

The Association of Self-Differentiation and Rumination with Anxiety among Adolescent Girls

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Abstract

Background: Anxiety in adolescent girls is influenced by pivotal psychological factors, including self-differentiation and rumination, amid their profound developmental and social challenges. The present study aimed to investigate the relationship between self-differentiation, rumination, and the severity of anxiety in adolescent girls.

Methods: This correlational-descriptive study targeted high school girls in Shiraz, Iran throughout the 2023–2024 school year. A total number of 252 participants were recruited through multi-stage cluster sampling technique. For data collection, Anxiety Scale (SA), Differentiation of Self Inventory (DSI), and Rumination Response Scale (RRS) were used. Pearson correlation coefficients and stepwise multiple regression were applied for data analysis. The statistical analysis was performed using SPSS version 26.

Results: The mean value for anxiety, self-differentiation, and rumination was 55.36 ± 12.30 , 139.88 ± 44.62 , and 63.55 ± 13.70 , respectively. The results revealed a robust inverse association between self-differentiation and anxiety ($r=-0.46$, $P<0.01$), while rumination exhibited a strong positive link with anxiety ($r=0.53$, $P<0.01$).

Conclusions: Our study demonstrated that self-differentiation and rumination are significantly associated with anxiety in adolescent girls, with rumination showing a stronger correlation. These findings highlighted the importance of fostering self-differentiation and addressing ruminative tendencies in interventions to mitigate anxiety in adolescent girls.

Keywords: Rumination, Anxiety, Differentiation, Adolescent

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1. Introduction

Adolescence represents a critical developmental phase for girls, characterized by profound biological, psychological, and social changes that increase susceptibility to mental health challenges, particularly anxiety (1, 2). Among adolescent girls, anxiety—manifested as excessive worry, psychological distress, and physical symptoms—can significantly disrupt academic performance, and the processes of identity and personality development (3). Recent research has indicated a rising prevalence of anxiety disorders, with approximately 6.5% of adolescent girls reporting significant anxiety, highlighting the urgent need for comprehensive research into the factors predicting anxiety in this population (4). However, existing literature has not fully elucidated the direct associations of self-differentiation and rumination with anxiety specifically in adolescent girls, with some studies reporting inconsistent findings regarding the strength and direction of these correlations (5, 6).

Self-differentiation denotes an individual's ability to discern their internal thoughts, emotions, and values from external environmental influences and expectations (7). Adolescents with lower levels of self-differentiation frequently experience identity diffusion when confronted with social and familial demands, thereby increasing their vulnerability to anxiety and psychological distress (8). Furthermore, self-differentiation, conceptualized as the capacity to distinguish one's own thoughts, feelings, and beliefs from those of others, has been recognized as an influential predictor of anxiety (9). Higher self-differentiation is associated with better coping and reduced anxiety susceptibility in adolescents (10).

In contrast, rumination, characterized as a maladaptive emotion regulation strategy, entails a pervasive and uncontrollable preoccupation with the indicators of distress and their potential origins, thereby substantially contributing to the persistence and intensification of anxiety (11). Rumination is delineated as a pattern of cyclical and persistent anxious ideation, a frequently

observed response to negative affect, and a salient cognitive feature associated with dysphoric states and anxiety disorders (12, 13). Investigating the interplay between these two constructs is pertinent, as ruminative tendencies may be amplified in adolescents exhibiting lower levels of self-differentiation (14). Specifically, adolescents who struggle to maintain clear boundaries between their inner experiences and the external world are more vulnerable to becoming trapped in the harmful cycle of rumination, which in turn significantly increases their anxiety levels (15). In contrast, adolescents with higher levels of self-differentiation show better emotional regulation and less engagement in repetitive negative thinking (16).

The present study is driven by the need to elucidate the associations of self-differentiation and rumination with anxiety among adolescent girls, thereby deepening the understanding of the underlying mechanisms of anxiety during this pivotal developmental stage. Such insights can provide a robust scientific basis for designing targeted preventive programs and therapeutic interventions. The focus on adolescent girls is critical due to their heightened vulnerability to anxiety, driven by unique stressors such as societal expectations around gender roles, body image pressures, and interpersonal dynamics, which may amplify the expression of rumination and hinder self-differentiation (3, 4). In Iranian society, cultural factors like collectivist values—which prioritize family and group harmony—can intensify these effects, heightening anxiety when social or familial expectations clash with girls' personal identity development. Specifically, fostering skills to enhance self-differentiation and reduce rumination may significantly improve emotional regulation and decrease anxiety in adolescent girls. This study aimed to examine the relationships between self-differentiation, rumination, and anxiety levels in adolescent girls.

2. Methods

2.1. Design

This was a descriptive-correlational study conducted in Shiraz, Iran in 2023–2024 school year.

2.2. Selection and Description of Participants

The study participants were female high

school students enrolled in schools in Shiraz, Iran, during the 2023–2024 academic year. The inclusion criteria were: (a) enrollment as a female student in grades 7-9; (b) attendance in one of the randomly selected classes within the participating schools; (c) completion of all questionnaire items; (d) provision of informed consent, confirmed by school administrators and, where applicable, parental or guardian consent; and (e) diversity in socioeconomic status and urban residence to enhance sample representativeness. The exclusion criteria were: (a) submission of incomplete or invalid questionnaires, defined as those missing more than 10% of responses or showing inconsistent answer patterns (e.g., selecting the same response for all items); and (b) lack of consent from relevant parties.

2.2.1. Sample Size Determination

Sample size was set at 252 based on power calculations that accounted for three primary variables (anxiety, self-differentiation, rumination), guaranteeing sufficient power to identify notable associations. The study participants (n=252) were recruited through multi-stage cluster sampling technique, as follows. First, District 2 of Shiraz, Iran was randomly selected, followed by the random selection of three girls' high schools, and then four classes within each school to ensure generalizability. As a result, the study sample might not comprehensively capture the diversity of teenage girls in Shiraz or Iran, owing to possible regional and economic disparities across the city.

2.3. Data Collection and Measurements

2.3.1. The Anxiety Scale (SA)

The Anxiety Scale, a 45-item measure for anxiety in 8–15 year-olds, features six subscales: separation anxiety, social anxiety, obsessive-compulsive symptoms, panic-agoraphobia, generalized anxiety, and fear of physical injury. Items employ a 4-point Likert scale (0=Never; 3=Always), generating total scores of 0–135 after reverse-scoring specified items and summing responses. Scores denote low (0–44), moderate (45–88), or high (>88) anxiety levels (17). Ghanbari and colleagues (18) reported a Cronbach's alpha value of >0.84, while we obtained a value of 0.83 in this study. The Persian adaptation, refined via back-translation and pilot testing for Iranian cultural relevance, showed CVI=0.91 and CVR=0.89 (18).

2.3.2. The Differentiation of Self Inventory (DSI)

The Differentiation of Self Inventory (DSI) by Skowron and Friedlander in 1998 comprises 43 self-report items measuring self-differentiation through four subscales: emotional reactivity (11 items), emotional cutoff (12 items), I-position (10 items), and fusion with others (9 items) (19). Participants rate items on a 6-point Likert scale (1=not at all true of me; 6=very true of me), with designated reverse-scoring and summation for total scores (19). Earlier work reported Cronbach's alpha of 0.74 (20); the present study yielded a value of 0.80, reflecting excellent internal consistency. The Persian DSI, refined via back-translation and pilot testing, achieved CVI=0.88 and CVR=0.83, affirming its cultural fit for Iranians (20).

2.3.3. The Rumination Response Scale (RRS)

The Rumination Response Scale (RRS), developed by Nolen-Hoeksema and colleagues in 2008, evaluates maladaptive negative responses via two 11-item subscales: ruminative and distracting (21). The 22-item tool uses a 4-point Likert scale (1=Never; 4=Often), with total scores summed directly (no reverse scoring) ranging from 22–88 (21). Previous research indicated strong reliability (Cronbach's $\alpha=0.90$) (22) while we found $\alpha=0.81$ in this study, confirming adequate consistency. The Persian RRS, adapted through back-translation and piloting for cultural fit, yielded CVI=0.92 and CVR=0.87 (22).

2.4. Procedure

The present study received ethical approval from the relevant institutional review board. We coordinated with school officials to facilitate data collection. A multi-stage cluster sampling technique was employed, involving the random selection of District 2, Shiraz, Iran, followed by the selection of three girls' secondary schools within this district and subsequently four classes from each school. The study participants completed questionnaires in their classrooms in small groups during regular school hours, with standardized instructions provided by trained research assistants to ensure comprehension and minimize response bias. Data collection occurred between October and December 2023 to avoid periods of high academic stress, such as exams, which could influence responses. The participants were assured of the confidentiality and anonymity of their responses,

with measures such as anonymized questionnaire coding and secure data storage to protect privacy and reduce social desirability bias. To mitigate potential attrition, 280 questionnaires, including Anxiety Scale, Differentiation of Self Inventory, and Rumination Response Scale, were distributed to all students within the selected classes. A total of 252 fully completed responses from eligible participants were included in the final analysis.

2.5. Data Analysis

Data from the study were processed using descriptive metrics (mean and standard deviation values) in SPSS version 26. Inferential tests—Pearson's correlation and stepwise regression—were applied to evaluate linear relationships and detect major predictors among interrelated variables. Pearson's correlation was applied to assess bivariate correlations, while stepwise regression was used to determine the incremental contribution of predictors to anxiety, given the exploratory nature of the study.

3. Results

The study sample comprised 252 adolescent girls, distributed across three age groups: 84 participants were 13 years old (33.3%), 90 were 14 years old (35.7%), and 78 were 15 years old (31.0%). The mean anxiety level was 55.36 ($SD=12.30$), suggesting a moderate degree of anxiety. The anxiety score distribution demonstrated positive skewness (1.86) and platykurtosis (0.24), indicating a concentration of scores at the lower end of the scale with less pronounced tails than a normal distribution. Conversely, self-differentiation scores yielded a mean value of 139.88 ($SD=44.62$), exhibiting negative skewness (-1.64) and platykurtosis (-0.33), which suggests a tendency for scores to cluster at higher values with a relatively flat distribution. Lastly, rumination scores presented a mean value of 63.53 ($SD=13.70$), with positive skewness (1.41) and platykurtosis (-0.42), indicating a clustering of scores towards the lower end and a flatter peak compared with a normal distribution.

Bivariate associations among anxiety, self-differentiation, and rumination were evaluated via Pearson correlation coefficients. Self-differentiation exhibited a significant inverse link with anxiety ($r=-0.46$, $P<0.001$), such that greater differentiation aligned with reduced anxiety.

Table 1: Results of stepwise regression analysis

Predictor Variable(s)	B	SE	β	t	P
Rumination	0.28	0.05	0.31	2.06	0.001
Self-Differentiation	-0.15	0.03	-0.27	-5.00	0.001

SE: Standard Error

By contrast, rumination demonstrated a significant positive association with anxiety ($r=0.53$, $P<0.001$), with elevated rumination tied to heightened anxiety. These robust correlations (both $P<0.001$) emphasize key interrelations among these factors in adolescent girls.

Table 1 outlines the stepwise multiple regression findings for predicting anxiety. The final model identified rumination and self-differentiation as key predictors, with rumination displaying a positive effect ($B=0.28$, $SE=0.05$, $\beta=0.31$, $t=2.06$, $P<0.001$) and self-differentiation a negative one ($B=-0.15$, $SE=0.03$, $\beta=-0.27$, $t=-5.00$, $P<0.001$).

4. Discussion

Our results demonstrated a strong inverse link between self-differentiation among adolescents and their anxiety severity. This pattern aligned with findings from local studies by Álvarez-Hierro and Oliver (9) and Dolz-Del-Castellar and Oliver (23). This finding can be elucidated by considering self-differentiation as a psychological construct that encompasses an individual's capacity to uphold personal boundaries and distinguish their internal thoughts, feelings, and beliefs from those of others. Adolescents with higher self-differentiation generally possess an enhanced ability to develop their identity, make autonomous decisions, and sustain emotional independence when confronted with social and familial pressures (10). This capacity may serve as a protective mechanism against anxiety, as individuals with strong self-differentiation are less susceptible to the expectations and opinions of others and are better positioned to navigate psychological and social difficulties (9). In contrast, low self-differentiation may facilitate rumination by increasing vulnerability to external pressures, forming a potential mediating pathway to heightened anxiety, as individuals struggle to disengage from repetitive negative thoughts (14). In contrast, adolescents with lower self-differentiation may struggle to maintain personal boundaries and are more readily influenced by the emotions and viewpoints of others (24). This vulnerability can contribute to feelings of confusion, emotional

dependency, and impaired independent decision-making, all of which are recognized as factors that can intensify anxiety.

Adolescents with difficulties in achieving adequate self-differentiation may exhibit amplified feelings of helplessness and insecurity when confronted with conflicts and stressors, thereby increasing their susceptibility to anxiety (23). Furthermore, self-differentiation impacts adolescents' emotional regulation and interpersonal functioning. Those with a greater capacity for self-differentiation typically demonstrate enhanced emotional regulation abilities and maintain more adaptive interpersonal boundaries (10). These skills can contribute to lower levels of anxiety, as individuals are better able to engage in constructive coping strategies when facing stress and challenges. In contrast, adolescents with lower self-differentiation may experience challenges in managing their emotions and exhibit excessive emotional dependency or frequent relational conflicts, conditions that can elevate anxiety levels (24).

The present study also revealed a significant positive correlation between rumination and anxiety among adolescent girls, a finding consistent with previous research (25, 26). The response styles theory by Nolen-Hoeksema and colleagues (21) posits that rumination exacerbates and prolongs negative emotions by maintaining focus on distress. This theory complements the executive control theory (27), which proposes that rumination consumes cognitive resources and impairs the adaptive processing of threatening information. Together, these perspectives suggest that rumination not only amplifies emotional distress but also reduces cognitive flexibility—effects that may be particularly pronounced in adolescents whose emotion regulation skills are still developing. This suggests that rumination, as a key psychological construct, plays a critical role in both the emergence and persistence of anxiety in this developmental stage. The response styles theory of rumination (21) effectively elucidates how an excessive and involuntary focus on the

symptoms of distress and their potential origins exacerbates and prolongs negative emotional experiences. This mechanism is particularly salient during adolescence, a period marked by substantial cognitive and emotional transitions, which can considerably heighten susceptibility to anxiety (28). Neurobiological evidence from brain imaging studies indicated that rumination is linked to increased activation in neural networks involved in processing negative emotions (e.g., the amygdala) and reduced activity in regions responsible for emotion regulation (e.g., the prefrontal cortex) (29). This pattern of neural activity provides a compelling explanation for the positive correlation between rumination and anxiety, a correlation that may be even more pronounced in adolescents whose emotion regulation neural circuits are still maturing (30). Furthermore, longitudinal research has robustly demonstrated that rumination not only co-occurs with elevated anxiety levels but also serves as a strong predictor of future increases in anxiety symptoms (31). Research indicated that adolescents who resort to rumination when faced with stress exhibit higher levels of anxiety compared with peers employing more adaptive coping strategies (5). These findings offer a substantial theoretical foundation for the hypothesis in the present study. At a cognitive level, contemporary models, such as executive control theory, explain how rumination, by consuming cognitive resources and impairing executive functions, diminishes an individual's capacity for adaptive processing of threatening information (29). This mechanism can be particularly influential in adolescents who are still developing their cognitive and emotional regulation skills, potentially leading to increased vulnerability to anxiety. Consequently, the integration of response styles and executive control theories strengthens the understanding of the role of rumination in adolescent anxiety, particularly when coupled with low self-differentiation.

The outcomes of this study unequivocally demonstrate the significant predictive roles of self-differentiation and rumination, as two salient psychological constructs, in adolescent anxiety. The stepwise regression analysis confirmed that both rumination and self-differentiation were significant predictors of anxiety, with moderate effect sizes indicating practical significance in explaining variance in anxiety levels. The findings revealed that adolescents who present with lower self-differentiation

and a concurrent propensity for rumination report markedly elevated levels of anxiety. These results not only emphasize the importance of cultivating an autonomous identity and a well-defined self-concept during adolescence but also underscore the need for instruction in emotion regulation strategies and the implementation of psychological interventions targeting the reduction of rumination as protective mechanisms against anxiety. Specifically, interventions such as mindfulness-based cognitive therapy, cognitive-behavioral therapy (CBT) focusing on cognitive restructuring, and emotion regulation training could be effective in school or clinical settings.

4.1. Limitations

Several constraints should be noted when interpreting the results of this study. Primarily, the sample was limited to adolescent girls from Shiraz, Iran which may restrict the applicability of findings to teens in other cities or varying cultural environments. Local customs in Shiraz, Iran, like those promoting strong family ties and traditional gender expectations, could shape self-differentiation and rumination, thereby heightening anxiety and reducing relevance to diverse settings. Moreover, key confounders—such as socioeconomic background and personal histories—were not adjusted for, possibly skewing the results. The cross-sectional design of the study also prevents drawing causal conclusions from the links between self-differentiation, rumination, and anxiety. Future longitudinal research could clarify directional effects, while experimental approaches might evaluate interventions aimed at these factors. Incorporating boys or broader groups in subsequent studies would offer valuable comparisons on gender-related or shared anxiety drivers. Finally, the present study overlooked potential impacts from family dynamics (e.g., single- versus dual-parent households) and biological or genetic influences on anxiety development.

5. Conclusions

Our study highlighted robust links between self-differentiation, rumination, and anxiety in teenage girls. The inverse relationship between self-differentiation and anxiety implies that enhanced autonomy and emotional control correlate with diminished anxiety. In contrast,

the direct tie between rumination and anxiety emphasizes how persistent negative thoughts worsen anxiety in youth. These insights inform therapeutic approaches that promote self-differentiation and curb rumination to alleviate anxiety in this demographic. For adolescent girls in Shiraz, Iran, programs could be tailored to address cultural factors, such as collectivist values that may pressure conformity over autonomy, by incorporating group-based mindfulness activities or culturally sensitive CBT modules that promote self-differentiation while respecting familial interconnectedness. Consequently, these findings offer a robust foundation for the development of both preventative and therapeutic interventions within the domain of adolescent mental health.

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Authors' Contribution

Aida Naziri: Contributed to the data acquisition, analysis, and interpretations; drafted the manuscript. Farzaneh Hooman: Contributed to the conception and design of the work, interpretation of data; reviewed critically the manuscript for important intellectual content. All authors have read and approved the final manuscript and agree to be accountable for all aspects of the work, ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Ethical Approval

The Ethics Committee of Islamic Azad University, Shiraz Branch, Iran approved the present research with the code of IR.IAU.SHIRAZ.REC.1403.282. Also, written informed consent was obtained from the participants.

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