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Research Paper

The Mediating Role of Emotion Regulation, Entrapment, and Depression Between Effortful Control, Rumination, and Suicidal Ideation

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ABSTRACT

Objective: Depression and suicidal thoughts are severe issues in the field of mental health, and identifying factors affecting them can be a practical step to prevent them. This study examined the relationships between effortful control and rumination with suicidal ideation through mediation emotion regulation, entrapment, and depression.

Methods: The study used a cross-sectional design. The sample comprised university students (n=222, 75.4% women). Participants completed the effortful control scale, difficulty in emotion regulation scale-short form, entrapment scale, rumination-reflection scale, Beck scale for suicidal ideation, and Beck depression inventory.

Results: The results of the path analysis showed that the variables of rumination and effortful control had a significant effect on suicidal ideation through emotion regulation and depression. Furthermore, entrapment through depression affected suicidal ideation. The proposed model had good fit indices.

Conclusion: It seems that cognitive defects reduce the ability to regulate emotions and make individuals vulnerable to depression and suicidal ideation. The results indicate the importance of strengthening emotion regulation and effortful control to prevent depression and suicidal ideation.

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Highlights

- There is a significant association between suicidal ideation, depression, entrapment, and rumination, with difficulty in emotion regulation.
- Effortful control relates negatively to difficulty in emotion regulation, entrapment, and rumination.
- Rumination and effortful control significantly influence suicidal ideation through emotion regulation and depression.

Plain Language Summary

University students experience many stresses during their educations, including paying for living expenses and university tuition, preparing for exams and projects, having concerns about unemployment after graduation, losing romantic relationships, and being away from family. Students who suffer from several anxieties for an extended period are likely at risk for psychological problems. These students constantly think about negative problems, and all their attention is on them. Over time, negative thoughts are habitually formed, and the students cannot stop these thoughts. Negative thoughts are followed by negative emotions such as sadness, anxiety, and anger. If negative thoughts and feelings persist and do not decrease in intensity, it puts people at risk of depression. They think they are trapped in this situation, and there is no way out. Some people in this situation think about suicide to get out of this situation. In this research, researchers wanted to know what is going on in the minds of students who are thinking about suicide and how students cope with their negative thoughts and feelings, which ultimately lead to suicidal ideas. Understanding this issue can help psychologists design effective suicide prevention programs.

Introduction

The results of the studies have reported that the rate of suicide in Iran is 9 per 100000 people, of whom teenagers account for about 10% of the suicide statistics (Arezoo et al., 2019). Also, studies show that suicide attempts in university students varied from 3.8% to 6% and suicidal ideation from 8.2% to 49.7% (Miri et al., 2022). Identifying the risk factors of suicidal ideation and attempts is an essential step in prevention (Weber et al., 2017). Although several studies have attempted to identify determinants of suicidal behaviors and thoughts, many identified factors predict poor suicide (Franklin et al., 2017). Previous studies have proven that during psychological disorders, vulnerability to major depression increases the risk of suicidal behaviors and thoughts (Mullins et al., 2014; Ren et al., 2019). The current study seeks to inquire into the role of effortful control and rumination in suicidal ideation through emotion regulation, entrapment, and depression.

One of these crucial factors in depression and suicide is feeling entrapment, believing in the inability to change unfavorable situations. A sense of entrapment occurs when a person's efforts to break free from distressing or degrading situations are obstructed (Gilbert & Allan, 1998). Studies indicate that suicide attempts are caused by a person's desire to evade unpleasant circumstances (external entrapment) or to flee from unpleasant thoughts and emotions (internal entrapment) (O'Connor & Portzky, 2018). In the integrated motivational-volitional (IMV) model (O'Connor & Kirtley, 2018), entrapment serves as a fundamental element within the psychological processes that contribute to the emergence of suicidal thoughts. It is assumed that feeling entrapment is a primary factor contributing to suicidal behavior (O'Connor & Kirtley, 2018). In a longitudinal study with a sample of hospitalized patients after a suicide attempt, O'Connor et al. (2013) found that levels of entrapment predicted the status of suicide attempts. Significantly, even after controlling for suicidal ideation, symptoms of depression, hopelessness, and entrapment remained a significant predictor of suicidal status. In a meta-analysis study, Siddaway et al. (2015) found that the effect size of the relationship between suicidal attempts and feelings of entrapment is substantial. Also, Ho¨ller et al. (2022) found that both dimensions of entrapment (internal and external) affected suicidal thoughts as well as entrapment has an effect on suicidal thoughts through the variable of hopelessness, and external entrapment had a more significant impact on suicidal thoughts.

Emotion regulation comprises two independent processes: the ability to control emotion and utilizing emotion regulation strategies, which are considered complementary standpoints—the work of Aldao and Tull (2015). The ability to regulate emotion, for example, a lack of clarity of emotion, difficulty in performing purposeful behavior, difficulty controlling impulse, limited access to emotion regulation strategies, and lack of acceptance of emotional response, influences different strategies and affects the development and persistence of psychopathology (Naragon-Gainey et al., 2017). Empirical evidence has indicated that problems of emotion regulation are associated with depression (Joormann & Tanovic, 2015; Joormann & Quinn, 2014), and individuals with weak emotion regulation abilities tend to be poor at overcoming depression in stressful situations. In contrast, people with a strong ability for emotion regulation prefer to manage their negative emotions (Joormann & Stanton, 2016).

Furthermore, a systematic review showed that individuals with difficulty in emotion regulation in both dimensions of processes and strategies had higher levels of suicidal ideation and behaviors. These results were actual among adolescents and adults and in clinical and general populations (Colmenero-Navarrete et al., 2022). Difficulty in the cognitive regulation of emotion increases the risk of suicidal ideation and behavior (Brausch & Woods, 2019; Hatkevich et al., 2019; Neacsiu et al., 2018; Wolff et al., 2018). Also, a longitudinal study has shown that general problems in emotion regulation predicted increased scores in suicidal ideation in 6 months (Raudales et al., 2020). In Iran, one study found that a lack of clarity of emotion, difficulty in performing purposeful behavior, difficulty controlling impulses, limited access to emotion regulation strategies, and lack of acceptance of emotional responses were correlated with suicidal thoughts and behavior (Sadjadpour et al., 2021). Thus, cognitive defects and problems with cognitive emotion regulation play an important role in suicide (Fazakas-DeHoog et al., 2017).

Temperament is a significant potential susceptibility to depression (Marchetti et al., 2018). In Rothbart's model, effortful control is one of the key components of temperament, which manages mood and emotional and behavioral responses. The term effortful control refers to the three components of attentional control, activation control, and inhibitory control (Rothbart et al., 2001). Attentional control is defined as the ability to focus attention and to shift it when necessary; inhibitory control is the ability to stop or withhold inappropriate behaviors; activation control is the ability to act in situations when there is an intense desire not to do so (Damon et al., 2006). Effort control skills involve integrating information, planning, and modulating emotional experience and behavior. Research confirms that effortful control is stable over time and is an essential factor correlated with lower depression (Liu et al., 2022; Marchetti et al., 2018). Considering the safekeeping effect of effortful control on depression (Dolcini-Catania et al., 2020), this study selected this dimension. According to temperamental theories of risk, a significant degree of effortful control was associated with efficient strategies to regulate negative emotions. Individuals with low levels of effortful control have difficulty inhibiting inappropriate responses and quickly shifting their attention away. As such, they may experience chronic negative effects that can eventually lead to the onset of depression (Gulley et al., 2016). Previous studies on the relationships between effortful control and suicide have shown that depressed individuals with suicide attempts had more difficulties than those without suicide attempts in inhibiting response and choosing appropriate behavior (Moniz et al., 2017).

In a longitudinal study with a considerable sample size of young individuals, Lawson et al. (2022) found that individuals with more significant amounts of effortful control are less likely to experience suicidal ideation and behaviors. On the other hand, higher levels of negative emotion were associated with a higher risk for the onset of suicidal thoughts and actions. Recently, one study investigating the relationship between attention control capacities and suicidal ideation in individuals with major depression measured attention control capacity by using the computerized Stroop test and the continuous performance task. The results showed that suicidal ideation was related to more significant attentional interference in the Stroop test, while the score of continuous performance tasks was not correlated with suicidal ideation (Herzog et al., 2023).

Evidence suggests that persistent negative thoughts can serve as a significant risk factor for suicidal thoughts and behavior (Law & Tucker, 2018; Rogers & Joiner, 2017). Rumination is persistent and recurring thoughts about a prevalent subject matter. Such thoughts intrude upon consciousness without intention, redirecting focus away from intended subjects and present objectives (Watkins et al., 2020). Rogers and Joiner (2017), in a meta-analysis study, indicated that rumination was related significantly to suicidal ideation and suicide attempts. Tang et al. (2021) found that depressed patients with a history of suicide attempts had a higher score in rumination than depressed patients without a history of suicide attempts. Even after accounting for the effects of age, depression, and anxiety,

this difference was significant. In a study involving 5211 participants, Yao et al. (2023) discovered that negative life events, if processed through rumination, affect suicidal ideation. Also, hope acts as a protective factor, which reduces both the direct and indirect influences of negative life events on suicidal thoughts. Hallard et al. (2021) examined the role of rumination and different thought control strategies in relation to the understanding of suicidal thoughts. According to the authors, maladaptive thought control strategies, namely, worry and self-punishment together with rumination, predicted the experience of suicidal thoughts, whereas adaptive ones, distraction, and cognitive reappraisal, negatively predicted it. This finding underlines how vital rumination is as a thought control strategy in the development of suicidal ideation.

Regarding the purpose of the current study, one study employed the Stroop, Wisconsin, and Raven tasks for assessing cognitive control and the cognitive emotion regulation questionnaire for assessing emotion regulation in Iranians. This study reports that individuals with suicide ideation or attempted suicide show less cognitive control and cognitive emotion regulation compared to controls. Moreover, the attempters show less cognitive control and report more self-blame, rumination, catastrophizing, and less acceptance than ideators (Abdollahpour Ranjbar et al., 2021). In another research study, the impact of effortful control and emotion regulation on depression in children was confirmed as well (Zhang et al., 2023). Nasso et al. (2019) investigated the relationship between emotional regulation strategies and rumination among college students. They found that those with a lower level of rumination could benefit from the beneficial effects of reappraisal in emotion regulation. Catalino et al. (2017) found that acceptance of thoughts and emotions was related to fewer negative emotions and that this association was part of the lesser extent to which rumination occurs, and hence, less stress at moments when the stressors present. Rumination is more powerfully related to negative emotion. Sadatmiri et al. (2021) confirmed that rumination directly impacted emotion regulation. Choi and Shin (2023) noted that cognitive controls might weaken the association between feelings of entrapment and hopelessness, indicating that cognitive control plays a protective role in preventing the escalation of these negative feelings.

The current study has a novelty element as it investigates the mediating effects of difficulties in emotion regulation, entrapment, and depression in the relationship between effortful control, rumination, and suicidal ideation in students whose suicidal ideation has been verified. Its results could usefully help develop and implement specific intervention practices among students.

Materials and Methods

This research has a descriptive and cross-sectional design. The study population comprised 3700 students who attended the online mental health screening. The students had to participate in this online screening by entering their names and phone numbers. In the online screening, 332 respondents answered positively to the suicidal thoughts questions. These students were invited by phone to conduct a face-to-face interview at the Counseling and Health Center of Bojnord University. Suicidal thoughts were established in 222 students using the mini-international neuropsychiatric interview (MINI). These students were invited to participate in the present study. The questionnaires of the study were answered anonymously by those who gave their consent to participate in the study.

Based on the formula suggested by Tabachnick and Fidell (2007), the minimum sample size required in the correlation study is calculated from the relationship $N \geq 50+8M$, where N is the sample size, and M is the number of predictor variables. Considering the existence of 6 variables and according to the formula, the minimum sample for this study should be 98 people. The age of the participants was in the range of 19 to 28 years. Also, 55 students (24.6%) were male, and 167(75.4%) were female. Participants completed study questionnaires, and data were analyzed using SPSS and AMOS software, version 24.

Inclusion and exclusion criteria

The inclusion criteria included consent to participate in the study, being a student, and having suicidal thoughts. The exclusion criteria included a lack of mental health screening or visits to the Bojnourd University Counseling and Health Center for an interview.

Study instruments

The MINI

Psychiatrists and clinical psychologists developed the MINI interview to conduct a quick diagnostic interview. It is a short, structured diagnostic interview that takes approximately 15 minutes. Designers compared MINI with the structured clinical interview for DSM diagnoses (SCID) and the composite international diagnostic interview for ICD (CIDI). Findings indicated good concordance between the MINI, SCID, and CIDI (Sheehan et al., 1998).

Difficulty in emotion regulation scale-short form

Gratz and Roemer (2004) developed the difficulty in emotion regulation scale with 36 items. Subsequently, Bjureberg redesigned this scale and validated it with 16 items. It has five subscales: Lack of clarity of emotion, difficulty performing purposeful behavior, difficulty controlling impulses, limited access to emotion regulation strategies, and lack of acceptance of emotional response. The range of answers is placed on a Likert scale of 1 to 5. The designers reported a high internal consistency (0.93) on this scale (Bjureberg et al., 2016). In Iran, reliability coefficients by the Cronbach α were obtained in the range of 0.68 for difficulty performing purposeful behavior, 0.77 for lack of clarity of emotion, and 0.91 for the whole scale. Also, it was reported that this scale was correlated with the neuroticism of NEO inventory (Fallahi et al., 2021).

Effortful control scale

This study used the effortful control subscale of Evans and Rothbart's adult temperament questionnaire. It is a self-report questionnaire containing subscales of effortful control, negative affect, orienting sensitivity, and extraversion/surgency. The short form of effortful control has 19 items and three components: activation control, attentional control, and inhibitory control. The Cronbach α was reported to be 0.78, and a correlation between effortful control short form and its long-form was 0.96. Items consist of 7-response option Likert scales. A high score indicates intense effortful control and a low score indicates weak effortful control. It was reported that the Cronbach α of activation inhibition, attention inhibition control, and the whole were 0.74, 0.83, 0.84, and 0.90, respectively. Also, retesting reliability was obtained with an interval of two weeks as 0.79, 0.89, 0.81, and 0.90, respectively, for subscales and the whole scale (Evans & Rothbart, 2007). In Iran, this scale was adapted for teenagers and reported a total reliability of 0.79, and its construct validity was confirmed through confirmatory and exploratory factor analysis(Keramati et al., 2021).

Beck depression inventory (BDI-II)

The BDI-II is a self-report instrument of 21 items and measures depressive symptom severity on a 4-point Likert scale. High scores indicate the severity of depression. It has confirmed good psychometric properties (Wang & Gorenstein, 2013). In the Iranian sample of university students, the Cronbach α and retest reliability were reported to be 0.87 and 0.73, respectively. Also, the correlation coefficient between BDI-II and the depression subscale of the general health questionnaire was 0.68 (Rahimi, 2014).

Beck scale for suicidal ideation

The Beck scale for suicidal ideation has 19 items and measures the presence and intensity of suicidal ideation. Each item is scored based on a 3-point Likert scale. In the Iranian population, the Cronbach α coefficient was reported to be 0.83, and its correlation with the global severity index in SCL-90-R (the symptom checklist-90-revised) was 0.51 (Esfahani et al., 2015).

Entrapment scale

The entrapment scale is a 16-item self-report questionnaire designed to assess entrapment. It was initially developed to measure feelings of entrapment in the context of depression (Gilbert & Allan, 1998). The scale is scored on a 5-point Likert scale (0=does not apply to me at all, 1=applies to me a little, 2=applies to me moderately, 3=somewhat applies to me or it applies to me, 4=completely applies to me) to items. The first ten items refer to external entrapment, and the following six refer to internal entrapment. Total scores range from 0 to 70. Ghamarani et al. (2013) studied the validity and reliability of the entrapment scale in a sample of Iranian students. By confirmatory and exploratory factor analysis, they confirmed the model of two factors. The Cronbach α reliability was obtained for the whole scale and internal and external subscales of 0.92, 0.87, and 0.88, respectively. They reported the correlation of the scale's total score with the external subscale of 0.95 and the internal subscale of 0.90.

Rumination-reflection scale

The rumination-reflection scale was designed by Trapnell and Campbell (1999) to measure rumination's maladaptive and adaptive components. It contains 24 items, of which 12 focus on self-rumination and its 12-item assessment of adaptive reflective thinking. Answer each item on a 5-point Likert scale ranging from 5 (strongly agree) to 1 (strongly disagree). The designers reported that the rumination subscale had a robust positive relationship with neuroticism, and the reflection subscale was related to openness to experience. They obtained the Cronbach α for reflection and rumination as 0.91 and 0.90, respectively. Also, in the study of Ghorbani et al. (2008), the characteristics of good psychometric validity were shown for this instrument, so the internal consistency of this scale was reported as 0.84 in Iran and 0.80 in United States.

Results

Table 1 includes the studied variables' Mean±SD skewness, and kurtosis. Since the coefficients of skewness and kurtosis of the variables are between +3 and -3, the data distribution is normal.

Table 2 presents gender differences in the variables studied. The independent t-test for the studied variables indicated a non-significant difference between genders at a significance level of 0.05. Therefore, in the subsequent analyses, there is no need to control the effect of gender.

Table 3 provides valuable information about the relationships between the studied variables, highlighting the strength and direction of the correlations.

Table 3 shows that suicidal ideation has a high correlation with depression (r=0.60) and entrapment (r=0.55). Besides suicidal ideation, depression has the highest correlation with entrapment (r=0.84) and difficulty in emotion regulation (r=0.75). The difficulty in emotion regulation on depression has the highest correlation between entrapment (r=0.79) and rumination (r=0.69). Effortful control has a high correlation with difficulty in emotional regulation (r=-0.61), entrapment (r=-0.46), and rumination (r=-0.44).

The correlation coefficients of suicidal ideation with difficulty in emotion regulation and rumination are 0.32 and 0.23, respectively.

Due to the weak association of reflection with the studied variables and the non-significance of the effects of reflection on other variables in the initial model, it was removed from the model. In fitting the initial model, the path of rumination to entrapment was added, but the path of entrapment to depression was omitted, which helped to fit the model.

The results of the path analysis showed that rumination has a direct and significant effect on the difficulty in emotion regulation, with a coefficient of 0.52, and entrapment, with a coefficient of 0.23. The effortful control directly and significantly affects the difficulty of emotion regulation, with a coefficient of -0.38. The difficulty in emotion regulation variable has a direct and significant

Table 1. Descriptive indices of the studied variables

Variables	Mean±SD	Skewness	Kurtosis
Suicidal ideation	8.72±6.53	1.027	1.004
Depression	20.85±13.89	0.277	-0.838
Entrapment	0±16	0.368	-1.155
Lack of clarity of emotion	2.44±2.08	1.028	0.057
Difficulty performing purposeful behavior	5.72±3.22	-0.021	-0.992
Difficulty controlling impulse	3.8±2.99	0.953	0.363
Limited access to emotion regulation strategies	7.18±4.84	0.665	0.079
Lack of acceptance of emotional response	3.52±2.94	0.769	-0.402
Difficulty in emotion regulation	22.67±13.2	0.53	-0.581
Attentional control	17.6±6.73	0.058	-0.671
Activation control	14.86±4.28	-0.321	-0.055
Inhibitory control	32.32±8.82	-0.571	-0.006
Effortful control	64.8±15.99	-0.692	0.329
Rumination	8±48	-0.17	-0.575
Reflection	16±48	0.19	-0.422

Table 2. Examination of gender differences in the studied variables

Variables	Gender	Mean±SD	t Independence	Sig.
Depression	Female	20.19±13.51	-0.91	0.36
	Male	22.86±15.04		
Difficulty in emotion regulation	Female	21.54±12.92	-1.66	0.099
	Male	26.13±13.69		
Effortful control	Female	65.6±15.3	0.97	0.33
	Male	62.33±18		
Suicidal ideation	Female	8.78±5.92	0.18	0.85
	Male	8.53±8.22		
Rumination	Female	29.78±8.74	-1.05	0.29
	Male	32±10.35		
Reflection	Female	30.62±7.6	0.04	0.96
	Male	30.2±5.8		
Entrapment	Female	6.67±5.01	-1.28	0.20
	Male	8.06±5.63		

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effect on the entrapment variable with a coefficient of 0.62 and depression with a coefficient of 0.23. Also, the depression on suicidal thoughts with a coefficient of 0.54.

Regarding goodness indicators of the fitted model (Figure 1), the results showed that RMSEA, p, χ^2/df, TLI, NFI, CFI, GFI, and IFI are 0.001, 0.52, 0.84, 0.99, 0.99, 0.99, 0.99, and 0.99 respectively. Thus, the model of the relationship between effortful control, rumination, and suicide ideation with the mediating role of emotion regulation, entrapment, and depression has a good fit. Also, the results of R^2 for suicidal ideation, depression, entrapment, and emotional regulation were 0.35, 0.73, 0.64, and 0.59.

Table 4 shows that the most substantial indirect effects are the path of rumination to depression 0.49, the path of difficulty in emotion regulation to depression 0.41, and the path of difficulty in emotion regulation to suicidal ideation 0.34. Also, the most potent total effects are the path of entrapment to depression 0.66 and the path of difficulty in emotion regulation to depression 0.64, the path of difficulty in emotion regulation to entrapment 0.62, the path of rumination to entrapment 0.56, depression to suicidal ideation 0.54, and the path of rumination to difficulty in emotion regulation 0.52.

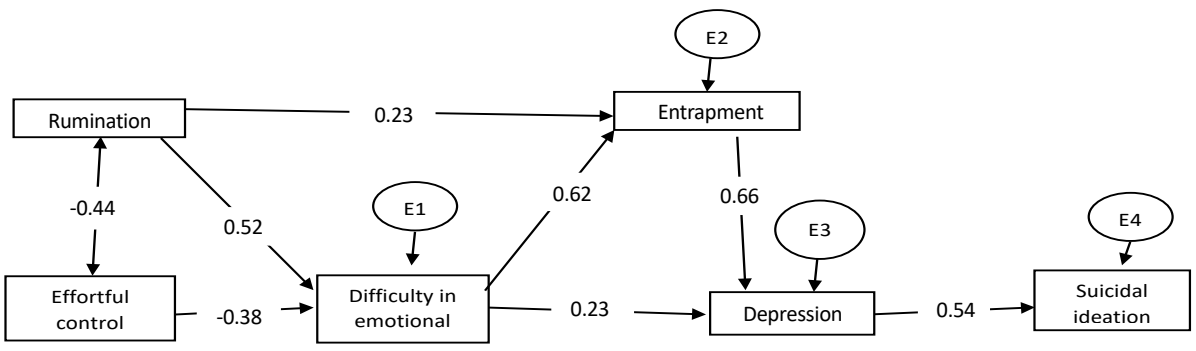

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Figure 1. Modified model

Table 3. Correlations between the studied variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1- Suicidal ideation	*													
2- Depression	0.60**	*												
3- Effortful control	-0.004	-0.41**	*											
4- Inhibitory control	0.004	-0.24**	0.83**	*										
5- Activation control	0.05	-0.30**	0.7^{5}**	0.39**	*									
6- Attentional control	-0.04	-0.47**	0.81**	40**	0.64**	*								
7- difficulty in emotion regulation	0.32**	0.75**	-0.61**	-0.33**	-0.49**	-0.71**	*							
8- Lack of acceptance of emotional response	0.23**	0.54**	-0.44**	-0.37**	-0.29**	-0.37**	0.74**	*						
9- Limited access to emotion regulation	0.26**	0.70**	-0.56**	-0.33**	-0.43**	-0.63**	0.92**	0.65**	*					
10- Difficulty controlling impulse	0.35**	0.63**	-0.45**	-0.21*	-0.33**	-0.59**	0.84**	0.54**	0.68**	*				
11- Difficulty performing purposeful behavior	0.26**	0.56**	-0.44**	-0.11	-0.41**	-0.64**	0.74**	0.28**	0.63**	0.55**	*			
12- Lack of clarity of emotion h	0.19*	0.58*	-0.63**	-0.33**	-0.60**	-0.68**	0.79**	0.53**	0.66**	0.67**	0.49**	*		
13- Rumination	0.23**	0.54**	-0.44**	-0.16	-0.44**	-0.55**	0.69**	0.47**	0.61**	0.53**	0.62**	0.57**	*	
14- Reflection	-0.16	-0.27**	0.08	0.004	0.02	0.17	-0.25**	-0.12	-0.25**	-0.26**	-0.19*	-0.18*	0.09	*
15- Entrapment	0.55**	0.84**	-0.46**	-0.25**	-0.36**	-0.54**	0.79**	0.54**	0.74**	0.63**	0.57**	0.70**	0.14	0.65**

*Sig.<0.05, **Sig. <0.01.

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Table 5 shows that based on the Sobel test and the level of significance, mediating variables, namely emotional regulation, depression, and entrapment, significantly mediate the relationships between effortful control, rumination, and suicidal ideation.

Discussion

This study examined the relationship between effortful control, rumination, and suicidal ideation via emotion regulation, entrapment, and depression. According to the results of the path analysis, rumination, and effortful control had significantly affected depression through emotion regulation, and entrapment through depression had an impact on suicidal ideation.

This study showed that effortful control affects depression by affecting emotion regulation. Empirical evidence confirms that cognitive deficits through emotion dysregulation affect depression (Joormann & Quinn, 2014; Joormann & Tanovic, 2015). In this regard, the cognitive-behavioral model points out that cognitive deficits may affect suicide ideation by triggering specific cognitive processes involved in negative emotion regulation (Wenzel & Beck, 2008). This result is also in line with the study of Abdollahpour Ranjbar et al. (2021), which shows that cognitive control deficits affect suicide ideation through cognitive emotion regulation (rumination, acceptance, self-blame, and catastrophizing). It seems that defects in the components of attention control, inhibitory control, and activation control lead to difficulty in emotion regulation. The inability to regulate negative emotions makes an individual prone to depression and the development of suicidal ideation.

Table 4. Direct, indirect, and total effects on paths

Paths			Direct effect				Estimate	
			Estimate	S.E.	C.R.	P	Indirect Effect	Total Effect
Effortful control	→	Emotion regulation	-0.38	0.05	-5.95	0.0001		-0.38
Rumination	→	Emotion regulation	0.52	0.09	8.14	0.0001		0.52
Rumination	→	Entrapment	0.23	0.04	3.28	0.001	0.33	0.56
Emotion regulation	→	Entrapment	0.62	0.03	8.65	0.0001		0.62
Emotion regulation	→	Depression	0.23	0.08	3.01	0.003	0.41	0.64
Entrapment	→	Depression	0.66	0.20	8.60	0.0001		0.66
Depression	→	Suicidal ideation	0.54	0.04	6.87	0.0001		0.54
Rumination	→	Depression					0.49	0.49
Rumination	→	Suicidal ideation					0.26	0.26
Effortful control	→	Entrapment					-0.24	-0.24
Effortful control	→	Depression					-0.25	-0.25
Emotion regulation	→	Suicidal ideation					0.34	0.34
Effortful control	→	Suicidal ideation					-0.13	-0.13
Entrapment	→	Suicidal ideation					0.35	0.35

S.E: Standard error; C.R: Critical ratio.

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This study found that rumination was related to difficulty in emotion regulation, depression, entrapment, and suicidal ideation. Also, path analysis showed that rumination had a significant effect on depression through difficulty in emotion regulation. Regarding the correlation between rumination and emotion regulation, this finding is consistent with the studies of Nasso et al. (2019), Catalino et al. (2017), and Sadatmiri et al. (2021). In line with previous studies (Tang et al., 2021; Yao et al., 2023; Hallard et al., 2021), we found that rumination indirectly by entrapment, difficulty in emotion regulation, and depression affect suicidal ideation. It seems that repetitive

Table 5. Sobel test for significance of mediation paths

Paths					Sobel Test	Sig.
Rumination	→	Entrapment	→	Depression	2.86	0.004
Rumination	→	Emotion regulation	→	Depression	2.57	0.01
Rumination	→	Emotion regulation	→	Entrapment	5.57	0.0001
Effortful control	→	Emotion regulation	→	Depression	2.68	0.007
Effortful control	→	Emotion regulation	→	Entrapment	7.15	0.0001
Emotion regulation	→	Depression	→	Suicidal ideation	2.81	0.004
Emotion regulation	→	Entrapment	→	Depression	3.26	0.001
Entrapment	→	Depression	→	Suicidal ideation	3.20	0.001

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negative thinking through increasing helplessness and entrapment and disruption of emotion regulation leads to suicidal thoughts.

The results of the correlation showed that the difficulty of emotion regulation was related to depression and suicidal ideation. Moreover, the findings from the path analysis showed that suicidal ideation is affected by the difficulty of emotion regulation through depression. These findings are in agreement with previous studies that also established that emotion regulation problems predict suicidal ideation (Brausch & Woods, 2019; Colmenero-Navarrete et al., 2022; Neacsiu et al., 2018; Raudales et al., 2020; Sadjadpour et al., 2021; Abdollahpour Ranjbar et al., 2021; Wolff et al., 2018). As for the difficulty in emotion regulation being associated with depression, the findings agree with earlier research by Zhang et al. (2023). Previous studies indicate that individuals with weak emotion regulation abilities tend to be poor at overcoming depression if stressed. In contrast, individuals who have strong emotion regulation are more likely to reduce their negative emotional experiences (Joormann & Stanton, 2016).

Finally, the findings from the path analysis indicate that the variables of entrapment affect direct suicidal ideation indirectly through depression. This result is consistent with those of O'Connor and Portzky's study (2018), O'Connor et al. (2013), and Ho¨ller et al. (2022). According to models of suicide, the inclination to escape severe feelings of emotional distress and entrapment arouses suicidal thoughts and behaviors. When strong negative emotions are combined with the perception of not being able to escape from situations, the possibility of committing suicide increases (O'Connor, 2003). According to the Cry of Pain model, the feeling of entrapment leads to hopelessness, which can trigger depression and suicidal thoughts (Roepke & Seligman, 2016). When individuals focus on unavoidable life situations resulting from rumination, the sense of entrapment intensifies, further contributing to the severity of depression and suicidal thoughts.

The interaction between emotional and cognitive control is complex but critical in the understanding of suicidal ideation. Insufficient regulation of negative emotions, together with deficits in cognitive flexibility and repetitive negative thinking, may impede problem-solving abilities and support the development or persistence of feelings of entrapment and depression that eventually trigger suicidal ideation. Generally, in the current study, there is no use of questionnaires measuring the degree of suicidal thoughts. Moreover, suicidal thoughts are verified using a mini-structured interview, which was a considerable advantage in the present study. In this context, the study investigates the parallel role of cognitive variables of effortful control, rumination, and entrapment with emotional variables (difficulty in emotion regulation) on depression and suicidal thoughts. Consequently, though the study was conducted with the university's students, generalizing into the overall population needs to be very cautious. Data collection through questionnaires also exposes them to bias, such as the responses provided. Further, the method of approach is a correlation, meaning no causality effect regarding relationships between variables can be considered. The investigation into the interaction between emotional regulation, cognitive regulation, and suicidal ideation has important implications for intervention. Intervention studies are required to establish whether targeting both emotional and cognitive control can indeed reduce suicidal ideation and enhance resilience among vulnerable individuals. Further research should continue to investigate these constructs within diverse populations, potential underlying neurobiological mechanisms, and their interaction.

Conclusion

The findings revealed that effortful control and rumination influence suicidal ideation through their impact on emotional regulation difficulties, feelings of entrapment, and depression. Cognitive deficits can impair emotional regulation abilities, increasing vulnerability to depression, entrapment, and suicidal ideation. These results emphasize the importance of improving effortful control and emotional regulation skills to reduce the risk of depression and suicidal thoughts.

Ethical Considerations

Compliance with ethical guidelines

The Ethics Review Board of the University of Bojnord, Iran, approved the present study (Code: IR.UB.REC.1402.023). Informed consent was obtained from participants.

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Authors' contributions

All authors equally contributed to preparing this article.

Conflict of interest

The authors declared no conflict of interest.

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