

Article

Temperament and Character Dimensions in Relation to Empathy and Resilience among University Students

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ABSTRACT

This study examined the relationships between temperament and character dimensions, empathy, and resilience in a sample of university students. Temperament and character dimensions refer to relatively stable personality features that shape how individuals respond emotionally, behaviorally, and adaptively to their environment. These dimensions have been widely studied in relation to emotional regulation, interpersonal functioning, and responses to stress. Empathy, defined as the ability to understand and share others' feelings, and resilience, defined as the capacity to cope with and recover from adversity, represent relevant psychological resources in emerging adulthood. The sample consisted of 329 university students enrolled in different degree programs, mainly within psychology and health-related fields. Participants completed a battery of validated self-report measures, including the Revised Temperament and Character Inventory, the Empathy Quotient, and the Resilience Scale for Adults. Data were analyzed using descriptive statistics and multiple linear regression analyses. The results showed that

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Harm Avoidance and Self-Transcendence were positively associated with empathy. Self-Transcendence was also positively associated with resilience, whereas Cooperativeness showed a negative association with resilience. Overall, these findings suggest that temperament and character dimensions may be relevant psychological correlates of empathy and resilience in university students. Given the cross-sectional and exploratory nature of the study, the results should be interpreted as preliminary associations rather than causal or predictive evidence.

KEYWORDS: temperament; character; empathy; resilience; mental health; university students

INTRODUCTION

Temperament and character are personality dimensions associated with individual differences in emotional and behavioral functioning [1]. Although temperament and character are related dimensions of personality, temperament is generally considered more biologically based, whereas character develops through individual experience and sociocultural learning [2,3]. The Revised Temperament and Character Inventory (TCI-R) is a commonly used scale designed to assess the seven dimensions of the psychobiological model of personality proposed by Cloninger et al. (1993) [4]. The TCI-R consists of four temperament dimensions and three character dimensions [5]. The temperament dimensions are Novelty Seeking (NS), Harm Avoidance (HA), Reward Dependence (RD), and Persistence (P). The character dimensions are Self-Directedness (SD), Cooperativeness (C), and Self-Transcendence (ST).

Temperament and character dimensions have been examined in relation to interpersonal and emotional functioning. Results obtained by Beceren and Özdemir (2019) [6] demonstrated that temperament traits are connected with empathy skills. Empathy involves taking other people's perspectives and resonating with them in a way that may alleviate their distress [7]. It is also considered a cornerstone of interpersonal relationships [8]. Difficulties in empathic functioning may contribute to maladaptive social outcomes. In this perspective, previous research suggests that temperament and character dimensions may be associated with individual differences in empathy. This view is supported by Young et al. (1999) [9], who showed that temperament is related to the development and expression of empathy within relational environments.

Resilience is another relevant psychological construct for understanding individual adaptation and well-being. It refers to the capacity to adjust to stressful circumstances and recover from adversity [10,11]. Resilience may be influenced by factors such as age, gender, and cultural background, and it is often considered an indicator of psychological adaptation. Using the Connor-Davidson Resilience Scale together with temperament and character measures, Kim et al. (2013) [1]

found that high Persistence and low Harm Avoidance were associated with greater resilience in coping with stressful situations. Consistent with these findings, Eley et al. (2013) [12] concluded that Self-Directedness, Persistence, and Cooperativeness are among the TCI dimensions most closely linked to resilience.

Temperament and character dimensions have received considerable research attention over the past two decades [6,8,9,12–15]. The TCI framework has been applied across different populations to examine the relationships between personality dimensions, interpersonal functioning, and adaptive resources. From a psychiatric and mental health perspective, temperament and character dimensions, empathy, and resilience may be considered relevant factors for understanding individual differences in psychological vulnerability and well-being. Within Cloninger's psychobiological framework [4], temperament and character dimensions describe individual differences in emotional reactivity, self-regulation, interpersonal functioning, and adaptation.

Alterations in these processes have been linked to a range of psychiatric conditions, including mood and anxiety disorders, psychosomatic symptoms, and personality-related features [16]. Individual differences in empathic functioning may be relevant to interpersonal and social functioning across developmental and educational contexts [8]. Resilience has been discussed as an adaptive resource associated with psychological functioning under conditions of stress and adversity [17]. Examining these constructs within the same sample may contribute to a better understanding of individual differences in emotional, interpersonal, and adaptive functioning.

Although previous studies have examined the relationships between TCI dimensions and empathy or resilience separately, fewer studies have considered these constructs together within the same non-clinical university sample. This represents an important gap, as university students may experience psychological vulnerabilities related to interpersonal functioning, stress management, and adaptive coping. The present study addresses this gap by examining how temperament and character dimensions are associated with empathy and resilience in the same sample of university students.

Aim of the Present Study

The aim of the present study was to examine the associations between temperament and character dimensions, empathy, and resilience in a sample of university students. More specifically, the study aimed to investigate whether specific TCI-R dimensions were associated with individual differences in empathy and resilience.

Based on previous literature, we expected that Harm Avoidance and Self-Transcendence would be associated with empathy. We also expected that Self-Transcendence, Self-Directedness, Persistence, and Cooperativeness would be associated with resilience.

University students represent a population of particular interest from a preventive and psychiatric perspective. Emerging adulthood is a developmental phase characterized by significant psychological, social, and academic transitions, during which many mental disorders show their first onset or consolidation [18]. Increased exposure to stressors, identity redefinition, and emotional challenges may interact with temperament and character dispositions, and may be related to emotional functioning and well-being [19]. For these reasons, examining temperament and character dimensions, empathy, and resilience in a university sample may provide useful insights into psychological vulnerability and adaptive functioning in non-clinical populations.

METHODS

Procedure

Participants were recruited through voluntary convenience sampling among university students enrolled in different degree programs. The inclusion criteria were: being enrolled as a university student, being at least 18 years old, and providing informed consent to participate in the study.

The present survey followed the Internet Research: Ethical Guidelines 3.0 issued by the Association of Internet Researchers (AoIR), approved by the AoIR membership on October 6, 2019. Participants completed the questionnaires online using a standardized survey procedure. Informed consent was obtained from all participants before completing the questionnaire. Participants were informed about the purpose of the study, the voluntary nature of participation, their right to withdraw, and the confidential treatment of their data. Participants who did not provide informed consent were excluded from the study. Questionnaires with missing data were retained for descriptive analyses when the relevant variables were available. For the regression analyses, listwise deletion was applied separately to each model. Data were collected through the administration of standardized self-report measures designed to assess empathy, resilience, and temperament and character dimensions.

Measures

Revised Temperament and Character Inventory (TCI-R)

Temperament and character dimensions were assessed using the complete Italian version of the Revised Temperament and Character Inventory (TCI-R). The TCI-R is a 240-item self-report questionnaire rated on a 5-point Likert-type scale, ranging from 1 (“definitely false”) to 5 (“definitely true”). It assesses four temperament dimensions (Novelty Seeking, Harm Avoidance, Reward Dependence, and Persistence) and three character dimensions (Self-Directedness, Cooperativeness, and Self-Transcendence) [5]. In the present study, total scores for the seven TCI-R

dimensions were used in the analyses and treated as continuous variables. Higher scores indicate higher levels of the corresponding temperament or character dimension. Item scores were summed according to the standard scoring key of the instrument to obtain total scores for each of the seven TCI-R dimensions. Internal consistency was estimated using the available facet-level scores. Cronbach's alpha values were acceptable for Harm Avoidance ($\alpha = 0.792$), Self-Directedness ($\alpha = 0.725$), and Cooperativeness ($\alpha = 0.708$). Lower values were observed for Novelty Seeking ($\alpha = 0.530$), Reward Dependence ($\alpha = 0.327$), and Self-Transcendence ($\alpha = 0.430$). Reliability for Persistence could not be estimated because only the total dimension score was available in the analytic dataset. Findings involving dimensions with lower internal consistency should therefore be interpreted with caution.

Empathy Quotient (EQ)

Empathy was assessed using the Empathy Quotient (EQ) [20], a self-report questionnaire developed to measure individual differences in empathic functioning. The EQ includes 60 items, of which 40 contribute to the empathy score and 20 are filler items. The questionnaire assesses both cognitive and affective components of empathy. Higher scores indicate higher levels of empathy. In the present study, the total EQ score was used as the empathy outcome variable. Internal consistency for the available EQ items was $\alpha = 0.641$; therefore, results involving empathy should be interpreted with caution.

Resilience Scale for Adults (RSA)

Resilience was assessed using the Resilience Scale for Adults (RSA) [21], a self-report measure designed to assess protective factors associated with resilience. The RSA evaluates several resilience-related dimensions, including personal competence, social competence, structured style, family cohesion, and social resources. In the present study, only the RSA total score was used in the analyses, rather than separate RSA domain scores. Higher total scores indicate higher levels of resilience-related resources. Internal consistency in the present sample was $\alpha = 0.698$.

Statistical Analysis

Statistical analyses were conducted using SPSS version 27.0, with the significance threshold set at $p < 0.05$. Descriptive statistics were first computed to summarize the sociodemographic characteristics of the sample and the main study variables. Multiple linear regression analyses were then conducted to examine the associations between TCI-R dimensions and the two outcome variables: Empathy Quotient and Resilience. In each model, the TCI-R dimensions were entered simultaneously using the Enter method. The independent variables were Novelty Seeking, Harm Avoidance, Reward Dependence, Persistence, Self-

Directedness, Cooperativeness, and Self-Transcendence. The dependent variables were Empathy Quotient and Resilience, respectively.

Regression analyses were conducted using listwise deletion separately for each model. Therefore, the final analytic sample was $N = 326$ for the Empathy Quotient model and $N = 286$ for the Resilience model. Model fit was evaluated using R^2 , adjusted R^2 , F statistics, degrees of freedom, and the overall model p value. For each variable included in the regression models, unstandardized coefficients, standard errors, standardized beta coefficients, t values, p values, 95% confidence intervals, tolerance, and variance inflation factor (VIF) values were reported.

Given the cross-sectional design of the study and the use of self-report measures, all regression results were interpreted as associations rather than causal or predictive effects.

Sample Characteristics

The final sample consisted of 329 university students recruited through voluntary convenience sampling. Participants were enrolled in different degree programs or academic fields. The main demographic characteristics of the sample and the distribution of degree programs are reported in Table 1.

Table 1. Sample characteristics.

Variable	Category/Statistic	N	%
Total sample	University students	329	100.0
Age	Valid responses	154	46.8
	Missing data	175	53.2
	Mean \pm SD	21.87 \pm 4.16	—
	Range	18–47	—
Sex	Valid responses	161	48.9
	Female	123	76.4
	Male	38	23.6
	Missing data	168	51.1
Degree program/ academic field	Psychology	108	32.8
	Physiotherapy	95	28.9
	Nursing	69	21.0
	Dentistry	25	7.6
	Neuropsychomotricity	12	3.6
	Speech Therapy	11	3.3
	Dietetics	9	2.7

Note. Percentages for degree program were calculated on the total sample ($N = 329$). Percentages for sex were calculated on valid responses ($N = 161$).

Missing data were present for some demographic and psychological variables. Therefore, available-case descriptive statistics and listwise deletion for regression analyses were used. The number of valid and missing cases for each variable is reported in Table 2.

Table 2. Missing data for demographic and study variables.

Variable	Valid N	Missing N	Missing %
Age	154	175	53.2
Sex	161	168	51.1
Degree program	329	0	0.0
Novelty Seeking	329	0	0.0
Harm Avoidance	329	0	0.0
Reward Dependence	329	0	0.0
Persistence	326	3	0.9
Self-Directedness	329	0	0.0
Cooperativeness	329	0	0.0
Self-Transcendence	329	0	0.0
Empathy Quotient	329	0	0.0
Resilience	288	41	12.5
Alexithymia/TAS-20	9	320	97.3

Although, alexithymia was initially collected using the TAS-20, only nine valid cases were available for this variable. For this reason, alexithymia was removed from the revised main analyses, as the limited number of valid cases did not allow reliable statistical interpretation of the regression model. The revised analyses therefore focused on Empathy Quotient and Resilience as outcome variables. For the regression analyses, listwise deletion was applied separately for each model. The final analytic sample was $N = 326$ for the Empathy Quotient model and $N = 286$ for the Resilience model.

RESULTS

The main analyses consisted of multiple linear regression models examining the associations between TCI-R dimensions and the two outcome variables, Empathy Quotient and Resilience.

Regression Model for Empathy Quotient

Figure 1 displays the regression coefficients for the TCI-R dimensions included in the Empathy Quotient model.

The multiple regression model accounted for approximately 14.8% of the variance in Empathy Quotient scores, $R^2 = 0.148$, adjusted $R^2 = 0.129$, $F(7, 318) = 7.870$, $p < 0.001$. Harm Avoidance ($B = 0.196$, $p < 0.001$) and Self-Transcendence ($B = 0.248$, $p < 0.001$) showed positive and statistically significant associations with empathy. In contrast, the other TCI-R dimensions were not significantly associated with Empathy Quotient scores. All variables were entered into the model using the Enter method, with the Empathy Quotient serving as the dependent variable. The full regression coefficients for the Empathy Quotient model are reported in Table 3.

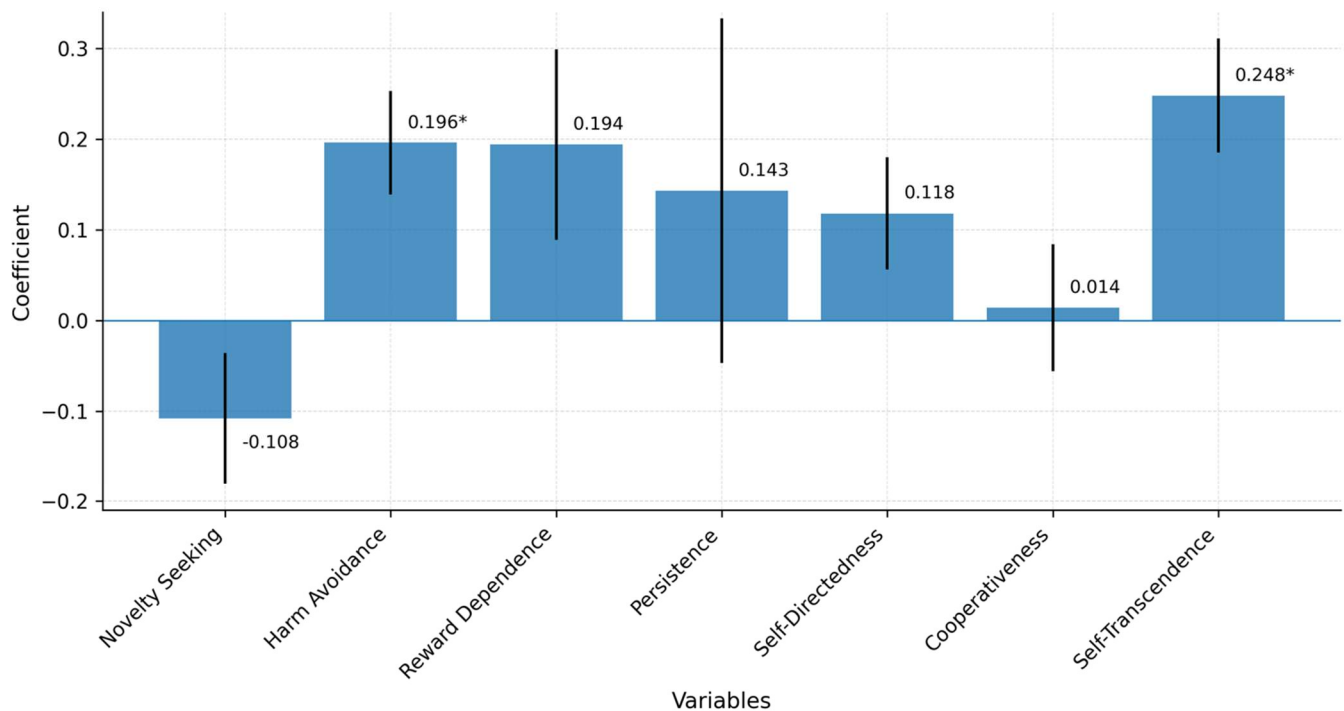


Figure 1. Coefficients of TCI-R dimensions associated with Empathy Quotient. Error bars represent standard errors. Asterisks indicate statistically significant associations ($p < 0.05$).

Table 3. Regression coefficients for Empathy Quotient.

Variable	B	SE	β	t	p	CI Lower	CI Upper	Tol.	VIF
Novelty Seeking	-0.108	0.074	-0.087	-1.473	0.142	-0.253	0.036	0.769	1.300
Harm Avoidance	0.196	0.057	0.226	3.421	<0.001	0.083	0.309	0.616	1.624
Reward Dependence	0.194	0.107	0.109	1.802	0.073	-0.018	0.405	0.738	1.355
Persistence	0.143	0.191	0.042	0.748	0.455	-0.233	0.518	0.866	1.154
Self-Directedness	0.118	0.062	0.138	1.900	0.058	-0.004	0.239	0.510	1.959
Cooperativeness	0.014	0.070	0.013	0.197	0.844	-0.124	0.151	0.584	1.713
Self-Transcendence	0.248	0.063	0.221	3.959	<0.001	0.125	0.371	0.862	1.160

Note. Model summary: $N = 326$, $R^2 = 0.148$, adjusted $R^2 = 0.129$, $F(7, 318) = 7.870$, $p < 0.001$. B = unstandardized coefficient; SE = standard error; β = standardized coefficient; CI = confidence interval; Tolerance = collinearity tolerance; VIF = variance inflation factor.

Regression Model for Resilience

Figure 2 displays the regression coefficients for the TCI-R dimensions included in the Resilience model.

The multiple regression model accounted for approximately 14.5% of the variance in Resilience scores, $R^2 = 0.145$, adjusted $R^2 = 0.123$, $F(7, 278) = 6.732$, $p < 0.001$. Self-Transcendence showed a positive and statistically significant association with resilience ($B = 0.580$, $p < 0.001$), whereas Cooperativeness showed a negative and statistically significant association with resilience ($B = -0.357$, $p = 0.006$). The other TCI-R dimensions were not significantly associated with Resilience scores. All variables were entered into the model using the Enter method, with Resilience serving as the dependent variable. The full regression coefficients for the Resilience model are reported in Table 4.

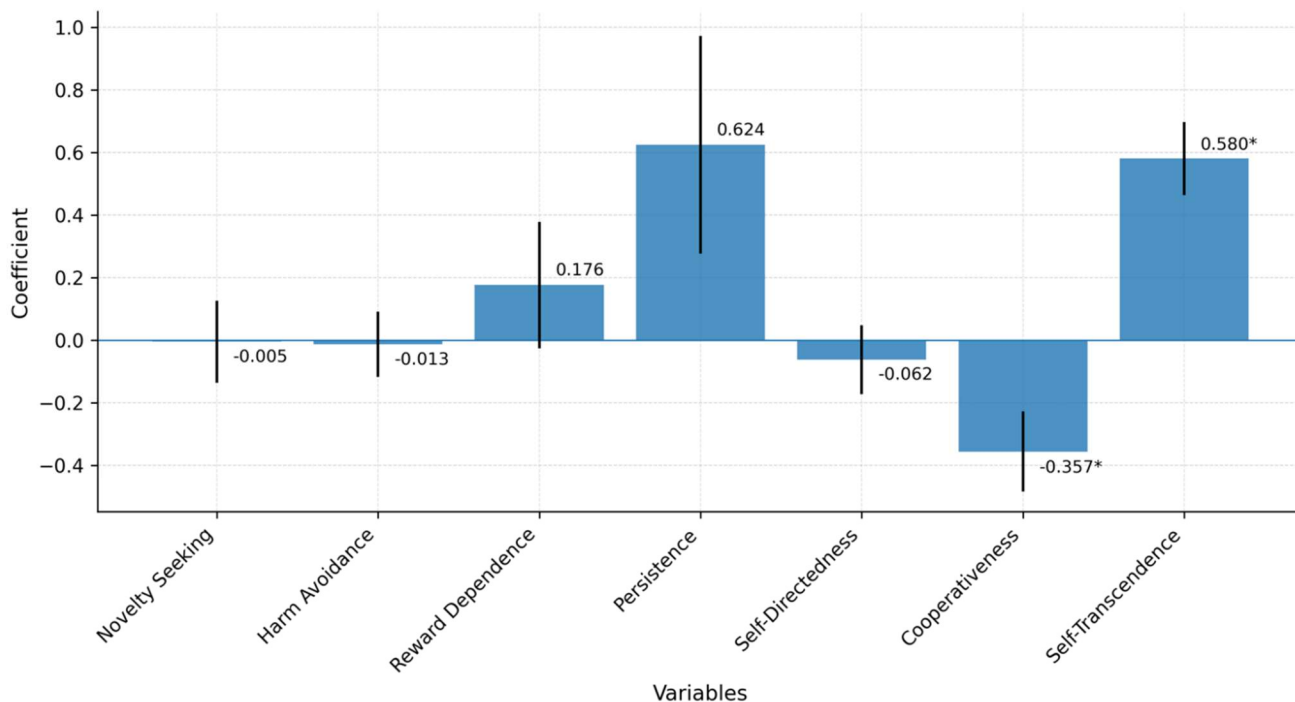


Figure 2. Coefficients of TCI-R dimensions associated with Resilience. Error bars represent standard errors. Asterisks indicate statistically significant associations ($p < 0.05$).

Table 4. Regression coefficients for Resilience.

Variable	B	SE	β	t	p	CI Lower	CI Upper	Tol.	VIF
Novelty Seeking	-0.005	0.131	-0.002	-0.036	0.971	-0.263	0.253	0.786	1.273
Harm Avoidance	-0.013	0.104	-0.009	-0.121	0.904	-0.217	0.192	0.620	1.612
Reward Dependence	0.176	0.202	0.058	0.871	0.384	-0.222	0.574	0.706	1.417
Persistence	0.624	0.348	0.107	1.794	0.074	-0.061	1.309	0.864	1.157
Self-Directedness	-0.062	0.110	-0.044	-0.560	0.576	-0.279	0.155	0.501	1.998
Cooperativeness	-0.357	0.130	-0.203	-2.756	0.006	-0.612	-0.102	0.564	1.772
Self-Transcendence	0.580	0.116	0.301	5.023	<0.001	0.353	0.808	0.859	1.165

Note. Model summary: $N = 286$, $R^2 = 0.145$, adjusted $R^2 = 0.123$, $F(7, 278) = 6.732$, $p < 0.001$. B = unstandardized coefficient; SE = standard error; β = standardized coefficient; CI = confidence interval; Tolerance = collinearity tolerance; VIF = variance inflation factor.

DISCUSSION

The empathy analysis showed that Self-Transcendence was positively associated with empathy ($B = 0.248$, $p < 0.001$), indicating that higher Self-Transcendence scores were associated with higher empathy scores. Harm Avoidance also showed a positive association with empathy ($B = 0.196$, $p < 0.001$). In contrast, Novelty Seeking, Reward Dependence, Persistence, Self-Directedness, and Cooperativeness were not significantly associated with empathy. This finding is broadly consistent with previous research suggesting links between temperament-related dimensions and empathic functioning [6–9,22].

The resilience analysis showed that Self-Transcendence was positively associated with resilience ($B = 0.580$, $p < 0.001$), suggesting that higher Self-Transcendence scores were associated with higher resilience scores. This

result is in line with previous studies suggesting that TCI-R dimensions are related to resilience-related functioning [1,12,23]. Cooperativeness showed a negative association with resilience ($B = -0.357$, $p = 0.006$), whereas the other TCI-R dimensions were not significantly associated with resilience.

More broadly, the observed associations can be situated within research highlighting the relevance of socio-emotional functioning in educational settings [24], the role of temperament and character dimensions across the lifespan [25], and the importance of mental health-related factors among university students [26]. Research conducted in clinical populations has also shown associations between affective temperament profiles and specific psychopathological features [27]. In the university context, recent studies have further emphasized the high prevalence of mental health difficulties and the influence of academic, social, and psychological factors on student well-being [28,29]. However, since the present study involved a non-clinical sample and did not assess clinical outcomes or intervention effects, these broader connections should be interpreted cautiously.

Overall, Self-Transcendence showed the most consistent associations with both empathy and resilience. Harm Avoidance was associated with empathy but not with resilience. The negative association between Cooperativeness and resilience should be considered tentative and potentially sample-specific. Although Cooperativeness is generally regarded as an adaptive interpersonal dimension, this result may reflect sample characteristics, measurement issues, or the possibility that high interpersonal orientation does not necessarily correspond to higher individual coping resources in this sample.

Given the cross-sectional design, these findings should not be interpreted as causal, developmental, protective, or intervention-related effects. Rather, they suggest that temperament and character dimensions may be associated with individual differences in empathy and resilience among university students. Future studies should use longitudinal designs, larger and more balanced samples, and more complete statistical diagnostics to clarify the robustness of these associations.

LIMITATIONS

This study has some limitations. First, its cross-sectional design does not allow causal or directional interpretations. Therefore, the findings should be interpreted as associations rather than evidence of predictive or causal relationships. Second, the use of self-report measures may have introduced response biases. Third, missing data were present for some demographic and psychological variables, and regression analyses were conducted using listwise deletion. Fourth, the convenience sampling strategy and the predominance of students from psychology and health-related programs may limit the generalizability of the findings.

Finally, some reliability estimates were low, particularly for Reward Dependence, Self-Transcendence, Novelty Seeking, and the Empathy Quotient. Therefore, findings involving these dimensions should be interpreted with caution. Future studies should use larger and more balanced samples, longitudinal designs, and more robust measurement procedures.

CONCLUSIONS

In conclusion, this study examined the associations between temperament and character dimensions, empathy, and resilience in a sample of university students. Self-Transcendence was associated with both empathy and resilience, while Harm Avoidance was associated with empathy only. Cooperativeness showed a negative association with resilience; however, this finding should be interpreted cautiously and requires replication.

Overall, the results suggest that temperament and character dimensions may be relevant for understanding individual differences in empathy and resilience among university students. However, given the cross-sectional design, the findings should be interpreted as preliminary associations rather than causal or predictive evidence.

ETHICAL STATEMENT

Ethics Approval

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and followed the Internet Research: Ethical Guidelines 3.0 issued by the Association of Internet Researchers (AoIR). Formal Ethics Committee approval was not obtained because the study consisted of an anonymous, voluntary, non-interventional survey administered to adult university students. Therefore, no approval date or protocol code is available.

Informed Consent Statement: Informed consent was obtained from all participants before completing the questionnaire. Participants were informed about the purpose of the study, the voluntary nature of participation, their right to withdraw, and the confidential treatment of their data.

Declaration of Helsinki and AoIR Ethical Guidelines

This study adhered to the Helsinki Declaration and followed the Internet Research: Ethical Guidelines 3.0 issued by the Association of Internet Researchers (AoIR).

DATA AVAILABILITY

The dataset from the study is not available due to privacy and confidentiality restrictions, as it contains potentially sensitive psychological data.

AUTHOR CONTRIBUTIONS

Conceptualization, AR and MB; Methodology, AR and MB; Software, AR and MB; Validation, AR, MB, RM and DAA; Formal Analysis, AR and MB; Investigation, AR and MB; Data Curation, AR and MB; Writing-Original Draft Preparation, AR and MB; Writing-Review and Editing, AR, MB, RM, FC, DAA and HK; Visualization, AR and MB; Supervision, AR, MB, RM, FC, DAA and HK; Resources, RM, FC, DAA and HK; Project Administration, AR and MB. All authors have read and agreed to the published version of the manuscript.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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