

# Understanding Rumination Thinking from the Perspectives of Psychological Control Source and Personality Traits

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**Abstract:** This study primarily explores the relationship between rumination thinking in high school students and their personality traits and psychological control sources. Utilizing a questionnaire survey method, we randomly distributed surveys to 557 high school students who completed the Rumination Thinking Response Scale, Internal Control, Authority and Opportunity Scale, and China's Big Five Personality Questionnaire. The results revealed significant differences in rumination and its dimensions concerning gender, only-child status, and grade ( $ps < 0.01$ ). Rumination showed a significant positive correlation with the big five personality, neuroticism, and conscientiousness ( $ps < 0.01$ ). Additionally, rumination was significantly correlated with psychological control sources, internal control, authority, and opportunity ( $ps < 0.01$ ). Through a mediation effect test, the mediating effect value of psychological control sources between the big five personality and rumination was found to be 0.048, accounting for 33.80% of the total effect, thus indicating that psychological control sources played a partial mediating role. The study suggests that there are individual differences in rumination thinking among high school students. Schools and parents may consider influencing students' rumination from the perspectives of personality and psychological control sources to enhance positive thinking and contribute to addressing and improving students' psychological well-being.

**Keywords:** Rumination thinking, Big Five personality, Psychological control sources, High school students

## 1. Introduction

During adolescence, a crucial period of physical and mental development, high school students face multifaceted pressures from society, family, and school. The increasing mental health challenges they encounter, particularly intensified by the stress of college entrance exams, lead to frequent self-reflection on failure and unfavorable environmental conditions. However, not all students succumb to detrimental self-reflection. On the contrary, some thrive in adversity. Is this reverse development in students correlated with personality? Does it involve attribution? For instance, students displaying pronounced neuroticism may be more prone to malicious reflection, while those flourishing in adversity might proactively address their own issues before seeking external assistance when faced with failure. Therefore, this research approaches the issue from the perspectives of personality and control sources, aiming to offer solutions for alleviating and intervening in the rumination thinking of high school students. Additionally, it seeks to contribute to the emotional stability and mental health of high school students.

The concept of rumination thinking, as proposed by Nolen and Morrow, has gained widespread recognition. They posit that individuals, following negative events such as exam failure and pressure, engage in constant contemplation of "why things happen to me" and similar queries. This passive, repetitive contemplation involves pondering the causes, outcomes, and emotions associated with events, without actively seeking solutions. It represents a maladaptive thinking pattern linked to individual personality traits and capable of inducing or exacerbating negative emotions, such as depression <sup>[1]</sup>. Some scholars categorize rumination as a cognitive-emotional phenomenon. Martin and Tesser distinguish between normal rumination thinking, which propels individuals towards accomplishing their behavioral goals, and pathological rumination thinking, which engenders negative emotions, inhibits actions, and obstructs goal attainment <sup>[2]</sup>. Research indicates a close association between rumination thinking and

depression, contributing to psychological challenges in individuals <sup>[3, 4]</sup>. Studies involving emotionally vulnerable groups affirm a significant correlation between repetitive thinking (i.e., rumination) and symptoms of anxiety and depression, highlighting negative repetitive thinking as a central factor in depression and anxiety <sup>[5]</sup>. In light of these findings, this study defines rumination thinking as a continuous and repetitive reflection on events and their causative factors, leading to negative emotions, without active problem-solving, particularly evident in high school students following negative experiences.

Personality traits, distinguishing individuals in thinking patterns and behaviors, warrant consideration in rumination thinking research. The most widely adopted personality theory is the Five-Factor Personality Theory proposed by McCrae and Costa, encompassing extraversion, neuroticism, conscientiousness, extroversion, and agreeableness <sup>[6]</sup>. Furnham et al. established a significant correlation between Big Five personality traits and mental health levels in their student study <sup>[7]</sup>. Other research indicates a mediating relationship between neuroticism, agreeableness, and anxiety in the context of rumination among the Big Five personalities <sup>[8]</sup>. Roelofs et al. further demonstrated rumination's mediating role in depression and neuroticism <sup>[9]</sup>. Additionally, Miranda's research on music emotion regulation strategies revealed that rumination mediated the influence of neurotic personality on internalized symptoms <sup>[10]</sup>. Hence, Hypothesis 1 posits a correlation between the Big Five personality and rumination.

Rotter pioneered in-depth research on psychological control sources, differentiating them into internal and external control sources based on their distinctions. Internal control sources attribute event success to personal efforts and characteristics, while external control sources attribute outcomes to luck, chance, or other external factors <sup>[11]</sup>. Levenson further categorized external control sources into chance and authority control types, with the former leaning towards events being governed by chance and luck, and the latter asserting that event outcomes are influenced by authoritative figures or events <sup>[12]</sup>. Extensive literature reading and research experiments have revealed a significant correlation between control sources and anxiety and depression, with internal control sources notably negatively predicting depression and anxiety <sup>[13, 14]</sup>. Regardless of whether rumination and depression or anxiety have a regulatory or mediating role <sup>[15, 16]</sup>, the relationship among these three factors is closely interconnected. Hence, Hypothesis 2 posits that the inclination towards psychological control sources is related to rumination thinking.

The manifestation of introversion and extroversion in psychological control sources exhibits distinct differences, and diverse personality traits also reflect variations in cognitive styles. Research on stock investor groups highlights the correlation between psychological control sources and neuroticism, extraversion, agreeableness, and openness <sup>[17]</sup>. Lima et al., focusing on cancer groups as subjects, discovered that control sources act as mediating influences between the Big Five personalities and depression <sup>[18]</sup>. Therefore, Hypothesis 3 posits that there is a relationship between the Big Five personality and psychological control sources, and psychological control sources play an intermediary role in the association between the Big Five personality and rumination thinking.

## 2. Research Object and Method

### 2.1 Research Object

*Table 1: Descriptive Statistics of Demographic Variables for High School Students*

Variable	Category	Sample Size (N)	Percentage (%)
Gender	Male	259	49.0%
	Female	270	51.0%
Only child	Yes	54	10.2%
	No	475	89.8%

Residence	City	234	44.3%
	Rural	295	55.7%
Grade	Senior One	182	34.5%
	Senior Two	170	32.2%
	Senior Three	176	33.3%

The study focuses on high school students. We selected two high schools and distributed 557 paper questionnaires to various classes, with 529 valid questionnaires collected (a response rate of 95.0%). Further details can be found in the Table 1. The study received approval from the high schools and obtained informed consent from the students' guardians. Adhering to the principle of voluntariness, the entire research process is conducted with strict confidentiality.

## 2.2 Tools

### 2.2.1 General Demographic Survey

A self-designed questionnaire was used to gather general demographic information, including gender, grade, place of residence, and whether the participant is the only child.

### 2.2.2 Rumination Response Scale -RRS

The measurement of rumination thinking utilized the Chinese version of the Ruminative Responses Scale <sup>[19]</sup>. The RRS includes dimensions of symptomatic rumination, reflective reflection, and compulsive thinking. The scale comprises 22 questions with a 4-level rating, and participants' scores are positively correlated with the level of rumination thinking. In this study, the Cronbach's  $\alpha$  coefficient for the total score of the scale was 0.929.

### 2.2.3 Chinese Big Five Personality Questionnaire Brief Version - CBF-PI-B

The measurement of Big Five personality traits utilized the Chinese Brief Version of the Big Five Personality Inventory <sup>[20]</sup>, known as Chinese Big Five Personality Inventory Brief (CBF-PI-B). This questionnaire consists of five dimensions, with a 6-level rating, and includes 7 reverse-scoring items. In this study, the Cronbach's  $\alpha$  coefficient for the total score of the scale was 0.856.

### 2.2.4 Internal Control, Authority, and Opportunity Scale - IPC

The measurement of psychological control sources utilized the scale developed by Levenson, consisting of dimensions of internal control, authority, and opportunity <sup>[12]</sup>, known as the Internal Control, Authority, and Opportunity Scale (IPC). This scale with a total of 24 questions. A higher total score indicates a higher tendency of the subject in that dimension. In this study, the Cronbach's  $\alpha$  coefficient for the total score of the scale was 0.859.

## 3. Results

### 3.1 Harman Single Factor Test

To address the potential issue of common method bias in self-reported questionnaire data, the Harman single factor method was employed. The results indicated that the variance explained by the first factor was 15.269%, significantly below the critical threshold of 40%. This suggests that there is no significant common method bias in this study <sup>[21]</sup>.

### 3.2 Demographic Differences in Rumination Thinking Among High School Students

Table 2: Demographic Differences in Rumination Thinking and its Dimensions among High School Students

Variable		Rumination Thinking	Symptomatic Rumination	Reflective Reflection	Compulsive Thinking
Gender ( <i>M±SD</i> )	Male	43.015±10.809	22.556±6.175	10.961±3.078	9.498±2.830
	Female	47.237±11.306	25.252±6.762	11.881±3.117	10.104±2.783
	<i>T</i> value	-4.375**	-4.782**	-3.415**	-2.481*
the only child ( <i>M±SD</i> )	Yes	41.019±8.111	21.426±4.307	10.556±2.633	9.037±2.472
	NO	45.642±11.500	24.217±6.772	11.531±3.168	9.895±2.846
	<i>T</i> value	-2.873**	-2.960**	-2.177*	-2.125*
Residence ( <i>M±SD</i> )	City	44.256±10.827	23.282±6.255	11.231±3.099	9.744±2.781
	Rural	45.891±11.618	24.439±6.884	11.592±3.154	9.861±2.858
	<i>T</i> value	-1.655	-2.001*	-1.317	-0.473
Grade ( <i>M±SD</i> )	Senior one	43.082±11.052	22.890±6.570	11.000±3.036	9.192±2.701
	Senior two	44.729±11.457	23.735±6.501	11.382±3.256	9.612±2.735
	Senior three	47.795±10.911	25.239±6.585	11.920±3.055	10.636±2.845
	<i>F</i> value	8.220**	5.875**	3.936*	12.878**

Note: \* $p < 0.05$ , \*\* $p < 0.01$ .

Differences in gender, only-child status, and grade regarding the total score of rumination thinking and its three dimensions were examined using independent sample t-tests and one-way analysis of variance. The results revealed significant differences ( $p < 0.01$ ). As shown in Table 2, females exhibited higher total scores in rumination thinking, as well as in the dimensions of symptom rumination, introspection, and forced thinking compared to males. Non-only children scored higher than only children. Notably, there was a higher likelihood of rumination thinking among senior high school students. However, no significant differences were observed in rumination thinking based on the place of residence ( $p > 0.05$ ).

### 3.3 Correlation Analysis of Rumination Thinking, Big Five Personality, and Psychological Control Sources among High School Students

As shown in Table 3, the results of the correlation analysis reveal significant positive correlations between the Big Five personality traits, neuroticism, and rumination thinking ( $p < 0.01$ ). Conscientiousness was found to be negatively correlated with rumination ( $p < 0.05$ ), while no significant correlations were observed with the other dimensions. Notably, there were significant correlations between psychological control sources, internal control, authority, opportunity, and rumination ( $p < 0.01$ ). Moreover, a significant correlation was identified between the control source and the Big Five personality ( $p < 0.01$ ).

*Table 3: Correlation Analysis of Rumination Thinking, Big Five Personality, and Psychological Control Sources (r) in High School Students*

Variable	1.	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	3.5	3.6
1.Rumination Thinking	1										
2.1Psychological Control Sources	0.281**	1									
2.2Internal Control	-0.058**	0.530**	1								
2.3Authority	0.264**	0.886**	0.199**	1							
2.4Opportunity	0.390**	0.875**	0.196**	0.752**	1						
3.1Big Five Personality	0.245**	0.373**	0.436**	0.226**	0.256**	1					
3.2Neuroticism	0.641**	0.317**	-0.042	0.299**	0.421**	0.435**	1				
3.3Conscientiousness	-0.092*	0.199**	0.472**	0.072	0.002	0.577**	-0.087*	1			
3.4Agreeableness	0.001	0.227**	0.314**	0.118**	0.137**	0.659**	0.162**	0.255**	1		
3.Openness	0.084	0.166**	0.363**	0.036	0.050	0.747**	0.082	0.406**	0.295**	1	
3.6Extraversion	0.010	0.245**	0.329**	0.149**	0.132**	0.744**	0.034	0.341**	0.449**	0.586**	1

Note: \* $p < 0.05$ , \*\* $p < 0.01$ .

### 3.4 Mediation Effect Test

Model 4 in the PROCESS program was employed to conduct the mediation effect test. The significance of the mediation effect was assessed using the deviation-corrected non-parametric percentage Bootstrap. The results are shown in Table 4 and Table 5, the 95% confidence intervals for each path did not include 0, indicating statistical significance for the total effect, direct effect, and indirect effect ( $p < 0.05$ ). The total effect of the Big Five personalities on rumination was 0.142 [0.094, 0.191], wherein the mediating effect of the psychological control sources constituted 33.80% of the total effect. The psychological control source played a partial mediating role between the Big Five personalities and rumination.

*Table 4: Mediation Effect Tests for Psychological Control Sources*

Regression Equation		Overall Fit Index			Regression Coefficient Significance	
Dependent Variable	Predictor Variable	$R$	$R^2$	$F$	$\beta$	$t$
Psychological	Big Five Personality	0.374	0.141	85.430	0.315	9.243**

Control Sources						
Rumination	Big Five Personality	0.319	0.102	29.708	0.095	3.649**
	Psychological Control Sources				0.152	4.936**

Note: \* $p < 0.05$ , \*\* $p < 0.01$ .

Table 5: Total Effects, Direct Effects, and Mediation Effects

Item	Item Effect Size	95% confidence interval	relative effect size
Total effect	0.142	[0.094,0.191]	
Direct effect	0.095	[0.044,0.146]	66.20%
Mediating Effect of Psychological Control Sources	0.048	[0.021,0.080]	33.80%

## 4. Discuss

### 4.1 Analysis of Demographic Differences in Rumination Thinking Among High School Students

This study reveals significant differences in rumination thinking and its sub-dimensions based on gender. Girls exhibit a higher degree of rumination compared to boys, aligning with the findings of Lilly et al. [22]. Gender differences may stem from variations in coping strategies; when faced with negative events, girls tend to be more sensitive, suspicious, and engage in frequent and uncontrolled negative thinking, leading to an increasing level of rumination. On the other hand, boys tend to adopt active measures, such as engaging in physical activities like running, to divert attention and release emotions. Even when girls attempt to shift their focus, for instance, by confiding in friends, the negative emotions may be transmitted and mutually reinforced, contributing to an exacerbation of rumination. The differences observed among only children echo the findings of Chen Jin's research [23]. Non-only children, having been taught to share and be humble from an early age, may face challenges in fair conflict resolution, leading to reflections on parental satisfaction and an increased focus on negative emotions, consequently intensifying rumination. The study also identifies variations in rumination thinking across grades, consistent with Zhang Jing's research [24]. Senior high school students, grappling with the pressures of college entrance exams and academic workload, engage in negative self-reflection regarding their academic prospects and ideal achievements. This pessimistic thinking contributes to heightened levels of rumination. As grades advance and academic stress intensifies, students are more prone to adopting rumination thinking when confronted with negative events and emotions.

No significant difference is observed in rumination thinking based on residence, aligning with Chen Jin's research conclusions [23]. This lack of distinction may be attributed to the stable social development in the city, improved living standards, advancements in educational technology, and the gradually enhanced educational conditions provided by schools and parents. Even when parents are not physically present, technological aids such as remote video assistance may reduce the likelihood of children engaging in rumination.

### 4.2 Relationship Analysis between Rumination Thinking and Big Five Personality Traits, Psychological Control Sources in High School Students

Rumination thinking is significantly positively correlated with the Big Five personality traits, specifically neuroticism and conscientiousness. There is a partial difference compared to the findings of

Lyon et al., who, based on depression symptoms, observed a close relationship between the Big Five personalities (except agreeableness) and rumination<sup>[25]</sup>. Although variations with other scholars' results exist, such discrepancies are inevitable. Neuroticism within the Big Five personalities reflects an individual's capacity to cope with stress and regulate negative emotions. Individuals with higher neuroticism exhibit emotional instability and nervousness. Faced with negative events, those with high neuroticism tend to ruminate more severely due to their heightened emotional expression and intense reactions to stimuli. Furthermore, individuals with high neuroticism find it challenging to calm down after emotional stimulation, leading to the persistent recall of negative emotions and a continuous cycle of rumination. Consequently, for adolescents with high neuroticism, negative rumination exacerbates negative emotions, contributing to an increase in depressive symptoms.

The research results indicate a significant correlation between psychological control sources, internal control, authority, opportunity, and rumination thinking. Notably, internal control and rumination exhibit a negative correlation. Similarly, scholars, through analyzing college students, have noted that students' attributions of results influence self-reflection. The control source of college students is correlated with self-reflection, with internal control prevailing over external control<sup>[26]</sup>. Lin et al., under the influence of rumination, found that an individual's control source may change their attitude towards negative experiences<sup>[27]</sup>. Moreover, the psychological control source is significantly related to the Big Five personalities, and the mediating effect of the psychological control source is significant, validating hypothesis 3. Filipiak et al. also confirmed the relationship between the control source and personality, emphasizing the close association between the individual's control source tendency and conscientiousness, openness, and agreeableness<sup>[28]</sup>. Lima et al. studied cancer patients and found that control source played a mediating role between the Big Five personality traits and depression<sup>[18]</sup>. The root of the psychological control source lies in whether the individual attributes the results of behavior to internal factors or other uncontrollable external factors. Overall, there is a meaningful connection between the psychological control source and rumination thinking. If a student attributes exam failure to internal factors such as insufficient effort, they are likely to work harder, resulting in lower levels of rumination. Conversely, if students attribute exam failure to external uncontrollable factors, such as the difficulty of the exam paper and their own mistakes, the denial of their own value increases, leading to heightened rumination. Particularly under the pressure of China's college entrance examination, third-grade students may be unable to respond timely and correctly, fostering feelings of uncontrollability, ambivalence, and negative thinking. Consequently, individuals with a bias towards external control believe that events are beyond their control, with outcomes dictated by opportunities, authoritative figures, or external circumstances. Individuals with external control respond to problems with a negative attitude, lack proactive problem-solving approaches, leading to feelings of inferiority and decadence, thereby exacerbating rumination.

Scholars have also discovered a significant positive correlation between rumination and depression, resulting in mental health problems<sup>[3, 4]</sup>. Philippot et al. focused on emotionally vulnerable groups, demonstrating that repetitive thinking (i.e., rumination) is significantly correlated with anxiety and depression symptoms<sup>[5]</sup>. Mercer et al., through their study on psychological control sources, found that control sources involve individuals' cognition of events and interpretations of internal or external control of event results. Individuals' behavioral tendencies will differ due to differences in control sources, thereby exerting varying impacts on individual mental health<sup>[29]</sup>. From the related studies mentioned above, it is evident that to achieve mental health development, individuals need to reduce their level of rumination thinking. This can be controlled and improved through psychological control sources or through their role as mediators.

## 5. Conclusion

There are significant variations in rumination thinking among high school students concerning demographic factors. Gender, being the only child, and grade exhibit significant differences, while there is no distinction based on residential location. Rumination thinking demonstrates a significant positive correlation with the big five personality traits, neuroticism, and conscientiousness, whereas other dimensions show no correlation. Additionally, rumination thinking is notably associated with psychological control sources, authority, and opportunities. The source of psychological control plays a partial mediating role between the Big Five personality and rumination thinking.

## 6. Shortcomings and Prospects

Through a literature review, it is evident that rumination thinking is influenced by numerous factors. This study, however, solely focuses on the negative aspects of rumination, neglecting positive aspects. Therefore, future research could explore positive rumination or consider the impact of other related factors. In terms of research methods, alternative approaches such as interviews or painting test may be considered. These projection methods can contribute to confirming relationships between variables from various perspectives and enhance strategies for improving rumination.

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