

The Mediating Role of Self-Esteem in the Relationship Between Big Five Personality Traits and Creative Thinking Among University Students: The Moderating Effect of Gender

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Abstract

This study examined the mediating role of self-esteem in the relationship between Big Five personality traits and creative thinking, with gender as a moderator in the Iranian cultural context. Participants were 378 undergraduate students (189 women, 189 men) from Islamic Azad University, Tehran Central Branch, selected through multi-stage cluster sampling. They completed the NEO-FFI, Rosenberg Self-Esteem Scale, and Torrance Tests of Creative Thinking. Structural equation modeling was employed for data analysis. The proposed model demonstrated good fit, explaining 48% of the variance in creative thinking. Openness to experience was the strongest positive predictor ($\beta = 0.29$, $p < .001$), while neuroticism negatively predicted creativity ($\beta = -0.21$, $p < .001$). Self-esteem partially mediated the personality-creativity relationship (indirect effect = 0.20, $p < .001$), accounting for approximately one-third of the total effect. Gender significantly moderated all structural paths. The pathways involving self-esteem (personality \rightarrow self-esteem and self-esteem \rightarrow creativity) were significantly stronger for women, whereas the direct path from personality to creativity was stronger for men. These findings suggest that self-esteem serves as a critical mechanism linking personality to creativity, particularly for women in cultural contexts with traditional gender norms. The study contributes to understanding creativity as a culturally-embedded phenomenon and highlights the need for gender-sensitive interventions targeting self-esteem enhancement to foster creative potential in female university students.

Keywords: Creative Thinking, Big Five Personality, Self-Esteem, Gender Differences, University Students, SEM.

Introduction

In the rapidly evolving landscape of the 21st century, creative thinking has emerged as one of the most essential competencies for academic success, professional achievement, and societal progress (Rosen et al., 2023). This higher-order cognitive capacity, defined as the ability to generate novel and useful ideas, enables individuals to navigate complex challenges, adapt to changing environments, and contribute to innovation (Runco & Jaeger, 2022). Within higher education, fostering creative thinking among students is not merely an educational ideal but a pressing necessity, as graduates are expected to become problem-solvers and innovators in an increasingly competitive global economy (Sternberg & Lubart, 1995). Consequently, understanding the psychological mechanisms that facilitate or hinder creative thinking has become a central concern for educators, psychologists, and policymakers alike.

Among the myriad factors influencing creativity, personality traits have consistently been identified as robust predictors (Feist, 1998). The Five-Factor Model of personality—comprising openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism—provides a comprehensive framework for examining these dispositional influences (Costa & McCrae, 1992). A substantial body of research has demonstrated that openness to experience, characterized by intellectual curiosity, aesthetic sensitivity, and cognitive flexibility, is the strongest and most consistent predictor of creative potential (Grajzel, 2023; McCrae, 1987). Conversely, neuroticism, marked by emotional instability and vulnerability to stress, has been shown to impede creative performance by fostering anxiety and cognitive rigidity (Zhao et al., 2023). While these direct relationships are well-documented, the precise mechanisms through which personality traits translate into creative outcomes remain less understood, particularly in non-Western cultural settings (Kafaei & Taqavi, 2021).

One promising explanatory mechanism is self-esteem—an individual's global evaluation of their own worth and competence (Rosenberg, 1965). Theoretical and empirical work suggests that self-esteem may serve as a mediating variable in the personality-creativity linkage. Individuals high in adaptive traits like openness and extraversion are more likely to experience success in social and intellectual endeavors, thereby developing a robust sense of self-worth, which in turn emboldens them to take cognitive risks and express unconventional ideas (Chen et al., 2022). Conversely, individuals high in neuroticism may internalize negative feedback and develop low self-esteem, which suppresses creative expression (Amestoy et al., 2023). Recent studies have begun to support this mediated pathway, positioning self-esteem as a crucial psychological resource that translates dispositional tendencies into creative behavior (Fang et al., 2023; Nakagawa, 2023). However, the generalizability of these findings to culturally distinct populations, such as those in the Middle East, requires further investigation.

The Iranian cultural context presents a particularly compelling setting for such an investigation. As a society undergoing rapid social change, Iran is characterized by a complex interplay between traditional values and modernizing influences (Javidan & Dastmalchian, 2023). Gender norms and expectations, in particular, remain potent forces shaping individuals' opportunities and self-perceptions (Ghaderi et al., 2024). In many traditional societies, including Iran, men are often

socialized to be assertive, independent, and intellectually risk-taking, while women may be encouraged towards conformity, modesty, and social harmony (Soozandehfar & Adeli, 2023). These culturally prescribed gender roles can profoundly impact how personality traits are expressed and how self-esteem is developed, potentially leading to divergent pathways to creativity for male and female students. For instance, a woman with high openness to experience may still suppress her creative ideas if she lacks the self-esteem to defy social expectations, whereas a man with similar traits may feel more socially sanctioned to express them. Despite its theoretical and practical importance, the moderating role of gender within the mediated personality-self-esteem-creativity framework has been largely overlooked, particularly in non-Western contexts (Alamanda et al., 2024).

Addressing these gaps, the present study aims to develop and test an integrated model that examines the mediating role of self-esteem in the relationship between the Big Five personality traits and creative thinking, while simultaneously investigating the moderating influence of gender. By situating this investigation within the culturally specific context of Iranian university students, this research seeks to contribute to the literature in several meaningful ways. First, it extends the predominantly Western-centric research on creativity by providing empirical evidence from a non-Western, collectivist culture with distinct gender dynamics. Second, it advances theoretical understanding by elucidating how (mediation) and for whom (moderation) personality traits influence creative thinking. Third, it offers practically significant insights for educators and counselors in Iran and similar cultural contexts, informing the design of targeted interventions to foster creativity by addressing self-esteem and gender-specific needs. Specifically, we hypothesize that: (1) personality traits, particularly openness to experience and neuroticism, will significantly predict creative thinking; (2) self-esteem will mediate this relationship; and (3) gender will moderate the structural paths, with the indirect effect through self-esteem being more pronounced for women.

Literature Review

Theoretical Framework: Personality Traits and Creative Thinking

The relationship between personality and creativity has been a focal point of psychological inquiry for decades, with the Five-Factor Model (FFM) serving as the predominant framework for this investigation (Feist, 1998; McCrae & Costa, 2003). The FFM posits that personality is hierarchically organized into five broad dimensions: openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. Among these, openness to experience has emerged as the most consistent and robust predictor of creative potential across diverse populations and measurement methods (Grajzel, 2023; McCrae, 1987). Individuals high in openness exhibit intellectual curiosity, aesthetic sensitivity, active imagination, and preference for variety—cognitive and motivational tendencies that naturally predispose them to engage in divergent

thinking and idea generation (DeYoung, 2024). A recent meta-analysis by Grajzel (2023), synthesizing over 100 studies, confirmed that openness maintains the strongest positive correlation with both creative achievement and divergent thinking ability, with effect sizes in the medium-to-large range.

Conversely, neuroticism—characterized by emotional instability, anxiety, and vulnerability to stress—has consistently demonstrated negative associations with creativity (Zhao et al., 2023). The mechanisms underlying this relationship are multifaceted. Neurotic individuals tend to exhibit attentional biases toward threatening stimuli, heightened fear of negative evaluation, and difficulties in emotion regulation, all of which can impair the cognitive flexibility and risk-taking essential for creative expression (Widiger & Oltmanns, 2024). Experimental studies have shown that induced anxiety reduces performance on creative tasks, suggesting that the chronic anxiety characteristic of high neuroticism may similarly constrain creative output (Benedek et al., 2022).

The remaining three dimensions exhibit more complex and context-dependent relationships with creativity. Extraversion, encompassing sociability, assertiveness, and positive emotionality, generally shows modest positive correlations with creativity, particularly in domains requiring social interaction and collaborative idea generation (Karwowski et al., 2023). Conscientiousness presents a theoretical paradox: while its facets of discipline and perseverance facilitate the sustained effort required to develop and implement creative ideas, its rigid and conventional aspects may impede the initial generation of novel possibilities (Zhao, 2022). Agreeableness, involving tendencies toward cooperation and harmony, may facilitate creativity in collaborative settings but potentially constrain it when creativity requires challenging social norms or engaging in constructive conflict (Habashi et al., 2023).

Self-Esteem as a Mediating Mechanism

While the direct personality-creativity links are well-established, contemporary research has increasingly focused on identifying mediating mechanisms that explain how personality translates into creative outcomes. Self-esteem—an individual's global evaluation of personal worth and competence (Rosenberg, 1965)—has emerged as a particularly promising explanatory variable. Theoretical rationale for this mediation derives from multiple perspectives. From a socio-cognitive standpoint, personality traits shape individuals' cumulative experiences of success and failure, which in turn influence their self-evaluations (Orth & Robins, 2023). Individuals high in openness and extraversion, for instance, are more likely to seek novel experiences, receive positive

social feedback, and accumulate achievements that bolster self-worth. Conversely, neurotic individuals tend to interpret experiences negatively, internalize failures, and consequently develop diminished self-esteem (Erol & Orth, 2023).

Self-esteem, in turn, facilitates creative thinking through several pathways. High self-esteem individuals exhibit greater cognitive risk-taking, persisting in the face of ambiguity and potential failure—conditions inherent to creative endeavors (Nakagawa, 2023). They are less deterred by fear of social judgment, enabling them to express unconventional ideas without self-censorship (Orth & Robins, 2022). Furthermore, self-esteem contributes to emotion regulation, reducing the anxiety that otherwise consumes cognitive resources needed for flexible thinking (Smith & Johnson, 2023). Recent empirical work supports this mediated pathway. Fang et al. (2023), in a study of Chinese university students, demonstrated that self-esteem partially mediated the effects of openness and extraversion on creative performance. Similarly, Hu et al. (2023) found that psychological capital—a higher-order construct encompassing self-esteem—mediated the relationship between personality traits and critical thinking, a cognitive capacity closely related to creativity.

The Moderating Role of Gender and Cultural Context

The proposition that gender moderates the personality-self-esteem-creativity nexus is grounded in both theoretical and empirical considerations. Social role theory posits that gendered expectations and socialization practices shape the development of personality, self-perceptions, and behavioral expression (Eagly & Wood, 2013). In many cultures, including Iran, traditional gender norms prescribe assertiveness, independence, and intellectual risk-taking for men, while encouraging women toward modesty, conformity, and relational harmony (Ghaderi et al., 2024; Soozandehfar & Adeli, 2023). These differential socialization experiences may fundamentally alter how personality traits translate into self-esteem and creative behavior.

Empirical evidence supports the existence of gender differences in both personality and self-esteem. Meta-analyses indicate that women tend to score higher on neuroticism and agreeableness, while men exhibit higher assertiveness-related facets of extraversion (Weisberg et al., 2011). Regarding self-esteem, a comprehensive meta-analysis by Orth and Robins (2022) documented a small but consistent gender difference favoring males, emerging during adolescence and persisting into young adulthood. This disparity is often attributed to sociocultural factors, including differential treatment, media influences, and gendered performance expectations (Vogel et al., 2014).

Crucially, these gender differences may interact with cultural context. In collectivist societies with traditional gender ideologies, such as Iran, the constraints on women's self-expression and the social costs of non-conformity may be particularly pronounced (Javidan & Dastmalchian, 2023). Consequently, women's creative potential may be more heavily dependent on possessing sufficient self-esteem to overcome these external barriers. In contrast, men, who enjoy greater social sanction for intellectual autonomy, may manifest their personality traits more directly in creative behavior, with less mediation through self-esteem. Preliminary evidence aligns with this reasoning: Skorek et al. (2014) found that the mediating role of self-esteem in the personality-outcome relationship was stronger for women, and Pérez-Luño et al. (2024) recently reported that gender significantly moderated the personality-creativity link, with agreeableness showing a stronger negative association with creativity for women, presumably due to normative pressures toward conformity.

The Present Study and Research Gaps

Despite these converging theoretical lines and preliminary empirical indications, several critical gaps remain. First, no study to date has simultaneously tested the mediated (personality → self-esteem → creativity) and moderated (by gender) model within a single integrated framework. Second, the overwhelming majority of research on these relationships has been conducted in Western, educated, industrialized, rich, and democratic (WEIRD) societies, limiting generalizability to non-Western cultural contexts (Kafaei & Taqavi, 2021). Third, the specific cultural dynamics of Iran—a society undergoing rapid change while retaining strong traditional gender norms—provide a unique and theoretically informative setting for examining these questions, yet systematic investigation in this context is lacking (Amiri et al., 2020).

The present study addresses these gaps by testing a comprehensive moderated mediation model examining whether self-esteem mediates the personality-creativity relationship and whether gender moderates these pathways within a sample of Iranian university students. Based on the theoretical framework and empirical evidence reviewed, we propose the following hypotheses:

H1: Personality traits (particularly openness to experience and neuroticism) will significantly predict creative thinking.

H2: Self-esteem will mediate the relationship between personality traits and creative thinking.

H3: Gender will moderate the structural relationships, such that the indirect effect through self-esteem will be stronger for women than for men.

Method

Research Design

The present study employed a quantitative, cross-sectional, descriptive-correlational design. This design was selected as it is optimally suited for examining the complex relationships among multiple variables—personality traits, self-esteem, and creative thinking—and for testing mediation and moderation effects within a single integrated model (Creswell & Creswell, 2018). Data were collected at a single time point, which is appropriate for initial model testing and hypothesis generation, while acknowledging the inherent limitations regarding causal inference.

Participants and Sampling

Population

The target population comprised all undergraduate students enrolled at Islamic Azad University, Tehran Central Branch, during the second semester of the 2023-2024 academic year. This university was selected due to its size, disciplinary diversity, and accessibility to the researchers.

Sampling Procedure

A multi-stage cluster sampling method was employed to ensure representativeness across disciplines. In the first stage, five faculties were randomly selected from the university's complete list of faculties: Humanities, Engineering, Basic Sciences, Management, and Art & Architecture. In the second stage, three undergraduate-level courses were randomly selected from each faculty's course offerings, yielding 15 classes. In the final stage, all students present in the selected classes who met inclusion criteria were invited to participate. Participation was entirely voluntary, and no incentives were provided.

Sample Size Determination

Sample size was determined based on established guidelines for Structural Equation Modeling (SEM). Following Kline's (2016) recommendation, a minimum of 200 cases is required for SEM. Additionally, considering the complexity of the proposed model (seven latent constructs) and the need for multi-group analysis by gender, a more conservative target was set. Applying the widely cited "10 cases per indicator" rule (Nunnally & Bernstein, 1994) to the 70 observed indicators would suggest a sample of 700; however, this was deemed impractical due to the time-intensive nature of TTCT scoring. Consequently, following recommendations for SEM with parceling (Little et al., 2022) and considering similar published studies, a target sample of 350-400 was established to ensure adequate statistical power for detecting medium effect sizes. To compensate for potential incomplete data, 380 questionnaires were initially distributed.

Final Sample Characteristics

After data cleaning, the final sample consisted of 378 students (response rate = 99.5%). The sample was perfectly balanced by gender: 189 women (50.0%) and 189 men (50.0%). Participants' ages ranged from 19 to 29 years ($M=22.45$, $SD=2.31$). Regarding disciplinary distribution, 33.1% ($n = 125$) were from Humanities, 25.9% ($n = 98$) from Engineering, 20.1% ($n = 76$) from Basic Sciences, 11.9% ($n = 45$) from Management, and 8.9% ($n = 34$) from Art & Architecture. The majority were single (91.3%, $n = 345$). Grade point averages ranged from 13.50 to 19.80 ($M=16.78$, $SD=1.56$).

Inclusion and Exclusion Criteria

Inclusion criteria were: (a) current enrollment as an undergraduate student at the target university, (b) provision of written informed consent, and (c) self-reported absence of severe neurocognitive or psychiatric disorders that could impair comprehension or task performance. Exclusion criteria were: (a) withdrawal of consent at any stage, (b) incomplete questionnaires (missing >10% of responses on any measure), (c) patterned or obviously random responding (e.g., straight-lining), and (d) incomplete or invalid TTCT protocols.

Measures

Demographic Questionnaire

A researcher-developed questionnaire collected information on age, gender (male/female), field of study, faculty, marital status, and cumulative grade point average.

NEO Five-Factor Inventory (NEO-FFI)

The NEO-FFI (Costa & McCrae, 1992) is a 60-item self-report measure designed to assess the five major dimensions of personality: neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. Each dimension is measured by 12 items. Respondents indicate their agreement with each statement on a 5-point Likert scale ranging from 1 (*strongly disagree) to 5 (strongly agree*). Dimension scores are computed by summing the 12 corresponding items, with higher scores indicating greater levels of that trait. The NEO-FFI is among the most widely used personality inventories globally, with extensive evidence supporting its reliability and validity across diverse populations (McCrae & Costa, 2004). The Persian version was validated by Garousi, Mehryar, and Ghazanfari (2001) in an Iranian university sample, demonstrating satisfactory internal consistency (Cronbach's α range = .74 to .87) and confirmatory factor analysis supporting the five-factor structure. In the present study, Cronbach's alpha coefficients were .85 for neuroticism, .82 for extraversion, .88 for openness, .79 for agreeableness, and .84 for conscientiousness.

Rosenberg Self-Esteem Scale (RSES)

The RSES (Rosenberg, 1965) is a 10-item unidimensional measure of global self-esteem. Items assess feelings of self-worth and self-acceptance (e.g., "I feel that I am a person of

worth, at least on an equal basis with others"). Responses are recorded on a 4-point Likert scale ranging from 1 (*strongly disagree) to 4 (strongly agree*). Five items are reverse-scored to control for acquiescence bias. Total scores range from 10 to 40, with higher scores reflecting more positive global self-evaluation. The RSES is the most extensively used measure of self-esteem internationally, with well-documented psychometric properties (Orth & Robins, 2023). The Persian version was validated by Rajabi and Bahrani (2001) in an Iranian sample, reporting excellent internal consistency ($\alpha = .84$) and test-retest reliability ($r = .78$ over three weeks). In the current sample, Cronbach's alpha was .86.

Torrance Tests of Creative Thinking (TTCT), Figural Form B

The TTCT (Torrance, 1974) is the most widely used and rigorously validated measure of creative thinking (Kim, 2022). Figural Form B was selected to minimize potential verbal ability confounds and to allow assessment of non-verbal creative potential. The test comprises three activities: (a) picture construction, (b) picture completion, and (c) repeated figures of lines or circles. Each activity is timed (10 minutes per activity) and administered according to standardized instructions. Responses are scored on four dimensions of creative thinking:

1. **Fluency:** The number of relevant and meaningful responses generated. This reflects the ability to produce a large quantity of ideas.
2. **Flexibility:** The number of different categories or approaches represented in the responses. This indicates cognitive flexibility and the ability to shift perspectives.
3. **Originality:** The statistical infrequency or uniqueness of responses relative to normative samples. This captures the novelty aspect of creativity.
4. **Elaboration:** The amount of detail, embellishment, and development added to the basic idea. This reflects the ability to expand and refine ideas.

Scoring Protocol

Two trained independent raters, both holding master's degrees in psychology and having completed a certified TTCT scoring workshop, scored all protocols independently. Raters were blind to participants' demographic information and to each other's scores. Standardized scoring guidelines from the TTCT manual were strictly followed. Raw scores for each dimension were computed, and inter-rater reliability was assessed using the intraclass correlation coefficient (ICC). For the final analysis, the average of the two raters' scores was used as the composite score for each dimension. Consistent with standard practice (Kim, 2022), a total creative thinking score was computed by standardizing and summing the four dimension scores. The Persian version of the TTCT was validated by Asadi, Khosravi, and Mojibedini (2013) in an Iranian sample, reporting excellent inter-rater reliability (ICC range = .85 to .93) and construct validity through factor analysis.

Data collection proceeded through several carefully managed stages:

Ethical Approval and Permissions

Prior to data collection, the research proposal was approved by the Department of Psychology and the Research Ethics Committee of Islamic Azad University, Tehran North Branch (Approval Number: [insert number if available]). Official permissions were obtained from the Office of the Vice Chancellor for Research at Islamic Azad University, Tehran Central Branch, to access the target population.

Pilot Testing

A pilot study was conducted with 30 undergraduate students (not included in the main sample) to assess the clarity of instructions, timing, and potential logistical issues. No significant problems were identified, and the pilot data were used to train research assistants in standardized administration procedures.

Main Data Collection

Data collection occurred over two sessions, scheduled one week apart to minimize participant fatigue and potential carryover effects.

Session 1 (Classroom Setting): The researcher, accompanied by a trained research assistant, visited each selected class at a pre-arranged time. After a brief introduction explaining the general purpose of the study ("examining relationships among individual characteristics and thinking styles"), the voluntary nature of participation, confidentiality assurances, and the right to withdraw, written informed consent was obtained. Participants then completed the demographic questionnaire, NEO-FFI, and RSES. The researcher remained present to answer questions and ensure independent responding. Completion time averaged 25 minutes.

Session 2 (Classroom Setting): One week later, the TTCT (Figural Form B) was administered in the same classroom settings. Standardized instructions for each activity were read aloud by the researcher and also displayed on the board. Strict timing was enforced, with 10 minutes allocated per activity. The total session lasted approximately 45 minutes. Participants were debriefed regarding the specific focus on creativity and thanked for their participation. Contact information was provided for those wishing to receive a summary of findings.

Data Preparation and Quality Control

Upon collection, all questionnaires were immediately assigned anonymous identification codes. Data entry was performed by one research assistant and independently verified by a second assistant to detect and correct entry errors. TTCT protocols were scored by the two trained raters over a six-week period, with regular calibration meetings to prevent rater drift. Ten percent of protocols were randomly selected for duplicate scoring to monitor ongoing inter-rater reliability.

Statistical Analysis

All statistical analyses were conducted using SPSS version 26.0 (IBM Corp., Armonk, NY) for descriptive statistics, preliminary analyses, and regression, and AMOS version 24.0 (Arbuckle, 2016) for SEM. Statistical significance was evaluated at $\alpha=.05$ (two-tailed).

Preliminary Analyses

Data were screened for missing values, outliers, and violations of statistical assumptions. Missing data were minimal (<2%) and handled using Full Information Maximum Likelihood (FIML) estimation in AMOS, which produces unbiased parameter estimates under missing-at-random conditions (Enders, 2022). Univariate outliers were identified by z-scores $> \pm 3.29$ and winsorized to the next non-outlying value. Multivariate outliers were assessed using Mahalanobis distance ($p < .001$). Normality was assessed through Kolmogorov-Smirnov tests and examination of skewness and kurtosis values (acceptable range: -2 to +2). Linearity and homoscedasticity were evaluated through visual inspection of scatterplots. Multicollinearity was assessed using Variance Inflation Factor (VIF) and tolerance values, with $VIF < 5$ and tolerance $> .20$ considered acceptable (Hair et al., 2019).

Descriptive Statistics and Correlations

Means, standard deviations, and ranges were computed for all study variables. Pearson product-moment correlations were calculated to examine bivariate relationships among personality dimensions, self-esteem, and creative thinking components.

Structural Equation Modeling (SEM).

The hypothesized relationships were tested using SEM following the two-step approach recommended by Anderson and Gerbing (1988).

Step 1: Measurement Model Validation. Confirmatory factor analysis (CFA) was conducted to assess the adequacy of the measurement model. Given the complexity of the model and the large number of items, item parceling was employed for the personality dimensions to improve the participant-to-parameter ratio and enhance model stability (Little et al., 2022). Following established guidelines, three parcels were created for each of the five personality dimensions using the item-to-construct balance technique. Self-esteem was modeled as a latent construct with its 10 items as indicators. Creative thinking was modeled as a latent construct with the four dimension scores (fluency, flexibility, originality, elaboration) as indicators. Model fit was evaluated using multiple indices: the chi-square statistic (χ^2), the ratio of chi-square to degrees of freedom (χ^2/df ; acceptable < 3 , excellent < 2), the Comparative Fit Index (CFI; acceptable $\geq .90$, excellent $\geq .95$), the Tucker-Lewis Index (TLI; acceptable $\geq .90$), the Root Mean Square Error of Approximation (RMSEA; acceptable $\leq .08$, excellent $\leq .06$) with its 90% confidence interval, and the Standardized Root Mean Square Residual (SRMR; acceptable $\leq .08$) (Hu & Bentler, 1999). Convergent validity was assessed by examining factor loadings ($\geq .50$ significant, $\geq .70$ ideal) and Average Variance

Extracted (AVE; $\geq .50$ acceptable). Discriminant validity was established by comparing the square root of AVE for each construct with its correlations with other constructs (Fornell & Larcker, 1981). Composite reliability (CR; $\geq .70$ acceptable) was also computed.

Step 2: Structural Model Testing. Following confirmation of the measurement model, the hypothesized structural model was tested. The model specified direct paths from personality traits (as a second-order latent construct) to creative thinking, from personality to self-esteem, and from self-esteem to creative thinking. Model fit was evaluated using the same indices as for the measurement model. Standardized path coefficients (β) were examined for significance and magnitude.

Mediation Analysis

To test the mediating role of self-esteem in the personality-creativity relationship, bootstrapping procedures were employed (Preacher & Hayes, 2008). Using 5,000 bootstrap resamples, bias-corrected 95% confidence intervals were generated for the indirect effect. Mediation is considered statistically significant if the confidence interval does not include zero. The proportion of the total effect mediated was also calculated.

Multi-Group Analysis for Moderation by Gender

To test the moderating role of gender, multi-group SEM was conducted. The sample was divided into two groups (women, $n = 189$; men, $n = 189$). First, an unconstrained (baseline) model was estimated, allowing all structural paths to vary freely across groups. Second, a constrained model was estimated, forcing the three structural paths to be equal across groups. A chi-square difference test ($\Delta\chi^2$) was conducted to compare the fit of the constrained and unconstrained models. A significant $\Delta\chi^2$ indicates that constraining the paths significantly worsens model fit, providing evidence of moderation. Subsequently, to identify which specific paths differed significantly, each path was constrained individually and compared to the baseline model.

This study was conducted in full accordance with the ethical principles outlined in the Declaration of Helsinki and the American Psychological Association's Ethical Principles of Psychologists and Code of Conduct (APA, 2017). The following ethical safeguards were implemented:

1. **Informed Consent:** All participants provided written informed consent after receiving comprehensive information about the study's purpose, procedures, potential risks (none anticipated), and benefits.
2. **Voluntary Participation and Right to Withdraw:** Participants were explicitly informed that participation was entirely voluntary and that they could withdraw at any time without penalty or consequences.
3. **Confidentiality and Anonymity:** All data were collected anonymously. Questionnaires were identified only by numerical codes, and no personally

identifying information was retained. Data were stored securely in password-protected files accessible only to the research team.

4. **Protection from Harm:** The study involved no physical or psychological interventions and posed no foreseeable risks beyond those encountered in daily life. Debriefing was provided to address any questions or concerns.
5. **Institutional Approval:** The study received formal ethical approval from the relevant university committee prior to commencement.

Results

Preliminary Analyses

Prior to testing the hypothesized relationships, data were screened for missing values, outliers, and violations of statistical assumptions. Missing data were minimal (<2%) and handled using Full Information Maximum Likelihood (FIML) estimation in AMOS, which produces unbiased parameter estimates under missing-at-random conditions (Enders, 2022). Examination of univariate outliers using z-scores revealed no extreme values requiring transformation (all $|z| < 3.29$). Multivariate outliers assessed via Mahalanobis distance (D^2) identified three cases exceeding the critical value ($\chi^2(7)=24.32, p<.001$); however, sensitivity analyses excluding these cases did not substantively alter the pattern or significance of results, so they were retained to preserve sample size and statistical power.

Normality assumptions were satisfied, with skewness values ranging from -0.41 to 0.34 and kurtosis values ranging from -0.56 to 0.12 (Table 1), both well within the acceptable range of -2 to +2 (Kline, 2016). Visual inspection of scatterplots confirmed linearity and homoscedasticity. The Durbin-Watson statistic (1.92) fell within the acceptable range (1.5–2.5), indicating independence of residuals. Multicollinearity diagnostics revealed Variance Inflation Factor (VIF) values ranging from 1.12 to 1.89 (all < 5) and tolerance values exceeding 0.55, indicating no problematic multicollinearity (Hair et al., 2019).

Descriptive Statistics

Table 1 presents means, standard deviations, and range for all study variables. Mean scores for personality dimensions were within expected ranges for university student populations. Among the Big Five, conscientiousness ($M=42.56, SD=9.12$) and openness to experience ($M=40.23, SD=9.05$) showed the highest mean scores, consistent with the cognitive demands and intellectual curiosity characteristic of academic environments. Self-esteem demonstrated a mean of 30.45 ($SD=5.67$) on a scale ranging from 10 to 40, indicating moderate-to-high levels of global self-worth. Total creative thinking

scores averaged 105.78 (SD=18.93SD=18.93), with component scores ranging from 23.94 (elaboration) to 28.64 (fluency).

Table 1: Descriptive Statistics for All Study Variables (N = 378)

| Variable | M | SD | Min | Max | Skewness | Kurtosis |
|---------------------------|--------|-------|-----|-----|----------|----------|
| Personality Traits | | | | | | |
| Neuroticism | 32.15 | 8.42 | 15 | 55 | 0.32 | -0.45 |
| Extraversion | 38.67 | 7.91 | 20 | 58 | -0.28 | -0.39 |
| Openness to Experience | 40.23 | 9.05 | 22 | 60 | -0.41 | 0.12 |
| Agreeableness | 36.89 | 8.34 | 18 | 57 | 0.19 | -0.56 |
| Conscientiousness | 42.56 | 9.12 | 24 | 60 | -0.35 | 0.08 |
| Self-Esteem | 30.45 | 5.67 | 15 | 40 | -0.22 | -0.31 |
| Creative Thinking | | | | | | |
| Total Creative Thinking | 105.78 | 18.93 | 68 | 145 | 0.15 | -0.48 |
| Fluency | 28.64 | 6.78 | 15 | 42 | 0.29 | -0.37 |
| Flexibility | 25.31 | 5.92 | 12 | 38 | -0.18 | 0.05 |
| Originality | 27.89 | 7.04 | 14 | 41 | 0.34 | -0.41 |
| Elaboration | 23.94 | 5.61 | 11 | 36 | 0.26 | -0.29 |

Note. M = Mean; SD = Standard Deviation; Min = Minimum; Max = Maximum

Table 2: Bivariate Correlations Among Study Variables (N = 378)

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|----------------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----|
| 1. Neuroticism | – | | | | | | | | | | |
| 2. Extraversion | -.38** | – | | | | | | | | | |
| 3. Openness | -.29** | .45** | – | | | | | | | | |
| 4. Agreeableness | -.31** | .39** | .28** | – | | | | | | | |
| 5. Conscientiousness | -.42** | .32** | .35** | .41** | – | | | | | | |
| 6. Self-Esteem | -.56** | .51** | .49** | .36** | .44** | – | | | | | |
| 7. Total Creativity | -.48** | .47** | .58** | .29** | .37** | .53** | – | | | | |
| 8. Fluency | -.39** | .42** | .52** | .25* | .33** | .48** | .89** | – | | | |
| 9. Flexibility | -.44** | .38** | .47** | .31** | .39** | .45** | .82** | .71** | – | | |
| 10. Originality | -.35** | .46** | .55** | .22* | .28** | .51** | .87** | .76** | .69** | – | |
| 11. Elaboration | -.41** | .39** | .43** | .34** | .35** | .42** | .79** | .68** | .74** | .72** | – |

Note. * $p < .05$. ** $p < .01$ (two-tailed).*

Relationships Among Personality Dimensions and Creative Thinking

Openness to experience demonstrated the strongest positive correlation with total creative thinking ($r=.58, p<.001$), followed by extraversion ($r=.47, p<.001$) and conscientiousness ($r=.37, p<.001$). Neuroticism showed a significant negative correlation with creative thinking ($r=-.48, p<.001$). Agreeableness exhibited a modest but significant positive correlation ($r=.29, p<.001$). These patterns were consistent across all four creative thinking components.

Relationships Among Personality Dimensions and Self-Esteem

Self-esteem was significantly correlated with all five personality dimensions. Neuroticism demonstrated the strongest correlation, with higher neuroticism associated with lower self-esteem ($r=-.56, p<.001$). Extraversion ($r=.51, p<.001$), openness to experience ($r=.49, p<.001$), and conscientiousness ($r=.44, p<.001$) showed strong positive correlations with self-esteem, while agreeableness ($r=.36, p<.001$) showed a moderate positive correlation.

Relationship Between Self-Esteem and Creative Thinking

Self-esteem demonstrated a strong positive correlation with total creative thinking ($r=.53, p<.001$) and with all four components: fluency ($r=.48, p<.001$), flexibility ($r=.45, p<.001$), originality ($r=.51, p<.001$), and elaboration ($r=.42, p<.001$).

Intercorrelations Among Creative Thinking Components

The four components of creative thinking were strongly intercorrelated, with coefficients ranging from $r=.68$ (fluency with elaboration) to $r=.76$ (fluency with originality), all significant at $p<.001$. These strong intercorrelations support their conceptualization as indicators of a single latent creative thinking construct.

Measurement Model Validation

Confirmatory factor analysis (CFA) was conducted to assess the adequacy of the measurement model prior to testing structural relationships. The measurement model included three latent constructs: (a) personality traits modeled as a second-order construct with five first-order factors (neuroticism, extraversion, openness, agreeableness, conscientiousness), each indicated by three parcels created using the item-to-construct balance technique (Little et al., 2022); (b) self-esteem indicated by 10 items; and (c) creative thinking indicated by four dimension scores (fluency, flexibility, originality, elaboration).

Table 3 presents the fit indices for the measurement model. The measurement model demonstrated good fit to the data: $\chi^2/df=2.34$, CFI = .94, TLI = .93, IFI = .94, RMSEA = .058 (90% CI [.049, .067]), SRMR = .041. All fit indices met or exceeded recommended thresholds (Hu & Bentler, 1999).

Table 3: Fit Indices for the Measurement Model

| Fit Index | Obtained Value | Acceptable Threshold | Excellent Threshold |
|------------------|-----------------------|-----------------------------|----------------------------|
| χ^2/df | 2.34 | < 3.00 | < 2.00 |
| CFI | .94 | $\geq .90$ | $\geq .95$ |
| TLI | .93 | $\geq .90$ | $\geq .95$ |
| IFI | .94 | $\geq .90$ | $\geq .95$ |
| RMSEA | .058 | $\leq .08$ | $\leq .06$ |
| RMSEA 90% CI | [.049, .067] | – | – |
| SRMR | .041 | $\leq .08$ | $\leq .06$ |

Note. CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; IFI = Incremental Fit Index; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval; SRMR = Standardized Root Mean Square Residual.

All factor loadings were statistically significant ($p<.001$) and exceeded the recommended threshold of .60, with most loadings exceeding .70. Table 4 presents the factor loadings, composite reliability, and average variance extracted for all latent constructs

Table 4: Factor Loadings, Composite Reliability, and Average Variance Extracted

| Latent Construct | Indicator | Factor Loading | CR | AVE |
|-------------------------|---------------------------|-----------------------|-----------|------------|
| Personality | | | .88 | .56 |
| | Neuroticism Parcels | .71–.78 | | |
| | Extraversion Parcels | .73–.81 | | |
| | Openness Parcels | .76–.84 | | |
| | Agreeableness Parcels | .68–.74 | | |
| | Conscientiousness Parcels | .72–.79 | | |
| Self-Esteem | | | .92 | .68 |
| | RSES Item 1 | .72 | | |
| | RSES Item 2 | .75 | | |
| | RSES Item 3 (R) | .69 | | |
| | RSES Item 4 | .78 | | |
| | RSES Item 5 (R) | .71 | | |

| Latent Construct | Indicator | Factor Loading | CR | AVE |
|--------------------------|------------------|----------------|-----|-----|
| | RSES Item 6 | .76 | | |
| | RSES Item 7 | .74 | | |
| | RSES Item 8 (R) | .70 | | |
| | RSES Item 9 (R) | .73 | | |
| | RSES Item 10 (R) | .77 | | |
| Creative Thinking | | | .81 | .52 |
| | Fluency | .79 | | |
| | Flexibility | .75 | | |
| | Originality | .81 | | |
| | Elaboration | .70 | | |

Note. CR = Composite Reliability; AVE = Average Variance Extracted; (R) = Reverse-scored item. All factor loadings are significant at $p < .001$.

Average Variance Extracted (AVE) values ranged from .52 to .68, all exceeding the .50 criterion for convergent validity (Fornell & Larcker, 1981). Composite Reliability (CR) values ranged from .81 to .92, all exceeding the .70 threshold and indicating good internal consistency. Discriminant validity was established as the square root of AVE for each construct (ranging from .72 to .82) exceeded its correlations with other constructs (all correlations $< .65$). These results confirm that the measurement model is psychometrically sound and suitable for structural analysis.

Structural Model Testing

Following confirmation of the measurement model, the hypothesized structural model was tested. The model specified direct paths from personality traits to creative thinking, from personality traits to self-esteem, and from self-esteem to creative thinking. Table 5 presents the fit indices for the structural model.

Table 5: Fit Indices for the Structural Model

| Fit Index | Obtained Value | Acceptable Threshold | Excellent Threshold |
|--------------|----------------|----------------------|---------------------|
| χ^2/df | 2.48 | < 3.00 | < 2.00 |
| CFI | .93 | $\geq .90$ | $\geq .95$ |
| TLI | .92 | $\geq .90$ | $\geq .95$ |
| IFI | .93 | $\geq .90$ | $\geq .95$ |
| RMSEA | .062 | $\leq .08$ | $\leq .06$ |
| RMSEA 90% CI | [.053, .071] | — | — |

| Fit Index | Obtained Value | Acceptable Threshold | Excellent Threshold |
|-----------|----------------|----------------------|---------------------|
| SRMR | .045 | $\leq .08$ | $\leq .06$ |

Note. CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; IFI = Incremental Fit Index; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval; SRMR = Standardized Root Mean Square Residual.

The structural model demonstrated acceptable fit: $\chi^2/df=2.48$, CFI = .93, TLI = .92, IFI = .93, RMSEA = .062 (90% CI [.053, .071]), SRMR = .045. All fit indices met or exceeded recommended thresholds, indicating that the hypothesized model adequately represents the underlying data structure.

Direct Effects

Table 6 presents the standardized path coefficients for the structural model, along with standard errors, critical ratios, and significance levels.

Table 6: Standardized Path Coefficients for the Structural Model

| Path | β | SE | CR | pp | Result |
|---------------------------------|---------|-------|-------|--------|-----------|
| Personality → Self-Esteem | .52 | 0.045 | 11.56 | < .001 | Supported |
| Personality → Creative Thinking | .41 | 0.052 | 7.88 | < .001 | Supported |
| Self-Esteem → Creative Thinking | .39 | 0.048 | 8.12 | < .001 | |

Note. β = Standardized path coefficient; SE = Standard Error; CR = Critical Ratio.

Personality traits significantly predicted self-esteem ($\beta=.52, SE=0.045, CR=11.56, p<.001$), accounting for 27% of the variance in self-esteem ($R^2=.27$). Personality traits also directly predicted creative thinking ($\beta=.41, SE=0.052, CR=7.88, p<.001$). Furthermore, self-esteem significantly predicted creative thinking ($\beta=.39, SE=0.048, CR=8.12, p<.001$). Together, personality traits and self-esteem explained 48% of the variance in creative thinking ($R^2=.48$), indicating substantial explanatory power.

Mediation Analysis: The Role of Self-Esteem

To formally test the mediating role of self-esteem in the relationship between personality traits and creative thinking, bootstrapping with 5,000 resamples and bias-corrected 95% confidence intervals was employed (Preacher & Hayes, 2008). Table 7 presents the direct, indirect, and total effects.

Table 7: Direct, Indirect, and Total Effects with Bootstrapped Confidence Intervals

| Effect | β | SE | 95% CI (Lower) | 95% CI (Upper) | pp |
|--------------------------|---------|-------|----------------|----------------|--------|
| Direct Effect | .41 | 0.052 | .308 | .512 | < .001 |
| Indirect Effect (via SE) | .20 | 0.034 | .140 | .270 | < .001 |
| Total Effect | .61 | 0.058 | .498 | .722 | < |

Note. β = Standardized effect; SE = Standard Error; CI = Confidence Interval; SE = Self-Esteem. Bootstrap resamples = 5,000. Confidence intervals are bias-corrected at the 95% level.

The direct effect of personality traits on creative thinking remained significant after including self-esteem in the model ($\beta=.41, p<.001, 95\beta=.41, p<.001, 95$), indicating partial mediation. The indirect effect through self-esteem was also significant ($\beta=.20, p<.001, 95\beta=.20, p<.001, 95$), as the confidence interval did not include zero. The total effect of personality traits on creative thinking was $\beta=.61, p<.001, 95\beta=.61, p<.001, 95$. The proportion of the total effect mediated by self-esteem was approximately 33% ($.20/.61=.328, .20/.61=.328$), indicating that about one-third of the personality-creativity relationship operates through self-esteem.

Moderation Analysis: The Role of Gender

To examine whether gender moderates the structural relationships, multi-group SEM was conducted comparing female ($n=189$) and male ($n=189$) participants. First, an unconstrained (baseline) model allowing all paths to vary freely across groups was estimated. The baseline model demonstrated acceptable fit: $\chi^2/df=2.61, CFI=.91, RMSEA=.065$. Second, a constrained model forcing all three structural paths to be equal across groups was estimated. Table 8 presents the results of the chi-square difference tests.

Table 8: Chi-Square Difference Tests for Gender Moderation

| Model | χ^2 | df | $\Delta\chi^2$ | Δdf | pp |
|---------------------------------|----------|-----|----------------|-------------|--------|
| Unconstrained (Baseline) | 1245.63 | 477 | — | — | — |
| Fully Constrained (All Paths) | 1264.08 | 480 | 18.45 | 3 | < .001 |
| Path-Specific Constraints | | | | | |
| Personality → Self-Esteem | 1250.95 | 478 | 5.32 | 1 | < .05 |
| Personality → Creative Thinking | 1250.52 | 478 | 4.89 | 1 | < .05 |
| Self-Esteem → Creative Thinking | 1251.75 | 478 | 6.12 | 1 | |

The chi-square difference test revealed that constraining all paths to equality significantly worsened model fit: $\Delta\chi^2(3)=18.45, p<.001, \Delta\chi^2(3)=18.45, p<.001$, indicating that gender significantly moderates the overall model. To identify which specific paths differed significantly, each path was constrained individually and compared to the baseline model. All three path-specific constraints resulted in significant chi-square increases, indicating that each path differs significantly between women and men.

Table 9 presents the standardized path coefficients separately for women and men, along with the significance of gender differences.

Table 9: Standardized Path Coefficients by Gender with Moderation Tests

| Path | Women (n=189) | Men (n=189) | $\Delta\chi^2(1)$ | pp |
|---------------------------------|---------------|-------------|-------------------|-------|
| Personality → Self-Esteem | .58*** | .46*** | 5.32 | < .05 |
| Personality → Creative Thinking | .37*** | .45*** | 4.89 | < .05 |
| Self-Esteem → Creative Thinking | .44*** | .34*** | 6.12 | < .01 |

Note. *** $p < .001$. Coefficients are standardized path coefficients.

The path from personality traits to self-esteem was significantly stronger for women ($\beta = .58, p < .001$) than for men ($\beta = .46, p < .001$), $\Delta\chi^2(1) = 5.32, p < .05$. Similarly, the path from self-esteem to creative thinking was significantly stronger for women ($\beta = .44, p < .001$) than for men ($\beta = .34, p < .001$), $\Delta\chi^2(1) = 6.12, p < .01$. Conversely, the direct path from personality traits to creative thinking was significantly stronger for men ($\beta = .45, p < .001$) than for women ($\beta = .37, p < .001$), $\Delta\chi^2(1) = 4.89, p < .05$.

Table 10 presents the indirect effects and explained variances separately for women and men.

Table 10: Indirect Effects and Explained Variances by Gender

| Statistic | Women (n=189) | Men (n=189) |
|------------------------------------|---------------|--------------|
| Indirect Effect (via SE) | .25*** | .16*** |
| 95% CI for Indirect Effect | [.175, .335] | [.102, .228] |
| R ² (Self-Esteem) | .34 | .21 |
| R ² (Creative Thinking) | .52 | .43 |

Note. *** $p < .001$. SE = Self-Esteem. CI = Confidence Interval (bias-corrected, 5,000 bootstrap samples).

The indirect effect of personality traits on creative thinking through self-esteem was significantly stronger for women ($\beta_{\text{indirect}} = .25, p < .001$) than for men ($\beta_{\text{indirect}} = .16, p < .001$), as evidenced by non-overlapping confidence intervals. The model explained substantially more variance in both self-esteem ($R^2 = .34$) and creative thinking ($R^2 = .52$) for women than for men ($R^2 = .21$ and $R^2 = .43$).

Table 11: Summary of Hypothesis Testing Results

| Hypothesis | Path/Relationship | Result | Evidence |
|------------|---|-------------------------------|---|
| H1 | Personality → Creative Thinking | Supported | $\beta=.41, p<.001$ $\beta=.41, p<.001$ |
| | Openness → Creative Thinking | Supported | $r=.58, p<.001$ $r=.58, p<.001$ |
| | Neuroticism → Creative Thinking | Supported | $r=-.48, p<.001$ $r=-.48, p<.001$ |
| H2 | Personality → Self-Esteem → Creative Thinking | Supported (Partial Mediation) | Indirect $\beta=.20, p<.001$ $\beta=.20, p<.001$ 33% of total effect mediated |
| H3 | Gender Moderation | Supported | $\Delta\chi^2(3)=18.45, p<.001$ $\Delta\chi^2(3)=18.45, p<.001$ |
| | Personality → Self-Esteem (Women > Men) | Supported | $\beta_w=.58, \beta_m=.46, p<.05$ $\beta_w=.58, \beta_m=.46, p<.05$ |
| | Self-Esteem → Creativity (Women > Men) | Supported | $\beta_w=.44, \beta_m=.34, p<.01$ $\beta_w=.44, \beta_m=.34, p<.01$ |
| | Personality → Creativity (Men > Women) | Supported | $\beta_w=.37, \beta_m=.45, p<.05$ $\beta_w=.37, \beta_m=.45, p<.05$ |
| | Indirect Effect (Women > Men) | Supported | $\beta_w=.25, \beta_m=.16$ $\beta_w=.25, \beta_m=.16$ |

Summary of Key Findings

The main findings can be summarized as follows:

1. **Personality-Creativity Relationship:** Personality traits significantly predicted creative thinking, with openness to experience showing the strongest positive association and neuroticism showing a significant negative association, supporting Hypothesis 1.
2. **Mediating Role of Self-Esteem:** Self-esteem partially mediated the personality-creativity relationship, accounting for approximately 33% of the total effect, supporting Hypothesis 2.
3. **Moderating Role of Gender:** Gender significantly moderated all structural paths. The paths involving self-esteem (personality → self-esteem and self-esteem → creativity) were significantly stronger for women, while the direct path from personality to creativity was stronger for men. The indirect effect through self-esteem was also stronger for women, supporting Hypothesis 3.

4. **Explanatory Power:** The final model explained 48% of the variance in creative thinking overall, with substantially higher explained variance for women (52%) than for men (43%).

These results provide strong empirical support for the proposed moderated mediation model, demonstrating that self-esteem serves as a crucial mechanism linking personality to creativity and that this mechanism operates differently for women and men in the Iranian cultural context.

Discussion

The present study aimed to investigate the mediating role of self-esteem in the relationship between Big Five personality traits and creative thinking, with a particular focus on the moderating role of gender within the cultural context of Iranian university students. Building upon theoretical frameworks from personality psychology, self-concept research, and creativity studies, we proposed and tested a moderated mediation model. The findings provided strong support for the hypothesized relationships: personality traits significantly predicted creative thinking, self-esteem partially mediated this relationship, and gender significantly moderated all structural paths. These results offer several important theoretical and practical implications, which are discussed in detail below.

Interpretation of Findings

Personality Traits and Creative Thinking

Consistent with Hypothesis 1 and a substantial body of previous research (Feist, 1998; Grajzel, 2023; McCrae, 1987), personality traits demonstrated significant associations with creative thinking. Openness to experience emerged as the strongest positive predictor, with a correlation of $r=.58$ with total creative thinking and a standardized regression coefficient of $\beta=.29$ in the multiple regression analysis. This finding aligns with the conceptualization of openness as encompassing intellectual curiosity, aesthetic sensitivity, active imagination, and cognitive flexibility—all dispositions that naturally facilitate divergent thinking and novel idea generation (DeYoung, 2024; McCrae & Costa, 2003). Individuals high in openness are intrinsically motivated to explore new ideas, entertain unconventional possibilities, and engage with complexity, making them particularly predisposed to creative thought (Kaufman & Gregoire, 2022).

Neuroticism showed a significant negative association with creative thinking ($r=-.48, \beta=-.21$), consistent with theoretical expectations and empirical evidence (Zhao et al., 2023; Widiger & Oltmanns, 2024). The cognitive and emotional characteristics of neuroticism—including heightened anxiety, fear of negative evaluation, attentional bias toward threat, and difficulties in emotion regulation—likely impede the cognitive risk-taking and psychological safety required for creative expression (Benedek et al., 2022). When individuals are preoccupied with worries about potential failure or social judgment, cognitive resources are diverted from the flexible, exploratory thinking processes essential for creativity (Smith & Johnson, 2023).

Extraversion, conscientiousness, and agreeableness also demonstrated significant positive associations with creative thinking, albeit with smaller effect sizes. Extraversion likely facilitates creativity through increased social engagement, exposure to diverse perspectives, and positive affectivity (Karwowski et al., 2023). Conscientiousness may contribute to creativity through the persistence and self-discipline required to develop and refine ideas, even if its structured nature may sometimes constrain initial idea generation (Zhao, 2022). Agreeableness may facilitate creativity in collaborative contexts, though its association with conformity could potentially limit certain forms of creative expression (Habashi et al., 2023). The modest effect sizes for these dimensions are consistent with meta-analytic findings (Grajzel, 2023) and underscore the primacy of openness in the personality-creativity nexus.

The Mediating Role of Self-Esteem

A central contribution of this study is the empirical demonstration that self-esteem partially mediates the personality-creativity relationship, supporting Hypothesis 2. The indirect effect through self-esteem ($\beta=.20$) accounted for approximately 33% of the total effect of personality on creative thinking, indicating that a substantial portion of personality's influence operates through individuals' global self-evaluations. This finding extends previous research on self-esteem as a mediating mechanism (Fang et al., 2023; Hu et al., 2023) and provides theoretical clarity regarding *how* personality traits translate into creative outcomes.

The mediation pathway can be understood through multiple complementary theoretical lenses. From a socio-cognitive perspective, personality traits shape individuals' cumulative experiences of success and failure across various life domains (Orth & Robins, 2023). Individuals high in adaptive traits like openness and extraversion are more likely to seek novel experiences, receive positive social feedback, and accumulate achievements—experiences that foster positive self-evaluations (Erol & Orth, 2023). Conversely, individuals high in neuroticism tend to interpret experiences negatively, internalize failures, and develop diminished self-worth (Amestoy et al., 2023). These cultivated self-evaluations, in turn, influence creative expression through multiple mechanisms.

High self-esteem individuals possess greater cognitive risk-taking capacity, persisting in the face of ambiguity and potential failure—conditions inherent to creative endeavors (Nakagawa, 2023). They are less deterred by fear of social judgment, enabling them to express unconventional ideas without self-censorship (Orth & Robins, 2022). Furthermore, self-esteem contributes to effective emotion regulation, reducing the anxiety that otherwise consumes cognitive resources needed for flexible, divergent thinking (Smith & Johnson, 2023). The experience of self-worth provides a psychological safety net that emboldens individuals to explore, experiment, and express ideas that deviate from conventional norms.

The finding of partial, rather than full, mediation indicates that personality traits also influence creativity through pathways independent of self-esteem. These may include direct cognitive mechanisms such as working memory capacity, associative fluency, and cognitive flexibility, which are partially heritable and directly linked to brain networks involved in creative cognition (Beaty et al., 2023). Personality may also influence creativity through motivational pathways,

such as intrinsic motivation and domain-specific interests, that operate independently of global self-evaluations (Hennessey & Amabile, 2022).

The Moderating Role of Gender

Perhaps the most novel and theoretically significant finding of this study is the demonstration that gender significantly moderates all structural paths in the model, providing strong support for Hypothesis 3. The pathways involving self-esteem—from personality to self-esteem and from self-esteem to creative thinking—were significantly stronger for women, while the direct path from personality to creative thinking was significantly stronger for men. Moreover, the indirect effect through self-esteem was substantially larger for women ($\beta=.25$) than for men ($\beta=.16$), and the model explained considerably more variance in both self-esteem (34% vs. 21%) and creative thinking (52% vs. 43%) for women.

These gender differences can be interpreted through the lens of social role theory (Eagly & Wood, 2013) and the specific cultural context of Iran. In many traditional societies, including Iran, gender norms prescribe distinct patterns of behavior, self-expression, and social evaluation for men and women (Ghaderi et al., 2024; Javidan & Dastmalchian, 2023). Men are typically socialized to be assertive, independent, and intellectually risk-taking—qualities that align with the direct expression of personality traits in creative behavior. They may receive greater social sanction for novelty-seeking, non-conformity, and intellectual exploration, allowing their dispositional tendencies to manifest more directly in creative output.

Women, conversely, often face stronger normative pressures toward modesty, conformity, and social harmony (Soozandehfar & Adeli, 2023). They may be subject to more stringent evaluation of their behavior and greater social costs for deviating from conventional expectations. In such contexts, self-esteem may serve as a critical psychological resource that enables women to overcome these external barriers. Women with high self-esteem may be better equipped to resist normative pressures, tolerate potential social disapproval, and persist in creative expression despite cultural constraints. For women, the journey from personality to creativity appears to require passing through the gateway of self-worth—a mechanism that is less critical for men, who enjoy greater social latitude for direct expression of their dispositional tendencies.

This interpretation is consistent with previous research suggesting that self-esteem plays a more prominent role in women's psychological functioning across various domains (Orth & Robins, 2022; Skorek et al., 2014). It also aligns with evidence that women's creative expression is more sensitive to contextual factors such as evaluation apprehension and social support (Baas et al., 2023; Pérez-Luño et al., 2024). The stronger path from personality to self-esteem among women suggests that their self-worth is more contingent on the successful expression of adaptive personality traits—perhaps because social validation for these traits is less readily available to women than to men.

The finding that the direct path from personality to creativity is stronger for men indicates that men's creative behavior may be more directly driven by dispositional tendencies, with less mediation through self-evaluative processes. This could reflect greater social permission for men

to act on their impulses and interests without extensive internal negotiation about social acceptability. It may also indicate that men's self-esteem is less contingent on creative expression or that they have alternative avenues for validating their creative potential.

Integration with the Iranian Cultural Context

The findings must be understood within the specific cultural context of Iran—a society characterized by a complex interplay between traditional values and modernizing influences (Javidan & Dastmalchian, 2023). Despite significant educational advancements and increasing female participation in higher education, traditional gender norms remain influential in shaping expectations, opportunities, and self-perceptions (Ghaderi et al., 2024). Iranian women often navigate a dual burden: they are encouraged to pursue education and professional achievement while simultaneously expected to conform to traditional roles and maintain family honor (Soozandehfar & Adeli, 2023).

In such a context, the stronger reliance on self-esteem for women's creativity is both understandable and concerning. It suggests that women's creative potential may be more vulnerable to erosion when self-esteem is compromised—whether through negative feedback, social rejection, or internalized doubts. Educational and familial environments that fail to nurture girls' self-worth may inadvertently suppress their creative development, even when they possess favorable personality dispositions. Conversely, interventions that successfully enhance self-esteem among female students may have particularly pronounced effects on unlocking their creative potential.

The findings also reflect the broader cultural transition occurring in contemporary Iran. As younger generations increasingly question traditional gender roles and seek greater autonomy, the dynamics observed in this study may evolve. Longitudinal research would be valuable to track whether the gender differences in mediation patterns diminish over time as societal norms continue to shift.

Theoretical Contributions

This study makes several important contributions to the theoretical literature. First, it extends the predominantly Western-centric research on personality and creativity to a non-Western, collectivist cultural context, demonstrating the generalizability of core theoretical relationships while revealing culturally specific patterns of moderation. The finding that openness remains the strongest predictor of creativity across cultural contexts reinforces its status as a universal dispositional determinant of creative potential (Grajzel, 2023).

Second, the study advances understanding of mediating mechanisms in the personality-creativity relationship. By demonstrating that self-esteem accounts for a substantial portion (33%) of personality's influence, the findings elucidate one critical pathway through which dispositional tendencies translate into creative outcomes. This contributes to the growing literature on psychological resources as explanatory mechanisms in personality-outcome relationships (Orth & Robins, 2023; Smith & Johnson, 2023).

Third, the study provides a theoretically grounded and empirically supported model of moderated mediation, demonstrating that the strength of mediating pathways can vary substantially across population subgroups. This highlights the importance of examining conditional effects rather than assuming uniformity of psychological processes across genders, cultures, or other social categories.

Fourth, by integrating insights from personality psychology, self-concept research, and gender studies within a specific cultural context, the study exemplifies the value of contextualized, interdisciplinary approaches to understanding complex psychological phenomena. It demonstrates that universal psychological processes are always embedded in, and modulated by, specific sociocultural contexts.

Practical Implications

The findings carry several important practical implications for educators, counselors, and policymakers concerned with fostering creativity in higher education, particularly in cultural contexts similar to Iran.

Targeted Interventions for Self-Esteem Enhancement. * Given the critical mediating role of self-esteem—especially for women—interventions aimed at enhancing self-esteem should be a priority in university counseling centers and educational programs. Such interventions might include:

- **Cognitive-behavioral workshops** focused on identifying and challenging negative self-evaluations, developing realistic self-appraisals, and building resilience to criticism (Nakagawa, 2023).
- **Self-compassion training** that helps students, particularly women, develop kinder, more accepting attitudes toward themselves and their creative efforts (Neff & Knox, 2023).
- **Achievement recognition programs** that systematically acknowledge and celebrate students' creative accomplishments, providing external validation that can internalize into enhanced self-worth.
- **Mentorship programs** pairing female students with successful women in creative fields who can model confident creative expression and provide supportive guidance.

***Creating Supportive Educational Environments.** * Educational institutions should actively work to create environments that reduce the psychological barriers to creative expression, particularly for female students:

- **Reducing evaluation apprehension** by incorporating low-stakes creative activities, providing constructive feedback focused on improvement rather than judgment, and normalizing failure as part of the creative process (Hennessey & Amabile, 2022).
- **Establishing safe spaces** such as creativity clubs, idea incubators, and peer support groups where students can experiment with ideas without fear of formal evaluation or social judgment.

- **Training faculty** to recognize and mitigate unconscious gender biases in their interactions with and evaluations of students, ensuring that female students receive equitable encouragement and support for creative expression.

Curriculum Development

Curriculum designers should consider incorporating elements specifically aimed at fostering the psychological precursors of creativity:

- **Courses or modules on self-awareness and personal development** that help students understand the connections between self-perception and creative expression.
- **Explicit instruction in cognitive skills** that underpin creativity, such as divergent thinking, perspective-taking, and idea combination, while simultaneously addressing the emotional and self-evaluative barriers to their application.
- **Project-based learning opportunities** that allow students to experience the full creative process—from idea generation to implementation—in supportive, collaborative contexts.

Addressing Gender Norms

At a broader societal level, interventions aimed at shifting restrictive gender norms may be necessary to fully unlock women's creative potential:

- **Public awareness campaigns** highlighting women's creative achievements and challenging stereotypes about gender and creativity.
- **Media representations** that portray diverse models of female creativity, countering narrow images that may limit girls' creative aspirations.
- **Family and community engagement** programs that help parents and community members understand the value of supporting girls' creative development and the costs of restrictive gender socialization.

Limitations and Future Directions

While this study offers important contributions, several limitations should be acknowledged, which also suggest directions for future research.

Cross-Sectional Design

The cross-sectional nature of the data precludes definitive causal conclusions. Although the proposed temporal ordering (personality → self-esteem → creativity) is theoretically grounded, alternative directional pathways are possible. For instance, creative success may enhance self-esteem, and elevated self-esteem may influence personality expression. Longitudinal research tracking these variables over time is needed to establish causal precedence and examine reciprocal dynamics. Experimental studies manipulating self-esteem and observing effects on creative performance would provide stronger causal evidence.

Self-Report Measures

Personality and self-esteem were assessed via self-report questionnaires, which are subject to social desirability bias, response sets, and limitations in self-awareness. Future studies might incorporate informant reports, behavioral measures, or implicit association tests to complement self-report data. The TTCT, while a performance-based measure of creativity, assesses creative potential rather than real-world creative achievement; incorporating measures of actual creative accomplishments would enhance ecological validity.

Sample Characteristics

The sample was limited to undergraduate students from a single university in Tehran, potentially limiting generalizability to other populations (e.g., graduate students, non-students, individuals from other regions of Iran, or other cultural contexts). Replication with more diverse samples, including clinical populations and individuals from different socioeconomic backgrounds, would test the robustness of the findings. Cross-cultural comparative studies directly comparing Iranian samples with those from other Middle Eastern or Western countries would illuminate the specific role of cultural factors.

Unmeasured Variables

The model explained 48% of the variance in creative thinking, indicating that other important predictors were not included. Future research might incorporate additional mediating mechanisms, such as cognitive flexibility (Zhang & Ziegler, 2022), intrinsic motivation (Hennessey & Amabile, 2022), creative self-efficacy (Fino et al., 2022), or environmental factors such as family support, educational quality, and cultural capital. The inclusion of biological measures (e.g., genetic markers, brain imaging) could further elucidate the neurobiological underpinnings of the observed relationships.

Measurement of Gender

Gender was operationalized as a binary variable (male/female) based on self-report, which does not capture the full spectrum of gender identity and may essentialize gender differences. Future research should consider more nuanced conceptualizations of gender, including gender roles, gender identity, and the intersection of gender with other social categories such as ethnicity, social class, and religiosity.

Depth of Cultural Analysis

While the findings were interpreted within the Iranian cultural context, the study did not directly measure cultural variables such as individualism-collectivism, gender role attitudes, or perceived social norms. Future research should incorporate explicit measures of these cultural dimensions to test their moderating effects directly rather than inferring them from group differences.

Potential for Bidirectional Relationships

The mediation model assumes unidirectional effects from personality to self-esteem to creativity. However, reciprocal relationships are plausible: creative achievement may enhance self-esteem, and elevated self-esteem may lead to personality changes over time (Orth & Robins, 2023). Longitudinal designs with multiple waves and cross-lagged panel analyses would help disentangle these complex dynamics.

Conclusion

This study investigated the mediating role of self-esteem in the relationship between Big Five personality traits and creative thinking, examining gender as a moderator within the cultural context of Iranian university students. The findings demonstrate that personality traits—particularly openness to experience and neuroticism—significantly predict creative thinking, with self-esteem accounting for approximately one-third of this relationship. Critically, gender moderates all structural paths: the mediating role of self-esteem is substantially stronger for women, while the direct path from personality to creativity is stronger for men.

These results advance theoretical understanding by elucidating *how* personality influences creativity (through self-esteem) and *for whom* these processes operate differently (women versus men). They highlight the importance of considering both universal psychological mechanisms and culturally specific moderating factors in understanding complex human capacities like creativity. The findings carry significant practical implications, suggesting that interventions aimed at enhancing self-esteem may be particularly effective for fostering creativity among female students in cultural contexts with traditional gender norms.

Ultimately, this study underscores that creativity is not merely a cognitive capacity or dispositional tendency but a psychologically complex phenomenon embedded in social and cultural contexts. Realizing the creative potential of all individuals—regardless of gender—requires not only understanding the psychological mechanisms involved but also actively working to create social environments that support and value creative expression. In a world increasingly dependent on innovation to address complex challenges, such understanding and action are not merely academic pursuits but pressing social necessities.

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