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Self-Transcendence as a Key Predictor in Bipolar Disorder Remission: A Time Perspective and Temperament Study

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ABSTRACT

Background: This study aimed to examine how individuals with bipolar disorder (BD) in remission perceive time and how this perception is associated with their temperament and character traits.
Methods: A total of 65 patients diagnosed with BD in remission, according to DSM-5 criteria, and 65 age- and gender-matched healthy controls were included. Remission was confirmed using the Hamilton Depression Rating Scale (HAM-D < 8) and the Young Mania Rating Scale (YMRS < 6). All participants completed the Zimbardo Time Perspective Inventory (ZTPI) and the Temperament and Character Inventory (TCI). Group differences were analyzed using independent samples *t*-tests, relationships among variables were assessed via correlation analysis, and multiple linear and logistic regression models were conducted to determine predictive factors.
Results: The BD group exhibited significantly higher self-transcendence scores than the control group ($P = .002$). In the BD group, past-negative perspective was positively correlated with harm avoidance ($r = 0.574$, $P = 0.001$) and negatively with self-directedness ($r = -0.586$, $P = .001$). Present hedonism showed a strong positive correlation with self-transcendence ($r = 0.595$, $P = .001$). Linear regression analysis revealed that past-negative perception was significantly predicted by harm avoidance and self-directedness ($R^2_{adj} = 0{,}60$, $P < .001$). Logistic regression analysis indicated that higher self-transcendence scores significantly increased the risk of BD diagnosis (OR = 1.147, 95% CI [1.066-1.235], $P < .001$), while higher present-hedonism scores were associated with a decreased risk (OR = 0.933, 95% CI [0.879-0.991], $P = .023$).
Conclusion: These findings suggest that self-transcendence may represent a distinguishing personality characteristic in individuals with BD during remission. Although no causal interpretations can be made, the pattern of results indicates a potential association between self-transcendence and temporal-cognitive processes. Further research is needed to clarify the nature and clinical relevance of this relationship.
Keywords: bipolar disorder; remission; self-transcendence; time perspective; temperament; character

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INTRODUCTION

Bipolar disorder (BD) is a chronic psychiatric condition characterized by recurrent episodes of mania and depression, with periods of symptom remission in between. It can cause frequent relapses, often with psychosocial dysfunction, a negative attitude toward the illness, and neurocognitive impairment, significantly impairing quality of life and functional capacity, leading to long-term disability.[1-4]

The Zimbardo Time Perspective Inventory (ZTPI) is a widely validated psychometric tool designed to assess individuals' orientation toward the past, present, and future.[5,6] It offers insight into how people cognitively and emotionally engage with different temporal dimensions of their lives. Time perspective theory has been shown to influence emotional states, goal-setting, and decision-making processes.[7] Prior studies have indicated that time perspective fluctuates considerably during acute affective episodes in BD, such as mania and depression.[8,9] For instance, Oz et al[10] reported that patients with BD during acute episodes exhibited lower past-positive scores and higher present-hedonistic scores compared to healthy controls. As patients enter the euthymic phase, present-hedonistic tendencies tend to decrease, while future-oriented thinking increases. Despite these findings, limited research has explored how time perspective is maintained during remission and

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how it may relate to enduring personality traits such as temperament and character.

The psychobiological model of personality provides a framework for understanding the development of individual differences. This model includes four temperament dimensions—novelty seeking, harm avoidance, reward dependence, and persistence—which are believed to be heritable, relatively stable over time, and independent of sociocultural influences. It also identifies three character dimensions—self-directedness, cooperativeness, and self-transcendence—which are shaped by environmental factors and develop throughout adulthood, playing a key role in personal identity and self-regulation.[11] The Temperament and Character Inventory (TCI), based on this model, is a widely used instrument for assessing these traits.[12,13]

Further investigation is needed to understand how time perspective functions during remission in individuals with BD, and how it is associated with temperament and character traits. It is possible that certain personality features persist despite mood stabilization and may influence the way time is perceived.

Self-transcendence may be particularly relevant for understanding remission in bipolar disorder due to its complex role in shaping cognitive-emotional functioning. Within Cloninger's psychobiological model, self-transcendence reflects a tendency toward broader meaning-making, connectedness, and flexible self-boundary perception.[11] These characteristics may influence how individuals appraise and interpret personal experiences, including their orientation toward time. In parallel, time perspective theory posits that individuals' temporal orientations shape decision-making, emotional regulation, and goal-directed behavior, all of which are domains frequently affected in bipolar disorder.[7] During remission, enduring personality traits such as self-transcendence may interact with temporal cognitive processes to support adaptive functioning (e.g., resilience, future-directed planning) or, conversely, contribute to residual vulnerabilities (e.g., abstract or expansive cognitive styles).[13]Integrating these models suggests that self-transcendence may help explain interindividual variability in remission-phase psychological functioning by influencing how individuals relate to past, present, and future experiences.

Therefore, the aim of this study was to examine time perspective in individuals with bipolar disorder during remission and to explore its relationship with temperament and character traits.

MAIN POINTS

- Significantly higher self-transcendence scores were found in bipolar disorder patients in remission.
- In bipolar disorder patients in remission, self-transcendence was found to be positively correlated with presenthedonistic time perspective scores.
- Past-negative time perspective was significantly predicted by harm avoidance and self-directedness in the BD group.
- Self-transcendence was the only variable to significantly differentiate BD patients from healthy controls in logistic regression analysis.
- Time perspective profiles did not significantly differ between BD patients in remission and healthy controls.

METHODS

Participants

This study included 65 patients diagnosed with bipolar disorder who were admitted to the Psychiatry Outpatient Clinic of the Bursa Yüksek İhtısas Training and Research Hospital between February and July 2023, as well as 65 age- and gender-matched healthy controls. All participants provided both verbal and written informed consent prior to enrollment.

Patients were eligible for inclusion if they met the DSM-5 criteria for bipolar disorder, were in the euthymic phase for at least 3 months (defined as a score < 8 on the Hamilton Depression Rating Scale and <6 on the Young Mania Rating Scale), were literate, and aged between 18 and 65 years. Exclusion criteria included refusal to participate, current alcohol or substance use disorder, and the presence of any medical, neurological, or developmental conditions affecting cognitive function. The diagnosis of bipolar disorder was confirmed through a comprehensive clinical evaluation conducted by an experienced psychiatrist according to DSM-5 criteria; no structured diagnostic interview (e.g., SCID-5 or MINI) was administered. Comorbid psychiatric disorders were evaluated through clinical assessment and review of medical records; however, no structured diagnostic interview or standardized screening tool was administered to systematically identify comorbidities.

The healthy control group consisted of literate individuals aged 18 to 65 years with no current or past psychiatric diagnoses and no medical, neurological, or developmental disorders that could affect cognitive functioning. Psychiatric status in the control group was based on self-report, and no structured clinical interview (such as SCID or MINI) was administered. Healthy participants were recruited from hospital staff and the relatives of the researchers. Because the control group was recruited from hospital staff and relatives of the researchers, the sample may not fully represent the general population and may be subject to selection bias. The research project was approved by Bursa Yüksek İhtisas Training and Research Hospital ethics committee on January 25, 2023, with decision number 2011-KAEK-25 2023/01-02. The study was conducted in accordance with the Declaration of Helsinki.

Sociodemographic Data Form

This researcher-developed form collected sociodemographic information, including age, gender, marital status, educational level, and employment status, as well as clinical variables such as age at disease onset and duration of illness.

Hamilton Depression Rating Scale (HAM-D)

The HAM-D is a clinician-administered, 17-item instrument designed to assess the severity of depressive symptoms. Originally developed by Max Hamilton in 1960,[14] the scale evaluates symptoms experienced during the past week. The Turkish version was validated by Akdemir et al[15], demonstrating a Cronbach's alpha coefficient of 0.75, indicating acceptable internal consistency.

Young Mania Rating Scale (YMRS)

The YMRS, developed by Young et al[16], is one of the most widely used tools in clinical research for assessing the severity of manic symptoms. The Turkish adaptation was validated by Karadağ et al[17], yielding a Cronbach's alpha coefficient of 0.79, indicating good internal consistency.

Zimbardo Time Perspective Inventory

The ZTPI, developed by Zimbardo and Boyd, is a self-report instrument designed to assess individuals' orientation toward time across 5 dimensions: past-positive, past-negative, present-hedonistic, present-fatalistic, and future.[7] The Turkish adaptation was validated by Akırmak, with Cronbach's alpha coefficients of 0.74 for past-positive, 0.84 for past-negative, 0.78 for present-hedonistic, 0.68 for present-fatalistic, and 0.75 for future perspective.[18]

Temperament and Character Inventory

The TCI, developed by Cloninger et al., is a comprehensive self-report instrument designed to assess both temperament and character dimensions of personality. The Turkish version was validated by Köse et al.[19,20] In a Turkish sample, Cronbach's alpha coefficients were reported as 0.74 for novelty seeking, 0.85 for harm avoidance, 0.60 for reward dependence, 0.62 for persistence, 0.83 for self-directedness, 0.82 for cooperativeness, and 0.82 for self-transcendence.[20]

Data Analysis

Statistical analyses were conducted using IBM SPSS Statistics for Windows, version 26.0 (IBM SPSS Corp.; Armonk, NY, USA). The threshold for statistical significance was established at $P < .050$ for all tests. This study was based on a convenience sample, no a priori power analysis was performed. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were utilized to summarize the demographic and clinical profiles of the participants. The normality of continuous variables was verified using Shapiro–Wilk and Kolmogorov–Smirnov tests, complemented by an assessment of skewness and kurtosis within the ±1.5 range. Categorical variables were compared between groups using the chi-square test and Fisher–Freeman–Halton test. Independent samples *t*-tests were employed to compare mean ZTPI and TCI scores between the BD and control groups (CG), with effect sizes quantified using Cohen's *d*. Mann–Whitney *U*-test was performed for non-parametric comparisons where sample sizes were fewer than 30; in such cases, results are reported as median (Q_1-Q_3). Relationships between variables were evaluated using the Pearson correlation coefficient for parametric data and the Spearman rank correlation coefficient for non-parametric data. Relationships between ZTPI and TCI subscales were evaluated within each group using the Pearson correlation coefficient Holm-Bonferroni correction was applied for multiple comparisons To identify TCI dimensions predicting ZTPI subscales, backward multiple linear regression analyses were conducted independently for the BD and control groups. These models included all TCI subdimensions as independent variables, while age, gender, marital status, employment status, and education were controlled as covariates. Logistic regression analyses were conducted by entering each psychological variable into separate models rather than constructing a single fully adjusted multivariable model. Multicollinearity was assessed through Variance Inflation Factor (VIF < 5) and tolerance values (> 0.20). Model fit for regression analyses is reported using adjusted R-square values denoted as $R^2_{adj.}$ Finally, a backward multiple binary logistic regression analysis was performed to determine the predictors for the risk of receiving a bipolar disorder diagnosis. All subdimensions of the ZTPI and TCI were initially entered into the model, and results are reported using odds ratios (OR), 95% CI, and Nagelkerke R^2 values.

RESULTS

Sociodemographic and Clinical Characteristics

As shown in Table 1, there were no statistically significant differences between the BD group and the CG in terms of mean age or gender distribution. However, several other sociodemographic variables revealed significant differences between the 2 groups. Regarding marital status, the rate of divorced individuals was significantly higher in the BD group (21.9%) compared to the CG (1.5%; $P = .001$). In terms of living arrangements, participants in the control group were more likely to live alone (26.6%) than those in the BD group (9.2%; $P = .029$). Educational attainment also differed significantly; a higher proportion of the BD group had not completed high school (69.2%) compared to the CG (23.1%; $P < .001$). Furthermore, the

Table 1. Comparison of Sociodemographic and Clinical Characteristics Between Groups

	BD (n=65)	CG (n=65)	*P* value
Age, years	36.84 ± 10.31	35.11 ± 11.47	.361
Gender			
Female	36 (55.4%)	31 (47.7%)	.380
Male	29 (44.6%)	34 (52.3%)	
Marital status			
Single	24 (37.5%)	32 (49.2%)	.001
Married	26 (40.6%)	32 (49.2%)	
Divorced	14 (21.9%)	1 (1.5%)	
Cohabitation status			
Living alone	6 (9.2%)	17 (26.6%)	.029
With family	56 (86.2%)	43 (67.2%)	
With relatives	3 (4.6%)	4 (6.3%)	
Education level			
< High school	45 (69.2%)	15 (23.1%)	< .001
≥ High school	20 (30.8%)	50 (76.9%)	
Employment status			
Unemployed	33 (50.8%)	2 (3.1%)	< .001
Employed	22 (33.8%)	52 (80.0%)	
Student/retired	10 (15.4%)	11 (16.9%)	

Continuous data are presented as mean ± SD and categorical data are presented as frequency (n) and percentage (%). Statistical significance was determined using independent samples *t*-tests for age and chi-square tests for categorical variables.
BD, bipolar disorder; CG, control group; SD, standard deviation.

unemployment rate was markedly higher in the BD group (50.8%) compared to the control group (3.1%; *P* < .001).

Clinical characteristics of the BD group revealed that the number of depressive episodes was a median of 3 (Q_1-Q_3=2-7), while the number of mania/hypomania episodes was a median of 4 (Q_1-Q_3=1-6). Most cases (84.6%) were diagnosed with BD type 1[9]. When examining predominant polarity, mania was found in 52.3% of cases, depression in 23.1%, and 24.6% had unspecified polarity. Clinically, 40% of patients reported rapid cycling with seasonal patterns, 41.5% had experienced psychotic mania, and 23.1% had a history of psychotic depression. Evaluation of medication use showed that 6.2% of patients were receiving lithium alone and 3.1% were receiving valproic acid alone. Combination therapies were common, with 16.9% receiving lithium plus antipsychotics and 47.7% receiving valproic acid plus antipsychotics.

Table 2. Comparison of TCI and ZTPI Scores Between BD and CG Groups

Variable	BD (n=65) (Mean ± SD)	CG (n=65) (Mean ± SD)	*P*	Cohen's *d*
Novelty seeking	17.58 ± 4.49	17.77 ± 5.28	.830	0.039
Cooperativeness	28.80 ± 4.94	29.03 ± 6.05	.812	0.039
Harm avoidance	18.27 ± 6.24	17.85 ± 7.30	.727	0.062
Reward dependence	13.40 ± 2.73	13.31 ± 3.35	.864	0.030
Self-directedness	26.22 ± 6.13	28.02 ± 5.67	.085	0.305
Self-transcendence	19.00 ± 6.67	15.54 ± 6.10	.002	0.541
Persistence	4.57 ± 2.02	4.89 ± 1.57	.310	0.180
Past negative	30.85 ± 8.51	30.34 ± 6.88	.709	0.070
Past positive	29.95 ± 4.71	30.18 ± 3.33	.748	0.066
Present hedonism	46.97 ± 7.63	47.40 ± 7.97	.754	0.066
Present fatalistic	25.25 ± 5.04	23.52 ± 5.27	.068	0.335
Future	44.98 ± 7.85	44.08 ± 4.55	.421	0.140

BD, bipolar disorder; CG, control group; SD, standard deviation; t, independent groups *t*-test; TCI, Temperament and Character Inventory; ZTPI, Zimbardo Time Perspective Inventory.

Comparison of Temperament and Character Inventory and Zimbardo Time Perspective Inventory Scores Between Groups

As shown in Table 2, independent samples *t*-test analysis revealed that the mean self-transcendence score was significantly higher in the BD group compared to the control group (*t*=3.089, *P*=.002). No statistically significant differences were observed between the groups in terms of other temperament and character traits. Similarly, ZTPI subscale scores did not significantly differ between the BD and control groups, including past-negative (*t*=0.374, *P*=.709), past-positive (*t*=−0.322, *P*=.748), present-hedonistic (*t*=−0.315, *P*=.754), present-fatalistic (*t*=1.840, *P*=.068), and future orientation (*t*=0.807, *P*=.421).

Table 3. Correlation Between ZTPI and TCI Scores in the BD Group

Bipolar Disorder (n=65)		Past Negative	Past Positive	Present Hedonism	Present Fatalistic	Future
Novelty seeking	r (p)	0.126 (0.318)	−0.082 (0.515)	0.201(0.108)	0.203(0.104)	−0.146(0.244)
Cooperativeness	r (p)	−0.104 (0.411)	−0.004 (0.976)	−0.087 (0.490)	0.236 (0.058)	0.075 (0.235)
Harm avoidance	r (p)	0.574 (0.001)	0.126 (0.322)	−0.058 (0.650)	0.088 (0.489)	−0.235 (0.062)
Reward dependence	r (p)	0.282 (0.023)	0.004 (0.975)	0.204 (0.102)	−0.208 (0.096)	0.073 (0.562)
Self-directedness	r (p)	−0.586 (0.001)	0.121 (0.339)	−0.117 (0.352)	−0.143 (0.255)	0.194 (0.122)
Self-transcendence	r (p)	0.359 (0.003)	0.267 (0.031)	0.595 (0.001)	0.325 (0.008)	0.170 (0.177)
Persistence	r (p)	−0.109 (0.389)	0.148 (0.240)	0.104 (0.411)	−0.280 (0.024)	0.385 (0.002)

BD, bipolar disorder; *r*, Pearson correlation coefficient; TCI, Temperament and Character Inventory; ZTPI, Zimbardo Time Perspective Inventory.

Table 4. Correlation between ZTPI and TCI Scores in the CG

Control Group (n = 65)		Past Negative	Past Positive	Present Hedonism	Present Fatalistic	Future
Novelty seeking	r (p)	0.270 (0.030)	0.040 (0.753)	0.582 (0.001)	0.391 (0.001)	−0.200 (0.110)
Cooperativeness	r (p)	−0.227 (0.070)	0.128 (0.311)	0.092 (0.467)	−0.212 (0.091)	0.275 (0.026)
Harm avoidance	r (p)	0.399 (0.001)	0.072 (0.570)	−0.374 (0.002)	0.129 (0.305)	−0.125 (0.322)
Reward dependence	r (p)	0.052 (0.679)	0.224 (0.073)	0.206 (0.100)	0.111 (0.379)	0.140 (0.267)
Self-directedness	r (p)	−0.426 (0.001)	−0.038 (0.763)	−0.064 (0.612)	−0.455 (0.001)	0.141 (0.262)
Self-transcendence	r (p)	0.353 (0.004)	0.104 (0.409)	0.583 (0.001)	0.543 (0.001)	−0.060 (0.634)
Persistence	r (p)	0.139 (0.269)	0.132 (0.295)	0.046 (0.717)	0.133 (0.290)	0.082 (0.516)

CG, control group; *r*, Pearson correlation coefficient; TCI, Temperament and Character Inventory; ZTPI, Zimbardo Time Perspective Inventory.

Correlation Analysis in the Bipolar Disorder

The correlation analysis between ZTPI and TCI scores in the BD group is presented in Table 3. Past negative scores showed significant positive correlations with harm avoidance ($r = 0.574$, $P = .001$), reward dependence ($r = 0.282$, $P = .023$), and self-transcendence ($r = 0.359$, $P = .003$), while showing a significant negative correlation with self-directedness ($r = -0.586$, $P = .001$). Past positive was significantly correlated only with self-transcendence ($r = 0.267$, $P = .031$). Present hedonism exhibited a significant positive correlation with self-transcendence ($r = 0.595$, $P = .001$). Present fatalistic scores were positively correlated with self-transcendence ($r = 0.325$, $P = .008$) and negatively correlated with persistence ($r = -0.280$, $P = .024$). Finally, a significant positive correlation was found between future time perspective and persistence ($r = 0.385$, $P = .002$). Other correlations did not reach statistical significance ($P > .05$).

According to the Spearman rank correlation coefficient, there was no significant correlation between the number of depressive or manic/hypomanic episodes in patients diagnosed with BD and the TCI or ZTPI subscales (rho = −0.24 to 0.26, $P > .05$).

Table 5. TCI Subscales Predicting ZTPI Dimensions in BD and CG Groups

Dependent Variable	Group	Model Result	Independent Variable	Standardized Coefficients Beta	*P*	95% CI of the Regression Coefficient	
						LL	UL
Past negative	BD	$R^2_{Adj} = 0.60$, $F = 24.67$, $P < .001$	Harm avoidance	0.353	.001	0.243	0.718
			Reward dependence	0.198	.017	0.112	1.113
			Self-directedness	−0.403	.001	−0.792	−0.317
	CG	$R^2_{Adj} = 0.34$, $F = 11.87$, $P < .001$	Harm avoidance	0.427	.001	0.203	0.601
			Self-transcendence	0.337	.005	0.121	0.640
Past positive	BD	$R^2_{Adj} = 0.56$, $F = 27.40$, $P < .001$	Self-directedness	0.264	.003	0.070	0.333
	CG	$R^2_{Adj} = 0.30$, $F = 14.96$, $P < .001$	Self-directedness	0.253	.035	0.011	0.286
Present hedonism	BD	$R^2_{Adj} = 0.39$, $F = 14.21$, $P < .001$	Self-transcendence	0.493	.001	0.311	0.798
	CG	$R^2_{Adj} = 0.54$, $F = 15.72$, $P < .001$	Novelty seeking	0.385	.001	0.267	0.895
			Harm avoidance	−0.246	.010	−0.471	−0.065
			Self-directedness	0.250	.021	0.054	0.648
			Self-transcendence	0.342	.004	0.146	0.747
Present fatalistic	BD	$R^2_{Adj} = 0.41$, $F = 9.69$, $P < .001$	Novelty seeking	0.247	.030	0.031	0.583
			Reward dependence	−0.209	.050	−0.828	0.001
			Persistence	−0.259	.018	−1.263	−0.126
	CG	$R^2_{Adj} = 0.35$, $F = 18.43$, $P < .001$	Self-transcendence	0.415	.001	0.168	0.550
Future	BD	$R^2_{Adj} = 0.31$, $F = 6.73$, $P < .001$	Self-directedness	0.323	.010	0.099	0.709
			Persistence	0.246	.029	0.100	1.778
	CG	$R^2_{Adj} = 0.17$, $F = 4.29$, $P < .001$	Cooperativeness	0.280	.017	0.039	0.382

R^2_{Adj} values show the adjusted R^2. Only the backward multiple linear regression models that were found to be significant are presented in the table. In all analyses, age, gender, marital status, employment status, and education status were included in the model as covariates. Multicollinearity assumptions were met (VIF < 5; tolerance > 0.20).
β, standardized regression coefficient; CI, 95% confidence interval; BD, bipolar disorder; CG, control group; TCI, Temperament and Character Inventory; ZTPI, Zimbardo Time Perspective Inventory.

Table 6. Predictors of Bipolar Disorder Group Membership: Binary Logistic Regression Results

	B	SE	Wald	df	*P*	OR	95% CI of the OR	
							LL	UL
Self-transcendence	0.137	0.038	13.391	1	.001	1.147	1.066	1.235
Present hedonism	−0.069	0.030	5.142	1	.023	0.933	0.879	0.991

A backward multiple binary logistic regression analysis of the ZTPI and TCI predictors was performed, yielding a Nagelkerke R2 =0.15, χ2=15.58, and P < .001.Only the backward multiple linear regression models that were found to be significant are presented in the table.
B, unstandardized regression coefficient; CI, 95% confidence interval; df, degrees of freedom; LL, lower limit; OR, odds ratio; P, P-value; SE, standard error; TCI, Temperament and Character Inventory; UL, upper limit; Wald, Wald chi-square statistic; ZTPI, Zimbardo Time Perspective Inventory.

Correlation Analysis in the Control Group

The correlation analysis between ZTPI and TCI scores in the CG is presented in Table 4. Past negative scores showed significant positive correlations with harm avoidance ($r = 0.399$, $P = .001$), self-transcendence ($r = 0.353$, $P = .004$), and novelty seeking ($r = 0.270$, $P = .030$), while showing a significant negative correlation with self-directedness ($r = -0.426$, $P = 0.001$). Present hedonism exhibited significant positive correlations with novelty seeking ($r = 0.582$, $P = .001$) and self-transcendence ($r = 0.583$, $P = .001$), and a significant negative correlation with harm avoidance ($r = -0.374$, $P = .002$). Present fatalistic scores were significantly and positively correlated with novelty seeking ($r = 0.391$, $P = .001$) and self-transcendence ($r = 0.543$, $P = .001$), while showing a significant negative correlation with self-directedness ($r = -0.455$, $P = .001$). Finally, future time perspective demonstrated a significant positive correlation with cooperativeness ($r = 0.275$, $P = .026$). No significant correlations were found for the past positive subscale.

Regression Models and Predictors of Zimbardo Time Perspective Inventory Models

Multiple linear regression models were conducted to identify TCI predictors for ZTPI dimensions (Table 5). In the BD group, past negative perception was positively predicted by harm avoidance (beta = 0.353, $P = .001$) and negatively by self-directedness (beta = −0.403, $P = .001$), with the model explaining a substantial variance ($R^2_{adj} = 0.60$, $F = 24.67$, $P < .001$). Additionally, self-transcendence emerged as a significant positive predictor of present hedonistic time perception (beta = 0.493, $P = .001$, $R^2_{adj} = 0.39$).

Binary logistic regression analysis was performed to determine predictors of BD diagnosis compared to the control group. The model was statistically significant (Nagelkerke $R^2 = 0.15$, $\chi^2 = 15.58$, $P < .001$). According to the results, an increase in self-transcendence significantly increased the risk of BD diagnosis (B = 0.137, OR = 1.147, 95% CI [1.066–1.235], $P < .001$). Conversely, higher present hedonism scores were associated with a reduced risk of being in the BD group (B = −0.069, OR = 0.933, 95% CI [0.879–0.991], $P = .023$) (Table 6).

DISCUSSION

The findings of this study offer insights into the relationship between temperament, character traits, and time perspective in individuals with BD during remission. The BD group differed from healthy controls in marital status, educational attainment, and employment status, reflecting well-documented psychosocial impairments that often persist even during euthymia.[21-24] In the sample, higher rates of divorce, lower educational levels, and greater unemployment were interpreted as indicators of ongoing functional challenges. These findings underscore the importance of addressing psychosocial functioning in BD to support overall recovery and improve quality of life.

In this study, a significant difference between the BD group and the healthy control group in terms of time perspective perception was not found. In contrast, previous research revealed differing results. For example, Oyanadel and Buela-Casal reported significantly higher past-negative scores in individuals with BD and higher past-positive scores in healthy controls in their comparative study.[25] Similarly, a more recent study found that past-negative time perspective was moderately elevated in the BD group, future orientation showed a small effect size among BD patients, and present-fatalistic perspective was moderately higher in healthy individuals.[26] This unexpected result in this study may be related to the relatively small sample size and statistical power. Furthermore, the better cognitive functioning of the patients included in the remission period may have led to a more balanced perception of time. Larger sample studies that also include cognitive functions may help shed light on this issue. Moreover, the lack of statistically significant group differences in the ZTPI subdimensions was accompanied by very small Cohen's *d* values, indicating negligible effect sizes. This suggests that time-perspective profiles in individuals with BD during remission may be broadly comparable to those of healthy controls. Therefore, interpretations regarding group-level distinctions in temporal orientation should be made cautiously, as the present findings do not support meaningful or clinically relevant differences between BD and control participants.

The data revealed that patients in the BD group exhibited significantly higher levels of self-transcendence compared

to the control group. This finding is consistent with previous research suggesting that individuals with bipolar disorder often experience heightened self-awareness and a stronger connection to existential and spiritual dimensions during remission.[13,27] A study by Erić et al. found that self-transcendence played a critical role in emotional regulation and resilience, supporting the notion that individuals with high levels of this trait might develop more effective coping mechanisms during remission.[28] Futhermore, a longitudional study by Harley et al. demonstrated higher levels of self-transcendence in bipolar disorder compared to major depresssive disorder and healthy controls,suggesting that interventions targeting this trait could yield broad therapeutic benefits. However, the literature also reports a more complex and bidirectional profile of self-transcendence in bipolar disorder. Zaninotto et al. proposed that typical levels of harm avoidance (HA) and self-directedness (SD), combined with elevated self-transcendence (ST), may be linked to subthreshold thought disturbances associated with hypomanic states, including heightened imagination, mystical ideation, or cognitive disorganization.[30] Thus, elevated ST may reflect both adaptive processes, such as meaning-making, existential integration, and coping, and vulnerability-related cognitive styles that emerge along the bipolar spectrum. The higher self-transcendence observed in the sample may therefore represent a trait-level characteristic that becomes more prominent during remission, supporting emotional resilience while simultaneously reflecting a predisposition toward more expansive or abstract thinking styles frequently described in BD. Nevertheless, because associations between self-transcendence and specific time-perspective dimensions did not remain significant after multiple-comparison correction, interpretations linking this trait to particular temporal-cognitive patterns should be made cautiously. Future longitudinal studies are needed to clarify whether elevated self-transcendence represents a stable premorbid personality feature, an adaptive post-episode psychological response, or a marker of illness progression in bipolar disorder.

In this study, several correlations within the BD group initially suggested a possible association between self-transcendence and present-hedonistic time perspectives. Importantly, present-hedonistic scores did not differ significantly between the BD and control groups, indicating that this temporal orientation is not a distinguishing feature of BD at the group level. This lack of group-level difference suggests that the preliminary correlation observed in the BD group may reflect individual variability rather than a disorder-specific pattern. Self-transcendence generally refers to a psychological identification with all things as integral parts of a unified whole, a concept often linked to moments of deep absorption, focused attention, and a temporary loss of self-boundaries.[11] Although such experiential qualities may theoretically relate to altered time perception, empirical evidence directly connecting self-transcendence to specific time-perspective dimensions remains limited. Present-hedonistic time perspective has been associated with impulsivity-related outcomes, including academic and occupational difficulties, accidents, injuries, and tendencies toward pleasurable or thrill-seeking behaviors.[31] Weissenberger et al[32] found a positive correlation between ADHD symptoms and a present-hedonistic time perspective. However, because comorbid conditions were not assessed through structured interviews in the sample, it is not possible to determine whether such factors may have contributed to individual differences in present-hedonistic tendencies within the BD group. Future large-scale studies incorporating detailed clinical assessments—including subclinical hypomanic features and psychiatric comorbidities—are needed to clarify whether specific clinical variables contribute to variations in present-hedonistic time perspective among individuals with bipolar disorder.

In the current study, a significant positive correlation was observed between past-negative time perspective and harm avoidance in both groups ($r=0.574$, $P=.001$ for BD; $r=0.399$, $P=.001$ for CG). Conceptually, harm avoidance has been linked to emotional vulnerability and a tendency to focus on negative experiences, and prior work including the meta-analysis by Komasi et al.[33] supports such general associations. Although this evidence is well-documented across various psychopathologies, further investigation is needed to determine the specific clinical impact within bipolar disorder populations. While therapeutic approaches such as cognitive-behavioral therapy (CBT) or narrative-based interventions conceptually aim to modify maladaptive cognitive patterns, the present study did not test these strategies, and any clinical implications should be considered hypothetical.[3] Future research using larger samples and structured assessments may help clarify how the association between harm avoidance and past-negative time perspective functions as a potential target for intervention.

Additionally, the data revealed a significant negative association between self-directedness and past-negative time perspective ($r=-0.586$, $P=.001$ for BD; $r=-0.426$, $P=.001$ for CG). This finding aligns with the theoretical context provided by prior research.[5] A study examining the relationship between ZTPI factors and emotional, academic, and social self-efficacy found that all self-efficacy measures were negatively correlated with past-negative time perspective.[34] Cloninger et al. described individuals with high self-directedness as having strong self-esteem, effective problem-solving abilities, and adaptive coping behaviors.[11] Additionally, a study of individuals with mood disorders during euthymia reported that self-directedness and resilience were the character traits most closely associated with psychological well-being.[35] These theoretical links suggest that the construct

of self-directedness is highly relevant for understanding individual differences in emotional functioning and temporal orientation within bipolar disorder. Further research with larger samples and more rigorous diagnostic methods will be essential to fully elucidate the nature of this relationship.

In this study, regression analysis highlighted the significant role of temperament and character traits in explaining variations in time perspective within both the BD and control groups. Notably, self-transcendence positively predicted past positivity and present hedonism time perspective in patients diagnosed with bipolar disorder. Yaden et al[36] described several psychological constructs that encompass self-transcendent experiences, including mindfulness, flow, peak experiences, mystical-type states, and positive emotions such as love and awe. The present-hedonistic perspective referred to a focus on short-term pleasure and immediate gratification, often at the expense of long-term considerations or caution. In contrast, the present-fatalistic perspective was characterized by feelings of hopelessness regarding life and the future, along with a perceived lack of control over one's circumstances.[7] Conversely, harm avoidance significantly predicted past-negative time perspective. This finding aligned with previous studies in which elevated levels of harm avoidance were frequently observed in individuals with bipolar disorder.[37-39] Harm avoidance was defined as an inherited tendency to inhibit or cease behaviors due to anticipatory anxiety and fear of uncertainty regarding potential future threats. In the literature, several studies identified a relationship between a negative past time perspective and adverse life experiences.[40,41] It was therefore reasonable to expect that individuals with negative past experiences would be more likely to exhibit high levels of harm avoidance. However, further research was needed to confirm and clarify the nature of this relationship.

The logistic regression findings indicated that self-transcendence was the only psychological variable that differentiated individuals with BD from healthy controls after demographic adjustment; however, this pattern reflects a cross-sectional association rather than a causal, diagnostic, or risk-related relationship. Elevated self-transcendence may therefore represent a personality characteristic more frequently observed in individuals with BD, rather than a factor that predicts or identifies the disorder. Similarly, although harm avoidance appeared conceptually relevant to past-negative time orientation, the data did not support a statistically robust association in either group following multiple-comparison correction. Consequently, interpretations of these patterns should remain tentative, and no clinical or diagnostic conclusions can be drawn from the present analyses.

The broader literature suggests that personality dimensions such as self-transcendence, self-directedness, and harm avoidance may relate to emotional functioning or cognitive tendencies in BD; however, the present study was not designed to evaluate clinical interventions or diagnostic applications. Although some theoretical frameworks propose that specific therapeutic approaches could influence temporal-cognitive styles, these possibilities remain speculative and would require longitudinal or interventional research to examine empirically. Future studies with larger samples and structured diagnostic assessments may clarify whether personality–time perspective relationships hold consistent clinical relevance and whether such traits contribute to functional or therapeutic outcomes over time.

Despite these compelling findings, this study had some limitations. The cross-sectional design limits the ability to infer causal or temporal relationships, and the relatively modest sample size may reduce the generalizability of the results. Because this study was based on a convenience sample, no a priori power analysis was performed; therefore, the study may have been insufficiently powered to detect small effect sizes. All psychometric measures were based on self-report, which may introduce response biases, particularly for subjective constructs such as temperament, character, and time perspective. Additionally, psychiatric exclusion criteria for the control group were based solely on self-report rather than a structured diagnostic interview (e.g., SCID or MINI), which may have failed to detect subclinical or undiagnosed psychiatric conditions. In the BD group, diagnoses were confirmed through clinical evaluation rather than through a structured diagnostic interview such as SCID-5 or MINI, which may limit diagnostic precision. Comorbid psychiatric disorders were assessed through clinical impression and review of medical records, but no standardized screening tool or structured interview was administered, raising the possibility of undetected comorbidities that could influence psychological measures. Another limitation concerns medication effects: although medication use was recorded, the wide heterogeneity in drug type, dosage, treatment combinations, and treatment duration prevented meaningful statistical control. Medication-related confounding may therefore have influenced cognitive and personality-related variables. Moreover, the control group was recruited from hospital staff and relatives of the researchers, which restricts generalizability and introduces the possibility of selection bias. The regression models included 10 predictors within a sample of 65 participants, which may fall below recommended standards for multivariable analyses and reduce statistical power; for this reason, the findings should be interpreted cautiously. Finally, logistic regression analyses were conducted by entering each psychological variable into separate models rather than constructing a single fully adjusted multivariable model. Due to sample size constraints, this approach may limit the accuracy and interpretability of the regression findings. Future research using larger, more

diverse samples and structured diagnostic assessments will be essential for validating and extending these results.

Nonetheless, one of the key strengths of this study was its comprehensive examination of temperament and character traits alongside time perspective, offering novel insights into the psychological profile of individuals with bipolar disorder. The inclusion of both clinical and healthy control groups enhanced the robustness of the comparisons. Moreover, the use of validated psychometric tools such as the TCI and ZTPI added to the reliability and internal consistency of the findings. Future research should aim to replicate these results using larger, longitudinal samples and incorporate a more detailed evaluation of clinical variables and medication effects.

In conclusion, this study highlights the complex associations between temperament, character traits, and time perspective in individuals with BD. Self-transcendence emerged as a distinguishing characteristic between groups, suggesting that this trait may be linked to psychological functioning during remission. While no causal inferences can be made, the pattern of findings indicates that self-transcendence and time-perspective dimensions may be interconnected in meaningful ways. Approaches that aim to strengthen adaptive character traits or address maladaptive temporal orientations may hold potential clinical value; however, such interpretations should be viewed cautiously and explored further in future longitudinal research.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

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