [ADHD]) were allowed if their severity was not high

(i.e., not markedly impairing the patient's functioning, not being the main reason for psychiatric treatment).

Sample size calculation was performed and based on the following assumptions: $\alpha = 0.05$; $\beta = 0.20$ (80% power); $r = 0.4$ (in order to detect at least moderate correlations [27]). Minimal calculated sample size was 47.

The study was approved by the Bioethics Committee of the Jagiellonian University in Krakow, Poland. The recruitment took place from January 2020 until August 2022. All participants provided informed, written consent to take part in the study.

1.2. Measures

The DARS (*Dimensional Anhedonia Rating Scale*) is a self-rated 17-item scale which assesses deficits in various dimensions of the reward processing [24]. It contains four categories – hobbies, foods/drinks, social activities, and sensory experiences. For every category the responders give examples of their favorite activities/experiences and rate their interest, motivation, desire, and pleasure "right now" on a 5-point Likert scale ("Not at all" = 0; "Slightly" = 1; "Moderately" = 2; "Mostly" =3; "Very much" = 4). The final score ranges between 0 and 68 points, lower scores indicate more severe anhedonia [28]. The Polish adaptation of the scale was validated by our team in a group of patients with mood disorders and healthy controls – it showed very good psychometric properties: strong internal consistency for the DARS total score (Cronbach's $\alpha = 0.95$) and all subscales (0.86–0.93), good convergent and divergent validity [29].

The SHAPS (*Snaith-Hamilton Pleasure Scale*) is a self-administered tool with 14 questions asking about pleasure from different experiences. Each item contains four answers: "strongly agree", "agree" (both rated 0 points), "disagree", and "strongly disagree" (both rated 1 point). Total score ranges from 0 to 14 points and higher scores indicate more severe anhedonia [30]. The Polish version of the SHAPS has demonstrated excellent reliability (0.913) [31, 32].

As studies have demonstrated low overlap between tools which measure affective symptoms, two scales measuring anhedonia were included in our study [33, 34]. Each of them assesses different domains of reward processing dysfunctions – DARS measures motivation, effort, interest, and consummatory anhedonia while SHAPS evaluates only the last domain [28, 35].

The O-LIFE is a self-rated scale containing 104 questions grouped into four subscales – unusual experiences (30 items), cognitive disorganization (24 items), introvertive anhedonia (27 items), and impulsive nonconformity (23 items) [2, 5]. Total score for each domain was calculated by dividing its sum of scores by the number of items in the particular subscale.

The TEMPS-A is a 110-item self-rated tool which evaluates the following domains: depressive (questions 1–21), cyclothymic (22–42), hyperthymic (43–63), irritable (64–84), and anxious (85–110) [10, 11, 36]. Scores for each domain were calculated as described above for the O-LIFE.

The QIDS-SR (*Quick Inventory of Depressive Symptomatology – Self-Report*) is a 16-item self-rated tool which uses DSM-5 criteria for MDD to measure depression

severity. The total score ranges from 0 to 27 points and higher scores indicate more severe depression [37].

1.3. Procedures

Patients were assessed at a single visit to the Department of Psychiatry by a trained clinician who collected the medical interview and verified clinical diagnosis (according to the DSM-5). The *Mini International Neuropsychiatric Interview* (MINI) was used as a screening tool in order to check if the inclusion criteria were fulfilled [38]. Sociodemographic and clinical data were also collected. Participants filled in the following questionnaires: DARS, SHAPS, O-LIFE, TEMPS-A, QIDS-SR.

1.4. Statistical analysis

Clinical and socio-demographic data were presented as percentages for nominal data, mean and standard deviation (*SD*) (for normally distributed quantitative data) or median with interquartile range (IQR) (for non-normally distributed quantitative data). Assessment of normality was performed by the inspection of histograms and analysis of *z*-scores for skewness and kurtosis (values <1.96 indicating normal distribution).

Correlations between anhedonia (DARS [total score and subscales] or SHAPS), schizotypy and affective temperaments were calculated. Pearson's or Spearman's rank correlation coefficients were used, depending on the distribution of the variables.

Linear regression models were built with anhedonia (measured by the DARS or SHAPS) as dependent variable. Subscales of the O-LIFE and TEMPS-A with statistically significant correlations with anhedonia were chosen as predictors in the regression. All models were adjusted for depression severity (measured with the QIDS-SR). Forced entry was chosen as a method of entering predictors. The following assumptions of the linear model were assessed: 1) linearity (analysis of scatterplots of the dependent variable and predictors); 2) homoscedasticity, linearity and normality of residuals (evaluated by inspection of histograms for the residuals and plots of standardized predicted values vs. standardized residuals). Data was checked for outliers and influential cases (by analysis of Cook's distance, Mahalanobis distance and average leverage) [39]. Variance inflation factor (VIF) was calculated for each model – values >10 would indicate collinearity.

Statistical analyses were performed using Statistical Package for the Social Sciences (SPSS) version 28.0. The level of significance was set at $p < 0.05$.

2. Results

2.1. Sample characteristics

54 patients participated in the study. Basic socio-demographic and clinical data are presented in Table 1. The average depression severity in our sample was moderate, as indicated by the QIDS-SR median score of 13 [40].

Table 1. **Characteristics of the studied sample**

Age (years: median; IQR)	35 (20)
Gender (% of females)	61.1
Education level (% of higher degree completed)	61.1
Duration of illness; (years: median; IQR)	7 (11.5)
Number of previous affective episodes (median; IQR)	
Past depressive episodes	4 (3)
Past maniac/hypomanic episodes	3 (2)
Duration of the current depressive episode (months; median; IQR)	4 (4)
Smoking (% of yes)	33.3
BMI (kg/m^2; median; IQR)	25.2 (7.1)
Bipolar type	
Type I	20.4 %
Type II	70.4 %
Bipolar spectrum	9.3 %
DARS (median; IQR)	42.5 (24.5)
SHAPS (median; IQR)	4.5 (7.3)
QIDS-SR (median; IQR)	13 (10.3)
TEMPS-A domains:	
Depressive (mean; SD)	0.55 (0.18)
Cyclothymic (mean; SD)	0.56 (0.25)
Hyperthymic (median; IQR)	0.29 (0.26)
Irritable (median; IQR)	0.29 (0.32)
Anxious (mean; SD)	0.49 (0.24)
O-LIFE subscales:	
Unusual experiences (median; IQR)	0.30 (0.40)
Cognitive disorganization (median; IQR)	0.79 (0.42)
Introvertive anhedonia (mean; SD)	0.40 (0.22)
Impulsive nonconformity (mean; SD)	0.38 (0.18)

IQR – interquartile range; SD – standard deviation

Correlation coefficients between measures of anhedonia, depression, affective temperaments, and schizotypy have been calculated. The results are presented in Table 2. Amongst different affective temperamental features, only hyperthymia was statistically significantly moderately correlated with anhedonia (regardless of the measurement tool used). Within schizotypal domains only IA correlated significantly with the DARS-total score, two of its domains ("Social activities" and "Sensory experiences") and the SHAPS.

Table 2. **Correlation coefficients between anhedonia measures, schizotypal domains and affective temperaments**

	DARS-total	DARS-hobbies	DARS-Food/ drink	DARS-social	DARS-sensory	SHAPS
TEMPS-A: D	-0.077	0.116	0.016	-0.125	-0.111	0.217
TEMPS-A: C	-0.029	0.099	-0.053	-0.013	0.021	-0.054
TEMPS-A: H	0.334*	0.138	0.142	0.265	0.427**	-0.475**
TEMPS-A: I	0.003	0.068	-0.020	-0.045	0.088	0.228
TEMPS-A: A	0.106	0.245	0.069	0.061	0.159	0.032
O-LIFE: UE	0.241	0.262	0.142	0.204	0.354**	-0.163
O-LIFE: CD	0.002	0.117	-0.005	-0.006	0.070	0.081
O-LIFE: IA	-0.418**	-0.191	-0.255	-0.370**	-0.466**	0.554**
O-LIFE: IN	0.173	0.185	0.069	0.092	0.290*	-0.017

A – anxious domain; C – cyclothymic domain; CD – cognitive disorganization; D – depressive domain; DARS – *Dimensional Anhedonia Rating Scale*; H– hyperthymic domain; I – irritable domain; IA – introvertive anhedonia; IN – impulsive nonconformity; O-LIFE – *Oxford-Liverpool Inventory of Feelings and Experiences*; TEMPS-A – *Temperament Evaluation of Memphis, Pisa, Paris, and San Diego Autoquestionnaire*; UA – unusual experiences.

* <0.05; ** <0.01, all coefficients were calculated as Spearman's correlation coefficient due to lack of normal distribution of at least one variable

2.2. Linear regression models

We built regression models with anhedonia as a dependent variable – with the DARS (Table 3) or SHAPS (Table 4) as a measurement tool. Hyperthymic features (measured by the TEMPS-A hyperthymic domain) and IA (assessed by the O-LIFE subscale) were chosen as independent variables (based on the analysis of correlations – Table 2). All models were adjusted for depression severity (QIDS-SR score).

Table 3. **Linear regression models with anhedonia measured with the DARS as a dependent variable**

	b	SE	β	p
O-LIFE – Introvertive anhedonia	-0.531	0.326	-0.215	0.110
QIDS-SR	-1.110	0.357	-0.410	0.003
$R^2 = 0.28$, $p_{model} < 0.001$				
TEMPS-A: Hyperthymia	0.888	0.449	0.253	0.054
QIDS-SR	-1.018	0.335	-0.389	0.004
$R^2 = 0.27$, $p_{model} < 0.001$				

b – unstandardized coefficient; SE – standard error; β – standardized coefficient. R^2 – coefficient of determination

When the DARS was included as a dependent variable, hyperthymia or IA were no longer significant predictors, adjusted for the depression severity.

Table 4. **Linear regression models with anhedonia measured with the SHAPS as a dependent variable**

	b	SE	β	p
O-LIFE – Introvertive anhedonia	0.181	0.061	0.287	0.004
QIDS-SR	0.408	0.063	0.624	<0.001
$R^2 = 0.60$, $p_{model} < 0.001$				
TEMPS-A: Hyperthymia	-0.240	0.085	-0.274	0.007
QIDS-SR	0.395	0.062	0.624	0.004
$R^2 = 0.57$, $p_{model} < 0.001$				

b – unstandardized coefficient; SE – standard error; β – standardized coefficient. R^2 – coefficient of determination

In the second model, both IA and hyperthymia statistically significantly predicted anhedonia measured by the SHAPS (adjusted for depression severity). Higher level of IA predicted higher ($\beta = 0.287$) whereas higher hyperthymia lower anhedonia ($\beta = -0.274$). Both models with the SHAPS as dependent variable explained high proportion of variance (with R^2 up to 60 %).

3. Discussion

In this paper we have demonstrated for the first time the relationship between schizotypal features, hyperthymic temperament and severity of anhedonia in the group of bipolar depressed patients.

Hyperthymia is characterized by, i.a., high level of energy, optimistic attitude, engagement in exciting activities, positive mood, and sociability [41]. As already mentioned in the *Introduction*, it has been linked to better prognosis in patients with mood disorders – better long-term response to lithium [18], lower suicidal risk [42, 43], better functional outcomes [44] or lower severity of depressive symptoms [19]. Hyperthymic temperament was observed to be distinct from other affective temperaments – contrary to depressive, cyclothymic, anxious, and irritable, hyperthymic temperament was linked to morning affect (in the *Composite Scale of Morningness*) [45, 46].

In our study higher hyperthymia was protective against anhedonia severity, independently from the severity of depressive symptoms. We speculate that hyperthymic features such as optimism, tendency to engage in activities and social contacts can contribute to lower deficiencies in the reward system. Interestingly, hyperthymia was a significant predictor only when anhedonia was measured by the SHAPS, not by the DARS. Hypothetically hyperthymic features can be more related to consummatory than to motivational anhedonia – the DARS assesses different aspects of the reward processing: motivation, interest, desire, effort, and consummatory pleasure, whereas the SHAPS only asks about the last aspect. It has been demonstrated that in bipolar patients hyperthymic temperament correlates negatively with disturbance of biological rhythms [6]. In our previous study we have also shown that higher dysregulation of biological rhythms was correlated with higher level of anhedonia, and was a significant predictor of worse functioning and more severe depressive symptoms (the results of the study has been sent for publication). Thus, we speculate that hyperthymia can be protective against anhedonia partially via its correlation with lower disturbance of biological rhythms.

IA subscale of the O-LIFE contains items asking about ability to enjoy different sensory or social potentially pleasurable activities [5]. More than 40% of questions in this section refer to "liking" various sources of pleasure. This might explain our observation that higher IA was a significant predictor of higher anhedonia but only when measured by the SHAPS. In other words, IA predicted higher consummatory anhedonia, but did not reach statistical significance when the instrument assessing more aspects of reward deficits (DARS) was the predicted variable. IA has also been observed to be correlated with dysregulation of biological rhythms [6], which could hypothetically explain its relationship with anhedonia during depressive episode (in the same mechanism as described above for hyperthymia).

There are a few limitations in our study: (1) cross-sectional design – this methodology does not allow to prove causality nor the direction of the observed interactions; (2) we included patients with comorbidities. However, this makes our sample more naturalistic as BD frequently cooccurs with different psychiatric diagnoses [47]; (3) patients with various psychiatric medications were enrolled which makes our sample more heterogeneous. On the other hand, schizotypal and temperamental features seem to be more stable with time and thus potentially less dependent on the used pharmacotherapy.

Recapitulation

In conclusion, we have described the relationship between affective temperament, schizotypal features and anhedonia during depressive episode in the course of BD. Hyperthymic features were protective and introvertive anhedonia (one of the schizotypy dimensions) was a risk factor for consummatory anhedonia. Our study adds to the research on continuum between trait – and state-like features in mood disorders. Further exploration of this topic is essential (especially in longitudinal studies) to better understand these complex interactions.

References

1. Grant P, Green MJ, Mason OJ. *Models of schizotypy: The Importance of conceptual clarity* Schizophr. Bull. 2018; 44(Suppl. 2): S556–563.
2. Dembinska-Krajewska D, Rybakowski J. *The assessment of schizotypy by the O-LIFE (Oxford-Liverpool Inventory for Feelings and experiences) in patients with schizophrenia and affective disorders*. Psychiatr. Pol. 2016; 50(6): 1147–1156.
3. Heron J, Jones I, Williams J, Owen MJ, Craddock N, Jones LA. *Self-reported schizotypy and bipolar disorder: Demonstration of a lack of specificity of the Kings Schizotypy Questionnaire*. Schizophr. Res. 2003; 65(2–3): 153–158.
4. Rybakowski JK, Klonowska P. *Bipolar mood disorder, creativity and schizotypy: An experimental study*. Psychopathology 2011; 44(5): 296–302.
5. Mason O, Claridge G. *The Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE): Further description and extended norms*. Schizophr. Res. 2006; 82(2–3): 203–211.
6. Dopierala E, Chrobak AA, Kapczinski F, Michalak M, Tereszko A, Ferensztajn-Rochowiak E et al. *The biological rhythms interview of assessment in neuropsychiatry in patients with bipolar disorder: Correlation with affective temperaments and schizotypy*. Rev. Bras. Psiquiatr. 2016; 38(4): 325–328.
7. Akiskal KK, Akiskal HS. *The theoretical underpinnings of affective temperaments: Implications for evolutionary foundations of bipolar disorder and human nature*. J. Affect. Disord. 2005; 85(1–2): 231–239.
8. DeGeorge DP, Walsh MA, Barrantes-Vidal N, Kwapil TR. *A three-year longitudinal study of affective temperaments and risk for psychopathology*. J. Affect. Disord. 2014; 164: 94–100.
9. Kawamura Y, Akiyama T, Shimada T, Minato T, Umekage T, Noda Y et al. *Six-year stability of affective temperaments as measured by TEMPS-A*. Psychopathology 2010; 43(4): 240–247.
10. Akiskal HS, Mendlowicz MV, Jean-Louis G, Rapaport MH, Kelsoe JR, Gillin JC et al. *TEMPS-A: Validation of a short version of a self-rated instrument designed to measure variations in temperament*. J. Affect. Disord. 2005; 85(1–2): 45–52.
11. Akiskal HS, Akiskal KK, Haykal RF, Manning JS, Connor PD. *TEMPS-A: Progress towards validation of a self-rated clinical version of the Temperament Evaluation of the Memphis, Pisa, Paris, and San Diego Autoquestionnaire*. J. Affect. Disord. 2005; 85(1–2): 3–16.
12. Karam EG, Saab D, Jabbour S, Karam GE, Hantouche E, Angst J. *The role of affective temperaments in bipolar disorder: The solid role of the cyclothymic, the contentious role of the hyperthymic, and the neglected role of the irritable temperaments*. Eur. Psychiatry 2023; 66(1): e37.

13. Mazzarini L, Pacchiarotti I, Colom F, Sani G, Kotzalidis GD, Rosa AR et al. *Predominant polarity and temperament in bipolar and unipolar affective disorders*. J. Affect. Disord. 2009; 119(1–3): 28–33.
14. Nowakowska C, Strong CM, Santosa CM, Wang PW, Ketter TA. *Temperamental commonalities and differences in euthymic mood disorder patients, creative controls, and healthy controls*. J. Affect. Disord. 2005; 85(1–2): 207–215.
15. Simonetti A, Luciano M, Sampogna G, Rocca B Della, Mancuso E, De Fazio P et al. *Effect of affective temperament on illness characteristics of subjects with bipolar disorder and major depressive disorder*. J. Affect. Disord. 2023; 334: 227–237.
16. Saguem BN, Mtiraoui A, Nakhli J, Mannaï J, Ben Salah N, El Kissi Y et al. *Affective temperaments and their relationships with life events in bipolar patients and siblings: A controlled study*. J. Ment. Health 2021; 30(1): 36–42.
17. Bahrini L, Damak R, Cheour M. *The role of the affective temperament in the treatment adherence in psychiatry*. Pan. Afr. Med. J. 2016; 25: 2.
18. Rybakowski JK, Dembinska D, Kliwicki S, Akiskal KK, Akiskal HH. *TEMPS-A and longterm lithium response: Positive correlation with hyperthymic temperament*. J. Affect. Disord. 2013; 145(2): 187–189.
19. Luciano M, Steardo L Jr, Sampogna G, Caivano V, Ciampi C, Del Vecchio V et al. *Affective temperaments and illness severity in patients with bipolar disorder*. Medicina (Kaunas) 2021; 57(1): 54.
20. Khazanov GK, Xu C, Dunn BD, Cohen ZD, DeRubeis RJ, Hollon SD. *Distress and anhedonia as predictors of depression treatment outcome: A secondary analysis of a randomized clinical trial*. Behav. Res. Ther. 2020; 125: 103507.
21. Spijker J, Bijl RV, De Graaf R, Nolen WA. *Determinants of poor 1-year outcome of DSM-III-R major depression in the general population: Results of the Netherlands Mental Health Survey and Incidence Study (NEMESIS)*. Acta Psychiatr. Scand. 2001; 103(2): 122–130.
22. Ballard ED, Wills K, Lally N, Richards EM, Luckenbaugh DA, Walls T et al. *Anhedonia as a clinical correlate of suicidal thoughts in clinical ketamine trials*. J. Affect. Disord. 2017; 218: 195–200.
23. *Diagnostic and Statistical Manual of Mental Disorders*, 5th Edition. 2013.
24. Rizvi SJ, Pizzagalli DA, Sproule BA, Kennedy SH. *Assessing anhedonia in depression: Potentials and pitfalls*. Neurosci. Biobehav. Rev. 2016; 65: 21–35.
25. Treadway MT, Zald DH. *Reconsidering anhedonia in depression: Lessons from translational neuroscience*. Neurosci. Biobehav. Rev. 2011; 35: 537–355.
26. Barrantes-Vidal N, Grant P, Kwapil TR. *The role of schizotypy in the study of the etiology of schizophrenia spectrum disorders*. Schizophr. Bull. 2015; 41(Suppl. 2): S408–416.
27. Schober P, Schwarte LA. *Correlation coefficients: Appropriate use and interpretation*. Anesth. Analg. 2018; 126(5): 1763–1768.
28. Rizvi SJ, Quilty LC, Sproule BA, Cyriac A, Michael Bagby R, Kennedy SH. *Development and validation of the Dimensional Anhedonia Rating Scale (DARS) in a community sample and individuals with major depression*. Psychiatry Res. 2015; 229(1–2): 109–119.
29. Gorostowicz A, Rizvi SJ, Kennedy SH, Chrobak AA, Dudek D, Cyranka K et al. *Polish adaptation of the Dimensional Anhedonia Rating Scale (DARS) – validation in the clinical sample*. Front. Psychiatry 2023; 14: 1268290.
30. Snaith RP, Hamilton M, Morley S, Humayan A, Hargreaves D, Trigwell P. *A scale for the assessment of hedonic tone. The Snaith-Hamilton Pleasure Scale*. Br. J. Psychiatry 1995; 167: 99–103.

31. Siwek M, Gorostowicz A, Chrobak AA, Gerlich A, Krupa AJ, Juryk A et al. *TED-Trazodone Efficacy in Depression: A naturalistic study on the efficacy of trazodone in an extended-release formulation compared to SSRIs in patients with a depressive episode-preliminary report*. Brain Sci. 2023; 13(1): 86.
32. Dudek D, Chrobak AA, Krupa AJ, Gorostowicz A, Gerlich A, Juryk A et al. *TED-trazodone effectiveness in depression: A naturalistic study of the effectiveness of trazodone in extended release formulation compared to SSRIs in patients with a major depressive disorder*. Front. Pharmacol. 2023; 14: 1296639. https://doi.org/10.3389/fphar.2023.1296639.
33. Fried EI. *The 52 symptoms of major depression: Lack of content overlap among seven common depression scales*. J. Affect. Disord. 2017; 208: 191–197.
34. Chrobak AA, Siwek M, Dudek D, Rybakowski JK. *Content overlap analysis of 64 (hypo) mania symptoms among seven common rating scales*. Int. J. Methods Psychiatr. Res. 2018; 27(3): e1737.
35. Siwek M. *Anhedonia w zaburzeniach depresyjnych*. Psychiatr. Psychol. Klin. 2017; 17(3): 216–224.
36. Borkowska A, Rybakowski JK, Drozdz W, Bielinski M, Kosmowska M, Rajewska-Rager A et al. *Polish validation of the TEMPS-A: The profile of affective temperaments in a college student population*. J. Affect. Disord. 2010; 123(1–3): 36–41.
37. Rush AJ, Trivedi MH, Ibrahim HM, Carmody TJ, Arnow B, Klein DN et al. *The 16-item Quick Inventory of Depressive Symptomatology (QIDS), clinician rating (QIDS-C), and self-report (QIDS-SR): A psychometric evaluation in patients with chronic major depression*. Biol. Psychiatry 2003; 54(5): 573–583.
38. Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E et al. *The Mini-International Neuropsychiatric Interview (M.I.N.I.): The development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10*. J. Clin. Psychiatry 1998; 59(Suppl. 20): 22–33.
39. Field A. *Discovering Statistics Using IBM SPSS Statistics, fifth ed*. London: SAGE Publications; 2018.
40. Yeung A, Feldman G, Pedrelli P, Hails K, Fava M, Reyes T et al. *The quick inventory of depressive symptomatology, clinician rated and self-report: A psychometric assessment in Chinese Americans with major depressive disorder*. J. Nerv. Ment. Dis. 2012; 200(8): 712–715.
41. Walsh MA, Brown LH, Barrantes-Vidal N, Kwapil TR. *The expression of affective temperaments in daily life*. J. Affect. Disord. 2013; 145(2): 179–186.
42. Vázquez GH, Gonda XMA, Lolich M, Tondo L, Baldessarini RJ. *Suicidal risk and affective temperaments, evaluated with the TEMPS-A scale: A systematic review*. Harv. Rev. Psychiatry 2018; 26(1): 8–18.
43. Miola A, Baldessarini RJ, Pinna M, Tondo L. *Relationships of affective temperament ratings to diagnosis and morbidity measures in major affective disorders*. Eur. Psychiatry 2021; 64(1): e74.
44. Perugi G, Cesari D, Vannucchi G, Maccariello G, Barbuti M, De Bartolomeis A et al. *The impact of affective temperaments on clinical and functional outcome of Bipolar I patients that initiated or changed pharmacological treatment for mania*. Psychiatry Res. 2018; 261: 473–480.
45. Chrobak AA, Tereszko A, Dembinska-Krajewska D, Arciszewska A, Dopierała E, Siwek M et al. *The role of affective temperaments assessed by the Temperament Evaluation of Memphis, Pisa and San Diego-Autoquestionnaire (TEMPS-A) in the relationship between morningness-eveningness and bipolarity*. J. Affect. Disord. 2018; 232: 83–88.

46. Chrobak AA, Tereszko A, Dembinska-Krajewska D, Arciszewska A, Siwek M, Dudek D et al. *Morningness-eveningness and affective temperaments assessed by the Temperament Evaluation of Memphis, Pisa and San Diego-Autoquestionnaire (TEMPS-A)*. Chronobiol. Int. 2017; 34(1): 57–65.
47. Loftus J, Scott J, Vorspan F, Icick R, Henry C, Gard S et al. *Psychiatric comorbidities in bipolar disorders: An examination of the prevalence and chronology of onset according to sex and bipolar subtype*. J. Affect. Disord. 2020; 267: 258–263.

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