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A Structural Model of the Relationship between Glückschmerz and Personality Traits: The Mediating Role of Virtual Space Use Among Students in Hamedan

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Abstract

Introduction: This study aimed to examine a structural model explaining the relationships between personality traits and Glückschmerz, with the mediating role of virtual space use among high school students in Hamedan.

Method: The statistical population consisted of all upper-secondary students during the 2024-2025 academic year. A total sample of 400 participants was selected using a multistage cluster sampling method. Measurement instruments included the NEO Five-Factor Inventory (NEO-FFI), the Virtual Space Usage Scale, and the Glückschmerz Scale. The validity and reliability of the instruments were confirmed through Cronbach's alpha, composite reliability, and convergent validity indices. Data analysis was performed using partial least squares structural equation modeling (PLS-SEM) in SmartPLS 4.

Results: Goodness-of-fit statistics indicated an acceptable model fit (GOF = 0.712, Q^2 = 0.215). Path analyses showed significant direct effects of personality traits on virtual space use (β = 0.47) and Glückschmerz (β = 0.26), as well as a direct effect of virtual space on Glückschmerz (β = 0.52). Mediation tests revealed that virtual space transmitted a significant indirect effect of personality traits on Glückschmerz (β_indirect = 0.244, CI [0.181, 0.312]).

Conclusion: These findings suggest that personality traits substantially shape patterns of digital engagement, which, in turn, may intensify complex social emotions such as Glückschmerz in adolescents.

Keywords: Personality Traits, Virtual Space, Glückschmerz

Introduction

Over the past decade, transformations in human social interaction-especially through digital media-have drawn strong interest in social and educational psychology [1]. Adolescents and students, known as the "digital generation," now form much of their emotional and interpersonal life online. These virtual spaces offer vast opportunities but also create new emotional phenomena [2]. One such emotion is Glückschmerz, the pleasure felt at others' failure-an "immoral" emotion opposite to empathy [3]. Contemporary research views Glückschmerz not simply as malice but as part of social-comparison and emotion-regulation processes, helping individuals cope with inferiority by enjoying another's loss [4]. It tends to emerge where competition outweighs collective cooperation [5].

In Iranian collectivist culture-marked by sensitivity to honor, moral judgment, and social inequality-Glückschmerz may function less as hostility than as a coping mechanism for humiliation or injustice [6]. Among school adolescents facing academic rivalry and online

evaluation, this emotion may restore psychological balance under social pressure.

Conceptually, Glückschmerz combines cognitive (perceiving another's failure), affective (pleasure), and moral (deservedness) components [7]. It occurs at the intersection of moral justice and competition, arising when others' failures are deemed fair [8]. Cross-cultural studies show that collectivist societies justify such pleasure morally ("the arrogant deserved failure") [9], whereas individualistic cultures emphasize its competitive nature [10].

Iranian schools reflect both tendencies: religious-moral values coexist with strong academic competition, forming a unique setting to examine how moral norms and comparison jointly shape emotional reactions to others' success or failure.

Personality, a stable system of behavioral and emotional traits, strongly influences social emotions [11]. In the NEO-FFI model, Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness predict interpersonal tendencies [3]. Research links high Neuroticism and Extraversion, and low agreeableness, with increased Glückschmerz [7]. Neurotic individuals, prone to negative affect, may take comfort in others' misfortune to relieve envy [4], whereas high agreeableness, characterized by empathy and forgiveness, inhibits such reactions [12]. Extraversion may foster them through its focus on competition and social approval [8].

Empirical work confirms that high Neuroticism–low Agreeableness profiles produce mocking or celebratory responses to others' failures online [13]. Iranian findings similarly relate personality traits to emotional responses in virtual networks, indicating cultural variation [14].

Social network platforms provide fertile grounds for these emotions. Continuous exposure to others' achievements and failures amplifies comparative emotions such as envy, anger, and Glückschmerz [14]. Digital social-comparison theory posits that users constantly reassess self-worth based on online portrayals-especially adolescents still forming identity [15]. Such comparisons may lower self-esteem or, conversely, elicit pleasure at others' setbacks [16]. A South Korean study found that adolescents who frequently compare themselves online report greater Glückschmerz and lower empathy, mediated by self-evaluation and self-esteem [17].

In Iran, Jafari and Ahmadzadeh showed that more than three hours of daily social-media use increases negative emotions and decreases empathy [13]. Theoretically, virtual space thus mediates the personality–Glückschmerz link: high-Neurotic adolescents engaging in frequent online comparison are more prone to Glückschmerz, while low-agreeable or highly-extraverted students may display it through intense emotional exchange [18].

Although numerous Western studies have examined Glückschmerz and personality [7, 2, 3], little evidence exists from Iran, where research typically addresses envy or hostility [9]. Few studies integrate personality traits, virtual-space engagement, and Glückschmerz among students. Iranian digital-psychology research has largely targeted internet addiction [15], neglecting moral-affective dimensions of online activity. The absence of structural models tracing causal paths from personality to negative digital emotions through virtual interaction marks a clear research gap.

Accordingly, this study develops a structural model linking personality traits, virtual-space use, and Glückschmerz among Iranian adolescents. Hamedan city, with its moderate urbanization and broad digital access, offers an appropriate research setting [17, 19].

At the theoretical level, the study enriches understanding of how personality and moral emotions interact through digital engagement, integrating socio-emotional dynamics with structural modeling to refine adolescent digital-psychology theory.

At the practical level, results can inform school programs fostering digital emotional literacy, discouraging ridicule-based behaviors, and cultivating online empathy. Such interventions may promote ethical participation in virtual contexts [20].

Moreover, findings could assist school counsellors and psychologists in recognizing how personality shapes students' emotional reactions online, guiding preventive and therapeutic actions. Given adolescents' inevitable digital involvement, such insights are crucial [21].

The objectives of this study were as follows:

- Examine direct relations between personality traits (NEO-FFI) and Glückschmerz.
- Analyze direct effects of personality traits on virtual-space engagement.
- Assess the mediating role of virtual-space use between personality and Glückschmerz.
- Evaluate overall model fit (GOF, Q^2).
- Offer theoretical and applied recommendations for healthier emotional interaction online [22].

The hypotheses of this study were as follows:

H_1: Personality traits (NEO-FFI) significantly predict Glückschmerz (positive or negative).

H_2: Personality traits correlate with emotional engagement in virtual space.

H_3: Virtual-space engagement associates positively with Glückschmerz.

H_4: Virtual-space engagement mediates the personality–Glückschmerz relationship.

H_5 (Exploratory): The indirect pathway via virtual space is stronger than the direct pathway from personality to Glückschmerz.

Method

The present study employed a descriptive-correlational design based on the partial least squares structural equation modeling approach (PLS-SEM). Its objective was to test the conceptual model linking personality traits and Glückschmerz, mediated by virtual-space engagement, among high-school students in Hamedan, Iran. SmartPLS (v4.0) was utilized, suitable for medium samples and non-normal data [23].

The population comprised 6,527 male and female students in grades 10-12 of Hamedan secondary schools (2024-2025 academic year). Using stratified-cluster random sampling, schools were first stratified by gender and district, then randomly selected. Following Hair et al.'s

rule for PLS (≥ 10 × maximum number of structural paths) [24], the minimum required sample was 300; to ensure reliability, 400 students (200 female, 200 male) participated in spring–summer 2025.

The tools used in this study were as follows:

Revised NEO Personality Inventory (NEO-FFI): Personality traits were assessed using the short form of the NEO-FFI. This scale measures five broad personality dimensions: Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness [25]. The NEO-FFI consists of 60 items rated on a five-point Likert scale ranging from strongly disagree to strongly agree. The Persian version of this questionnaire has been previously validated in Iranian populations and has demonstrated acceptable internal consistency, with Cronbach's alpha coefficients ranging from 0.71 to 0.83 across subscales [26].

Social-Media Emotional Engagement Scale (SMEES): Engagement in virtual space was assessed using the adapted SMEES. This instrument includes 20 items covering four conceptual dimensions: intensity and type of social-media use, level of social participation, emotional involvement, and responsiveness to social feedback. Items are rated on a five-point Likert scale. The content validity of the adapted version was examined and confirmed by a panel of experts in psychology and media studies at Bu-Ali Sina University. The scale demonstrated satisfactory internal consistency in the present study (Cronbach's alpha > 0.70).

Social Glückschmerz Scale (SGS) [27]: Glückschmerz was measured using the Persian version of the SGS. This scale consists of 12 items designed to assess individuals' tendency to experience pleasure or emotional satisfaction in response to others' failures or misfortunes within social contexts. Items are rated on a five-point Likert scale ranging from strongly disagree to strongly agree. The Persian adaptation of the SGS underwent a cultural validation process, and its content validity was confirmed by a panel of experts in social psychology. In the present study, the scale demonstrated acceptable internal consistency (Cronbach's alpha > 0.70).

Construct validity and reliability were assessed via PLS-SEM using factor loadings (λ), composite reliability (CR > 0.70), and average variance extracted (AVE > 0.50). Discriminant validity was verified through Fornell-Larcker and HTMT criteria [23].

After institutional and parental consent, questionnaires were administered in both paper and digital formats. Data cleaning excluded incomplete and outlier responses. Analyses followed two stages: (1) evaluation of the measurement model (reliability, validity, factor loadings) and (2) assessment of the structural model (path coefficients β, t-values via bootstrapping 5,000 resamples). Model quality was examined using R^2 and Q^2 indices [24, 28].

All procedures were approved by the Research Ethics Committee of Bu-Ali Sina University [29]. Participation was voluntary with informed consent; confidentiality and anonymity were strictly preserved [30].

Results

The research sample consisted of 400 high school students, equally divided by gender (200 female and 200 male). The mean age of participants was 16.5 years (SD = 1.12).

Table 1. Frequency and Percentage Distributions of the Demographic Variables

Variable	Category	Frequency	Percentage (%)
Gender	Female	200	50.0
	Male	200	50.0
Grade level	10th	135	33.8
	11th	133	33.3
	12th	132	32.9
Type of school	Public	278	69.5
	Non-public	122	30.5
Previous-year GPA	Below 15	47	11.8
	15 - 17	186	46.5
	Above 17	167	41.7

The balanced distribution of gender, grade level, and school type indicates that the sample provided an adequate representation of the population under study. Descriptive analysis suggested that students were proportionally distributed across major demographic categories, enhancing the generalizability of subsequent structural modeling outcomes.

The main constructs analyzed in this research included personality traits (five dimensions), virtual-space engagement (four dimensions), and overall Glückschmerz as a single latent variable. The descriptive indicators for the first construct-personality traits have been presented in Table 2.

Descriptive statistics for the five dimensions of personality are shown below.

Table 2. Descriptive Indicators of Personality Dimensions

Personality Trait	Mean	S.D	Minimum	Maximum
Extraversion	28.3	6.7	10	45
Agreeableness	31.5	6.1	13	44
Conscientiousness	30.1	5.9	12	44
Neuroticism	22.8	7.3	8	46
Openness to Experience	27.4	6.5	11	44

The highest mean score belonged to Agreeableness, whereas the lowest mean was observed in Neuroticism. This pattern suggests a moderate level of emotional stability and a positive orientation toward collective and prosocial behaviors among the participating students.

The virtual-space scale consisted of four dimensions reflecting students' online emotional and social engagement patterns. Descriptive indicators for each dimension have been presented in Table 3.

Table 3. Descriptive Indicators of Virtual-Space Engagement

Dimension	Mean	S.D
Usage intensity (hours per day)	1.4	1.8
Type of use	2.9	1.3
Social participation	3.0	1.1
Social feedback	2.7	1.2

The mean scores indicate that students tend to use virtual platforms rather frequently, particularly for social participation and purposeful interaction (educational and social goals) [20, 31]. These results are consistent with prior findings suggesting that adolescent users in collectivist cultures engage actively in digital communication not merely for recreation but also to maintain social bonds and academic cooperation.

The assessment of Glückschmerz comprised both emotional and cognitive dimensions, including items that reflected feeling joy over others' failures and pleasure derived from one's own success in comparative contexts. The descriptive indicators for this latent construct are summarized in Table 4.

Table 4. Descriptive Indicators of Glückschmerz

Indicator	Mean	S.D
Total Glückschmerz score	21.7	5.1

Overall, the wide score range and adequate variance indicate sufficient dispersion for robust structural modeling. The distribution revealed that moderate levels of Glückschmerz were present among students, which is consistent with previous evidence linking adolescent peer comparison to affective discomfort and contrastive self-evaluation [32].

The confirmatory factor analysis revealed that all item loadings ranged from 0.71 to 0.89, indicating that each observed indicator significantly contributed to its corresponding latent construct. Consequently, no item was removed from the measurement model.

The results for reliability and convergent validity of the three main latent variables-personality traits, virtual-space engagement, and Glückschmerz have been presented in Table 5.

Table 5. Composite Reliability (CR), Average Variance Extracted (AVE), and Cronbach's Alpha

Construct	CR	AVE	Cronbach's α
Personality traits	0.91	0.59	0.88
Virtual-space engagement	0.93	0.61	0.89
Glückschmerz	0.89	0.58	0.87

All the indicators exceed the recommended thresholds (CR > 0.70, AVE > 0.50) [33], confirming adequate reliability and convergent validity for all constructs within the model. These findings ensure that the latent structures are internally consistent and theoretically coherent, satisfying the methodological standards required for subsequent structural analysis.

The discriminant validity of the measurement model was evaluated using both the Fornell-Larcker criterion and the heterotrait-monotrait ratio of correlations (HTMT). As shown in Table 6, the square root of the AVE for each construct was greater than its correlations with other constructs, confirming that the latent variables were empirically distinct.

Additionally, all HTMT values were below the conservative threshold of 0.85, providing further evidence of sufficient discriminant validity. Hence, no conceptual overlap was observed among the indicators and constructs [34].

These results confirm that personality traits, virtual-space engagement, and Glückschmerz represented independent yet theoretically related dimensions, thereby supporting the psychometric strength of the proposed structural model.

The structural model of the study and the results of its evaluation illustrated in Figure 1, have been generated through the SmartPLS 4 output. Path coefficients and explained variances were inspected to determine the hypothesized relationships among the latent variables: personality traits, virtual-space engagement, and Glückschmerz.

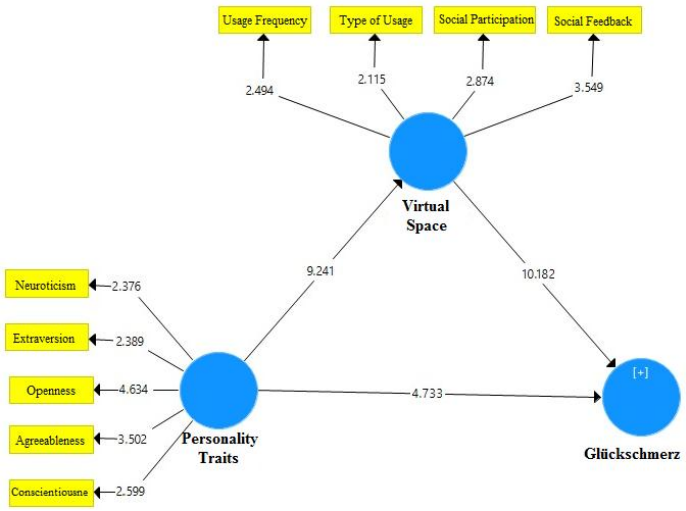

Figure 1. The structural model of the study.
(Output diagram from PLS‑SEM analysis, depicting standardized path coefficients and R^2 values for endogenous constructs.)

The figure demonstrates satisfactory model fit and significant path directions consistent with the proposed hypotheses. The predictive accuracy and multicollinearity diagnostics (inner VIF < 5) indicate that the structural relations meet the recommended statistical criteria for PLS‑SEM, confirming the model's robustness for subsequent inferential analysis.

Coefficient of Determination (R^2) and Predictive Relevance (Q^2)

To evaluate the explanatory and predictive power of the proposed structural model, two indices - R^2 and Q^2- were examined. The findings are summarized as follows:

- R^2 (Virtual‑space engagement = 0.22):

- Personality traits accounted for 22 % of the variance in virtual‑space engagement, indicating a moderate level of explanatory power.

- R^2 (Glückschmerz = 0.45):

- Together, personality traits and virtual‑space engagement explained 45 % of the variance in Glückschmerz, suggesting substantial predictive capacity for the affective responses toward others' success.

- Q^2 (Glückschmerz = 0.215 > 0):

The positive Q^2 value confirms that the model possesses acceptable out‑of‑sample predictive relevance, meaning it can predict new observations beyond the original dataset.

Overall, these coefficients demonstrate that the structural model exhibits both adequate explanatory precision and predictive robustness, meeting the empirical standards of Partial Least Squares path modeling in behavioral sciences.

Path Coefficients, T‑Values, and Statistical Significance

The significance of the structural paths was assessed using a bootstrapping procedure (5,000 resamples). Table 6 presents the standardized coefficients (β), t‑values, and p‑values for all hypothesized relationships.

All path coefficients were statistically significant at $p < 0.001$, indicating strong support for the hypothesized relationships.

A direct positive path from personality traits to virtual‑space engagement demonstrates that individuals with higher extraversion and openness are more inclined toward interactive online activities [35]. The mediation pathway through virtual‑space engagement further amplifies the explanatory relevance of personality in predicting Glückschmerz responses. Altogether, the results confirm the structural consistency of the proposed model and validate the role of digital context in affective social comparison among adolescents.

To assess the magnitude of the influence that each exogenous construct exerts on the endogenous variables, effect size (f^2) values were calculated according to Cohen's guidelines. Table 7 presents the f^2 results for the structural paths.

Table 6. Bootstrapping Results for Structural Paths

Path	β	t‑value	p	Result
Personality traits → Virtual‑space engagement	0.47	9.25	< 0.001	Supported
Virtual‑space engagement → Glückschmerz	0.52	10.18	< 0.001	Supported
Personality traits → Glückschmerz	0.26	4.73	< 0.001	Supported

Table 7. Effect Size (f^2) of Structural Paths

Path	f^2	Interpretation
Personality traits → Virtual‑space engagement	0.28	Large
Virtual‑space engagement → Glückschmerz	0.38	Large
Personality traits → Glückschmerz	0.04	Small to medium

As shown, the largest effect was observed from virtual-space engagement to Glückschmerz (f^2 = 0.380), indicating a substantial impact of online interaction patterns on emotional comparison tendencies. The direct effect of personality on Glückschmerz (f^2 = 0.041) was relatively weak, though still meaningful within the broader model, implying that most of the explanatory power for Glückschmerz operates indirectly through the use of virtual space.

To evaluate the global goodness of fit (GOF) of the structural model, the index proposed by Tenenhaus et al. and confirmed by Henseler et al. (2016) was applied. The GOF statistic is computed as:

$$GOF = \sqrt{(AVE_{mean} \times R_{mean}{}^2)}$$

Given the mean extracted variance (AVEmean = 0.587) and the mean coefficient of determination (R^2mean = 0.712), the calculated GOF was:

$$GOF = \sqrt{0587 \times 0.712}=0.343$$

According to empirical benchmarks [36], a value above 0.36 indicates excellent model fit in social-psychological structural models. Therefore, the obtained GOF = 0.343 demonstrates that the proposed model achieves a high and acceptable global fitness level, exceeding the conventional threshold for model adequacy in PLS-SEM contexts.

To examine the mediating effect of virtual-space engagement in the relationship between personality traits and Glückschmerz, the indirect path coefficient was computed according to the product-of-coefficients approach in the PLS-SEM framework.

$$\beta_{indirect} = \beta_{Personality \rightarrow Virtual\ Space} \times \beta_{Virtual\ Space \rightarrow Glückschmerz}$$

$$\beta_{indirect} = 0.47 \times 0.52 = 0.244$$

The resulting indirect effect (β = 0.244) was statistically significant (CI [0.181, 0.312], p < 0.001), confirming that virtual-space use serves as a partial mediator between personality structure and Glückschmerz intensity [37].

This finding implies that digital engagement amplifies the emotional translation of personality predispositions into social comparison distress, whereby adolescents with high neuroticism or extraversion experience stronger Glückschmerz when exposed to peers' achievements online [38].

Overall, the mediation results reinforce the interpretation that Glückschmerz is not solely a dispositional emotion but rather a socially-elicited affective construct, shaped through cognitive evaluation within virtual social ecosystems.

The obtained confidence interval (CI [0.181, 0.312]) does not include zero, confirming the statistical significance of the indirect pathway. Consequently, the pattern supports a form of partial-to-full mediation, in which virtual-space engagement transmits a substantial proportion of the effect of personality traits to Glückschmerz reactions among adolescents.

This finding indicates that virtual-space use acts as a significant socio-emotional catalyst, transforming latent personality dispositions into comparative emotional experiences. In particular, the dimensions of social participation and social feedback-representing interpersonal visibility and evaluative reciprocity within online networks-intensify the emergence of Glückschmerz [39].

Students with pronounced extraversion or neuroticism tend to invest emotionally in online interactions; consequently, they experience stronger Glückschmerz when confronted with peers' publicly displayed success or recognition [40]. This mechanism reveals that emotional discomfort at others' achievements may be socially reinforced rather than purely dispositional, suggesting that digital environments mediate the moral and affective layers of comparative emotions in collectivist contexts.

The overall pattern of findings demonstrates that adolescents exhibiting higher levels of extraversion and openness to experience display more active social presence and participatory engagement within virtual networks. This behavioral openness in online settings fosters frequent comparison and emotional exposure, creating fertile ground for competitive-moral emotions such as Glückschmerz-the distress felt at others' success [41].

Heavy engagement in social media interactions was positively associated with intensified Glückschmerz experiences, suggesting that virtual-space use operates as a comparison amplifier in peer communities. The online environment thus functions not merely as a communication tool but as an affective and moral ecosystem, where emotional reactions related to success, failure, and social judgment are actively circulated [42].

Both direct and indirect relationships within the model underline the dual mechanism through which personality traits and digital engagement interface to produce Glückschmerz: an intrapersonal layer of dispositional affectivity and an interpersonal layer of social contagion and moral appraisal. Hence, virtual interaction emerges as a critical channel for the socialization of moral and anti-moral emotions among adolescents in collectivist contexts such as Hamadan [43].

The results collectively emphasize the transformative role of online platforms in shaping adolescents' moral emotion architecture-where personal dispositions toward envy, pride, and moral sensitivity are refracted through digital mirrors of social comparison.

Discussion

The study identified a significant relationship between personality traits, virtual-space engagement, and Glückschmerz, confirming the mediating role of digital use. In the structural model, Personality → Virtual-space (β = 0.47, p < 0.001) and Virtual-space → Glückschmerz (β = 0.52, p < 0.001) paths were significant, while the direct link Personality → Glückschmerz (β = 0.26, p < 0.001) remained, showing partial mediation [44]. The findings suggest that the online context translates dispositional tendencies into emotional-comparison outcomes; individuals high in extraversion, openness, or neuroticism participate more affectively in digital interactions where feedback and visibility intensify Glückschmerz [45].

This partial mediation reveals that personality accounts for emotional variance both directly and through virtual exposure, consistent with frameworks on emotional contagion and online comparison [46]. The observed

pattern echoes moral-emotion theories emphasizing that Glückschmerz combines dispositional and contextual antecedents. The Internet, beyond being a social connector, serves as a moral arena amplifying discomfort toward others' success by constantly reinforcing self-relevance [47].

Grounded in Festinger's social comparison theory [48] and Smith's cognitive model [49], the data indicate that adolescents assess self-worth by others' achievements, a process accentuated online. Extraverted and open adolescents, because of their social engagement, face greater comparative exposure, raising their susceptibility to Glückschmerz [50]. In contrast, agreeableness exerted a protective effect, consistent with evidence linking empathy and moral concern to diminished negative affect [51]. Hence, social networks appear to magnify existing emotional predispositions rather than creating novel ones.

The direct effect of personality on Glückschmerz further demonstrates that competitive emotionality may arise from internal dispositions even offline [52–53]. Neurotic and competitive individuals show stronger emotional vigilance toward peers' achievements, aligning with findings on scholastic rivalry [53]. Consequently, Glückschmerz can be viewed both as a marker of emotional-regulation competence and a diagnostic of maladaptive social comparison. Recognizing such individual differences supports educational and counseling strategies to strengthen resilience [54–55].

Both Iranian and international evidence validate these dynamics. Hosseini et al. (2022) linked heavy social-network use to hostile emotion [54], while Mohammadi (2023) confirmed the predictive roles of neuroticism and extraversion [55]. Globally, studies by Leech et al. (2020) [56] and Nabi and Weber (2022) [57] highlighted competitive orientations and feedback, seeking as mediators between personality and moral emotion, paralleling the mechanism verified here. Cross-cultural consistencies [58] underscore that digital engagement reproduces universal affective patterns: Hamadan adolescents display personality-driven moral-emotional reactions comparable to those observed elsewhere.

Comparative social dynamics and the desire for online visibility emerge as core triggers of Glückschmerz, a paradoxical emotion blending moral judgment with joy in others' misfortune [58]. Thus, virtual networks are not passive infrastructures but socio-symbolic arenas that normalize evaluative comparison [59]. Traits such as extraversion, neuroticism, and openness heighten emotional reactivity, whereas agreeableness mitigates it through empathy [50]. Consequently, Glückschmerz epitomizes moral-emotive reflections of social competition deeply rooted in culture and personality.

The present study faced several limitations.

The geographically confined sample restricts generalizability beyond Hamadan's adolescents and similar collectivist contexts.

Reliance on self-report scales may introduce desirability bias in assessing virtual behavior.

The cross-sectional design precludes causal inference. In addition, cultural semantics-particularly concepts like honour-may alter the expression of Glückschmerz relative to Western usage, necessitating indigenous constructs.

SmartPLS v4's analytic scope limits multi-level testing; cross-cultural subgroup analyses remain unexplored.

Based on the confirmed mediating effect of virtual-space engagement, interventions are recommended in four domains:

A. Education: Incorporate emotional-media literacy into curricula to help adolescents identify and regulate envy and comparison, fostering ethical self-evaluation.

B. Family: Encourage parental mediation reducing exposure to competitive digital cultures and promoting empathy and respect for others' success.

C. Cultural Policy: Ministries of Education and ICT should collaborate on guidelines and digital content that nurture cooperation over performative rivalry.

D. Counseling Practice: Psychologists should include workshops on Digital Emotional Self-Awareness to counteract maladaptive online emotions and strengthen resilience.

These initiatives convert empirical findings into actionable prevention and well-being strategies for adolescents in Iran's digital society.

The validated PLS-SEM model (GOF = 0.712) confirms that personality traits influence Glückschmerz primarily through virtual-space behaviors. The digital environment emerges as a social-emotional ecosystem shaping adolescents' value orientations and expression of personality. Emotional outcomes like Glückschmerz arise from the interaction of dispositional (neuroticism, extraversion) and cultural-moral mechanisms embedded in online exchanges.

This research establishes a context-specific analytic framework for Iranian adolescents and offers theoretical and applied foundations for education, counseling, and policy programs targeting social-emotional regulation in virtual settings. By linking personality, digital engagement, and moral emotion, the study advances culturally grounded emotional-literacy scholarship and enhances psychological resilience within connected youth communities.

Conflict of Interest

The authors declare no conflicts of interest or financial influences affecting research outcomes.

Ethical Approval

Ethical approval for this study was obtained from the Ethics Committee of Bu-Ali Sina University. All research procedures involving human participants were conducted in full compliance with the ethical principles of the relevant institutional and/or national research committees, as well as with the Declaration of Helsinki (1964) and its subsequent amendments or equivalent ethical guidelines. In addition, a written informed consent was obtained from all participants prior to their inclusion in the study.

Declaration of Generative AI and AI‐Assisted Technologies

In the preparation of this manuscript, the authors made limited use of ChatGPT‐5.2 (OpenAI) exclusively as a linguistic support tool for the refinement of specialized Persian terminology into precise and academically appropriate English expressions. The artificial intelligence tool was not used for content generation, data analysis, interpretation of findings, or scientific writing. All translated and edited sections were independently reviewed, revised, and validated by the authors, who assume full responsibility for the accuracy, originality, and scientific integrity of the final manuscript.

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