

## The Emergence of Suicidal Ideation: Testing the Three-Step Theory in Iranian Adolescents

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### Abstract

**Objective:** Suicide is a global public health problem with significant adverse effects on individuals and society, especially among adolescents. Klonsky's three-step theory (3ST) of suicide explains suicidal ideation through three factors, namely hopelessness, psychological pain, and connectedness in two steps. No study has investigated connectedness (step 2) in combination with psychological pain and hopelessness (step 1) in prediction of suicidal ideation among adolescents. Thus, we empirically tested the first two steps of the 3ST in a sample of Iranian adolescents.

**Method:** A total of 466 adolescents aged 12 to 20 years (356 females and 110 males) were recruited using convenience sampling. This cross-sectional study was conducted between September to November 2024. The participants completed self-report questionnaires on suicidal ideation, hopelessness, psychological pain, and connectedness. Hierarchical linear regression analysis was conducted to explore the impact of the interaction of hopelessness and psychological pain on suicidal ideation. In addition, we explored whether connectedness reduced the escalation of suicidal ideation in adolescents experiencing high psychological pain and hopelessness levels.

**Results:** The findings showed that the interaction of hopelessness and psychological pain accounted for 59% of the variance in suicidal ideation ( $P < 0.001$ ). Connectedness was found as a protective factor for suicidal ideation in adolescents who experience high levels of both psychological pain and hopelessness ( $r = 0.24$ ,  $P < 0.001$ ).

**Conclusion:** These findings support the applicability of the first two steps of the 3ST for Iranian adolescents. Future research should examine all three steps of this theory in a clinical sample of adolescents.

**Key words:** *Adolescents; Connectedness; Hopelessness; Psychological Pain; Suicidal Ideation; Three-Step Theory*

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**S**uicide is a significant public health concern globally and is ranked as the second leading reason for death in adolescents (1). In recent years, its prevalence has been increasing in many countries including Iran (2-4). In Iranian adolescents, the prevalence of suicide attempts is estimated to be 6% to 8.3%, while suicidal ideation is estimated to range from 2.8% to 7.49% (5). Suicidal ideation is a major warning sign for potential suicide attempts (6, 7). Studying suicidal ideation in adolescents is vital because they deal with unique risks that negatively impact their lives on individual, familial, social, educational, and economic levels (8, 9).

Suicidal ideation is characterized by thoughts of engaging in behaviors aimed at ending one's life (10, 11). Ideation-to-action theories, such as the three-step theory (3ST), the integrated motivational volitional model (IMV), and the interpersonal theory of suicide (IPTS), offer a framework that can guide future studies and preventive interventions in suicidal ideation (12). According to this perspective, (a) the suicidal ideation development and (b) the progression from suicidal ideation to suicide attempts is needed to be considered separate processes with unique predictors and explanations (13). The three-step theory (3ST) explains suicidal ideation by three factors (i.e., psychological pain, hopelessness, connectedness) in two steps. Step 1 indicates that the interaction of hopelessness and psychological pain leads to suicidal ideation development. Step 2 implies that connectedness serves as a significant protective factor against the suicidal ideation escalation among vulnerable individuals (i.e., individuals experiencing both psychological pain and hopelessness). Connections with loved ones, fulfilling roles, or a sense of purpose can provide meaning in life, even in the presence of psychological pain (12, 14).

The validity of hypotheses related to the 3ST has been investigated across different populations. For example, a study by Klonsky and May (2015) in a sample of American adults, found that the interaction of hopelessness and psychological pain markedly explained suicidal desire. Additionally, connectedness has been shown to offer protection against suicidal thoughts in individuals suffering from significant psychological pain and hopelessness (14). These results were widely replicated in clinical and non-clinical samples (15-21). Based on these studies, it seems that the 3ST holds significant potential for advancing suicide research and prevention.

While there is a growing body of evidence supporting the 3ST theory in adult populations, formulations derived from adult samples may not be equally applicable to adolescents (22, 23). Previous studies recommended that future studies should investigate the initial two steps of this theory in diverse populations, including samples from different countries and in various age groups, such as adolescents (14, 18).

Only a limited number of studies have focused on examining variables relevant to 3ST in adolescents (24).

For instance, a study involving inpatient adolescents who had recently attempted suicide found that psychological pain and hopelessness were the most significant predictors of suicidal behavior (25). Furthermore, a study by Gunn *et al.* in a community sample revealed that suicidal thoughts diminished as social connectedness (such as feelings of love, acceptance, and being wanted) and parental connectedness (including closeness to parents, perceived warmth, and satisfaction with communication) increased (26).

Previous studies have not investigated connectedness (step 2) in combination with psychological pain and hopelessness (step 1) among adolescents. As a result, it remains uncertain whether elevated levels of hopelessness and psychological pain contribute to increased suicidal ideation independent of the degree of connectedness or whether connectedness could serve as a protective factor (24). While various studies have identified risk factors associated with suicide among Iranian adolescents (27, 28), no study has been conducted on the ideation-to-action theories in this population. Therefore, it is essential to gain a deeper understanding of suicidal behaviors within an ideation-to-action framework in the Iranian society. Consequently, this study aimed to explore suicidal ideation within this framework among a sample of Iranian adolescents. Specifically, we examined how psychological pain and hopelessness, as outlined in Step 1 of the 3ST model, contribute to the development of suicidal ideation. Additionally, we investigated the protective role of connectedness, as described in Step 2 of the 3ST model, in preventing the escalation of suicidal ideation in at-risk adolescents. We hypothesized that psychological pain and hopelessness (step 1) would independently and interactively predict suicidal ideation in adolescents, while connectedness would act as a protective factor against the worsening of suicidal thoughts in those experiencing both psychological pain and hopelessness (step 2).

## Materials and Methods

A total of 466 adolescents aged 12 to 20 years were recruited using convenience sampling. This cross-sectional descriptive study was conducted between September to November 2024. Data were collected from four schools in Tehran, via an online survey administered to students. The inclusion criteria were: (a) adolescents aged 12 to 20 years at the time of the study, and (b) informed consent obtained from adolescents and their parents to participate. Participants were excluded if they provided incomplete responses to the questionnaires. According to recent studies, the age range of adolescence has evolved. A more comprehensive definition of adolescence, extending from ages 10 to early 20, more accurately reflects both developmental processes and societal perceptions of this life stage. Thus, the age range of 12 to 20 years was selected for this study (29).

The current study was approved by the Research Ethics Committee of School of Medicine-Shahid Beheshti

University of Medical Sciences [IR.SBMU.RETECH.REC.1403.253]. The consent form included assurances of confidentiality and anonymity, and participants were informed that their involvement was voluntary. Out of 510 adolescents who received the survey link, 466 responded to the questionnaires completely and were included in the final analysis, with the response rate being 91.3%.

#### Measurements

**Beck Scale for Suicidal Ideation (BSSI):** The BSSI is a self-report scale to evaluate suicidal ideation experienced over the last week. BSSI includes 19 items, each with three response options that range from 0 to 2. The total score is between 0 and 38, and higher scores indicate a greater suicidal ideation level. Items 1 to 5 can be utilized as a screening measure. If participants report any level of ideation greater than zero on the initial five items of the BSSI, they are asked to complete the entire BSSI, and their score for suicidal ideation is determined by summing the total BSSI score. If not, they receive a score of 0 for suicidal ideation (30, 31). As our primary focus was on evaluating suicidal ideation, rather than suicide planning, preparation, or attempting suicide, the first five items of the BSSI were used to measure the presence of suicidal desire. These items have consistently been identified as loading onto a suicidal ideation factor (15). The Cronbach's alpha of the Persian version has been reported to be 0.80 in the general population. It demonstrated a positive association with depression and the global severity index measured by the SCL-90, while showing a negative relationship with social support. Additionally, the screening scores showed a positive correlation with anxiety, psychoticism, hostility, and hopelessness (32). In our sample, Cronbach's alpha was 0.88.

**Beck Hopelessness Scale (BHS):** The Beck Hopelessness Scale is a 20-item scale designed to evaluate hopelessness or negative expectations regarding the future within the past week. Responses are scored as false or true, with the total score ranging between 0 and 20, calculated by summing the individual responses (33). Higher scores indicate a greater level of hopelessness. Cronbach's alpha of the Persian version has been reported to be 0.79 in a sample of university students (34). In our sample, the Cronbach's alpha was 0.91.

**The Psychache Scale:** The Psychache Scale is a 13-item self-report scale created by Holden *et al.* (2001) to measure psychological pain. Participants answer the items using a 5-point Likert scale, where higher scores indicate a more frequent and intense experience of psychological pain. The total score ranges from 13 to 65. The first nine items are rated from 1 (never) to 5 (always), while the last four items are rated from 1 (strongly disagree) to 5 (strongly agree) (35). Previous research has demonstrated that the reliability and validity of the Psychache Scale are satisfactory (35, 36). For this study,

the scale was translated into Persian, and a Cronbach's alpha of 0.96 was reported.

**Interpersonal Needs Questionnaire-15 (INQ-15):** The Interpersonal Needs Questionnaire-15 (INQ-15) is designed to evaluate participants' perceptions of their sense of connectedness to others (belongingness) and their feelings of being a burden to those around them (burdensomeness). Participants rate each item on a 7-point Likert scale (1 = Never, 7 = Always) (37, 38). In this study, the thwarted belongingness sub-scale (with reverse scoring) was used to assess connectedness. For the Persian version of the INQ-15, the Cronbach's alpha was found to be 0.90 for perceived burdensomeness and 0.85 for thwarted belongingness in a sample of undergraduate students. Additionally, convergent, discriminant, and concurrent validity were established (39). In the current study, the Cronbach's alpha was 0.84.

#### Statistical Analysis

Data analysis was conducted by SPSS 24. Pearson correlation coefficients examined the relationships between study variables. Hierarchical regression analysis was conducted in two steps. The first step investigated the predictive role of the psychological pain and hopelessness interaction on suicidal ideation and the second step assessed the connectedness protective role in mitigating the suicidal ideation escalation.

## Results

### Descriptive Statistics and Inter-Correlations for the Key Study Variables

The final sample included 466 adolescents aged 12 to 20 ( $17.04 \pm 4.87$  years), including 356 (76.4%) females and 110 (23.6%) males. Table 1 provides the participant's demographic and descriptive characteristics. Table 2 presents correlations, standard deviations, and means for the study variables. A significant positive correlation was found between psychological pain and suicidal ideation, and also between hopelessness and suicidal ideation ( $r = 0.67$ ,  $P < 0.01$ ). Moreover, a negative correlation was observed between connectedness and suicidal ideation ( $r = -0.52$ ,  $P < 0.01$ ).

### Testing Step 1 and Step 2 of the 3ST Step 1 of the 3ST

To evaluate step 1 of the 3ST, hierarchical regression models were used that included psychological pain, hopelessness, and their interaction term to predict suicidal thoughts (refer to Table 3). In line with step 1, significant interactions between psychological pain and hopelessness were found in relation to suicidal ideation. The three primary assumptions of hierarchical regression—normality, multicollinearity, and homoscedasticity—were satisfied. The regression models explained 59% of the variance in suicidal ideation ( $F_{2,463} = 315.05$ ,  $P < 0.001$ ), with the interaction term of psychological pain and hopelessness contributing an additional 1% of unique explanatory variance to the model ( $R^2 = 0.59$ ,  $P < 0.001$ ).

**Table 1. Demographic and Descriptive Characteristics of the Adolescent Participants**

Variables	N	%
Gender	466	
Male	356	76.4
Female	110	23.6
Educational level	466	
Sixth grade	48	10.3
Seventh grade	59	12.7
Eighth grade	18	3.9
Ninth grade	47	10.1
Tenth grade	39	8.4
Eleventh grade	86	18.5
Twelfth grade	169	36.3

**Table 2. Means, Standard Deviations, and Intercorrelation for Suicidal Ideation, Psychological Pain, Hopelessness, and Connectedness**

Variables	Mean (SD)	1	2	3
1. Suicidal ideation	2.25 (2.62)	1		
2. Psychological pain	24.68 (12.45)	0.67**	1	
3. Hopelessness	32.88(14.37)	0.67**	0.58**	1
4. Connectedness	6.40 (4.86)	-0.52**	-0.63**	-0.51**

p < 0.05\*; p < 0.01\*\*

**Table 3. Results of Regression Analysis Predicting Suicidal Ideation: Model Summary**

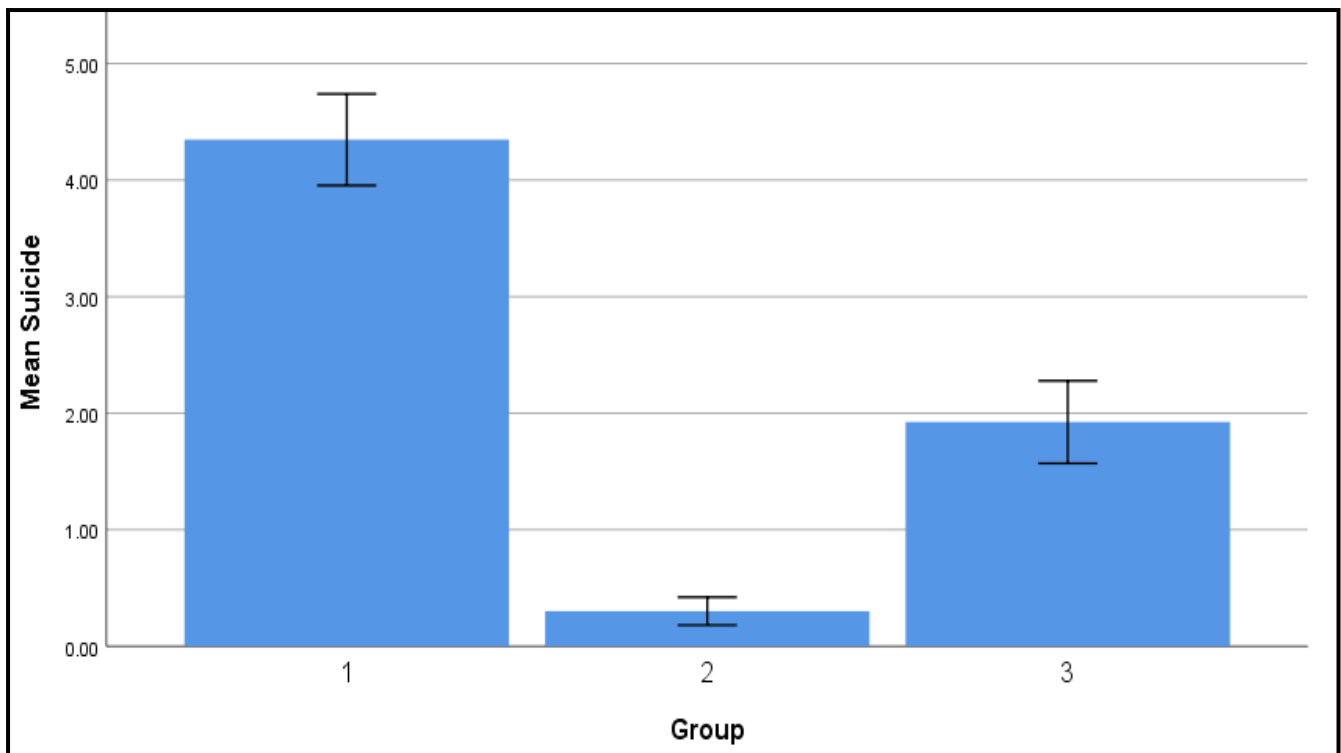
Variables	R <sup>2</sup>	R <sup>2</sup> change	β	P
Step 1	0.57			
Psychological pain			0.43	< 0.001
Hopelessness			0.42	< 0.001
Step 2	0.59	.01		
Psychological pain × Hopelessness			0.43	< 0.001

We also performed a supplementary analysis to investigate whether this interaction could assist in identifying adolescents experiencing suicidal ideation. To do this, we utilized median splits to form subgroups based on scores for psychological pain and hopelessness. For descriptive clarity, we designated subgroups with scores below the median as low and those above the median as high. As illustrated in Figure 1, we created three subgroups: (a) individuals with both high psychological pain and high hopelessness (n = 173), (b) individuals with low psychological pain and low hopelessness (n = 163), and (c) individuals with either high psychological pain or high hopelessness (n = 130) (Figure 1). According to Figure 1, the subgroup with both high hopelessness and

psychological pain exhibited the highest suicidal ideation level (M = 4.34).

**Step 2 of the 3ST**

Step 2 posits that for individuals who are high in both psychological pain and hopelessness (i.e., those who meet the criteria from Step 1), suicidal ideation rises when psychological pain surpasses feelings of connectedness. To evaluate this hypothesis, we standardized the scores for psychological pain and connectedness and then subtracted the connectedness score from the psychological pain score. The subtraction helps determine whether psychological pain is dominating—indicated by a positive score—or if connectedness is a stronger factor—shown by a negative score.



**Figure 1. Mean of Suicidal Ideation in Three Groups: (a) Both High Psychological Pain (P) and High Hopelessness (H), (b) Low P and H, and (c) Either High P or High H.**

Note: Error bars indicate  $\pm 5$  SE.

Step 2 of the 3ST suggests that the psychological pain-connectedness score would strongly correlate with suicidal ideation in the subgroup characterized by high psychological pain and high hopelessness. The results supported this prediction, showing a strong correlation between the psychological pain-connectedness score and suicidal ideation ( $r = 0.24, P < 0.01$ ). To provide a thorough overview, findings from the subgroup with low levels of psychological pain and hopelessness were also reported. In this subgroup, the correlation between the psychological pain-connectedness score and suicidal ideation was not significant ( $r = -0.13, P = 0.08$ ). Furthermore, the relationship between the psychological pain-connectedness score and suicidal ideation was also not significant in the subgroup with either high psychological pain or severe hopelessness ( $r = -0.06, P = 0.47$ ).

### Discussion

We empirically tested the predictive utility of the first two steps of the 3ST, rooted in the ideation-to-action framework, in a sample of Iranian adolescents. As the authors know, this is the first study to comprehensively investigate the initial two steps of this theory in adolescents. Overall, this study supported the validity of steps 1 and 2 of the 3ST in Iranian adolescents. The results are in line with prior research that investigated the 3ST (15, 17).

Our initial hypothesis, which proposed that suicidal ideation arises from a combination of psychological pain and hopelessness, was supported. In line with earlier studies (14-16), our findings indicated that psychological pain and hopelessness both independently and jointly predict concurrent suicidal ideation. The combination of psychological pain and hopelessness accounted for a substantial amount of the variance (59%) of the suicidal ideation. The 3ST model has a foundation on previous theories and highlights the roles of psychological pain and hopelessness in triggering suicidal ideation. According to Shneidman's theory, suicide is fundamentally driven by "psychache," an intense psychological pain characterized by feelings of humiliation, shame, anguish, and despair. This core factor influences all other psychological elements related to suicidal ideation (41) and leads directly to suicide when its intensity exceeds an individual's tolerance, making death seem like the only escape (42, 43). In line with this theory regarding psychological pain in understanding adolescent suicidal ideation, the findings of a descriptive phenomenological study (2025) are worth highlighting. This study explored the experiences of 69 Iranian adolescents with suicidal thoughts and suicide attempts history, identifying six main themes. One prominent theme (overwhelming Emotional Pain), which is comparable with psychological pain, was reported by all participants (44). In addition, Alloy and Abramson's hopelessness theory posits that

hopelessness is the core component of suicidality. According to this theory, individuals at risk for suicide are characterized by a negative cognitive style (also known as inferential or attributional style), in which they attribute negative events to stable and pervasive causes and anticipate adverse future outcomes resulting from these events (45, 46). Consistent with our findings, a study by Flamenbaum (2009) (42) investigated psychache as a necessary and sufficient factor for suicide by comparing psychological pain and hopelessness in a sample of undergraduate students. The results indicated that psychache was necessary but not sufficient for suicide. Suicide was significantly higher in groups that experienced both psychological pain and hopelessness. A key advantage of step 1 of the 3ST is its focus on the interaction and combination of hopelessness and psychological pain in explaining the development of suicidal ideation (14).

In line with the second hypothesis, this study revealed that connectedness played a vital protective role in reducing the increase of suicidal ideation among adolescents experiencing high levels of both psychological pain and hopelessness. As proposed by the 3ST, connectedness offered significant protection against the rise of suicidal thoughts in this subgroup experiencing psychological pain and hopelessness. However, it was less effective in protecting against suicidal ideation in other subgroups. This finding indicates that even in individuals experiencing psychological pain and hopelessness, the desire for suicide remains relatively low as long as their sense of connectedness outweighs their psychological pain (12, 14). Disrupted connectedness is similar to low levels of belongingness and high levels of perceived burdensomeness, as outlined in the IPTS. The IPTS identifies it as a crucial factor in the emergence of suicidal ideation (14). Also, the IMV model refers to the significance of thwarted belongingness and burdensomeness (i.e., disrupted connectedness) as motivational moderators (factors that obstruct or facilitate transitions between phases), which play a significant role in the suicidal ideation development (47). In other words, the distinction of the 3ST compared to the other two theories, lies in the fact that in the other theories, disrupted connectedness is considered a risk factor, whereas, in the 3ST, connectedness is considered a protective factor. This distinction is crucial because the 3ST helps to explain why individuals who experience mild suicidal ideation may still be able to resist the escalation from mild suicidal ideation to severe suicidal ideation. The 3ST's perspective on connectedness has led to a more comprehensive and complex explanation of the development of suicidal ideation. As a result, all theories related to the ideation-to-action framework emphasize the importance of connectedness, which is consistent with the findings of the current study. In general, our results support the applicability of steps 1 and 2 of 3ST in adolescents.

Overall, our findings offer practical guidance for how to identify and support Iranian adolescents who are vulnerable to suicidal ideation. For instance, schools should consider evaluating students for psychological pain and hopelessness, and should also pay attention to isolated students. Moreover, for students who express suicidal thoughts, structured group activities can be a preventative strategy against the escalation of their ideation. The present study focused on a specific subset of factors contributing to suicidal ideation among adolescents. Given the inherently complex and multifactorial nature of suicidal ideation, the findings should be interpreted with caution.

### Limitation

The current study has several limitations that indicate potential areas for future research. First, our findings were based on cross-sectional data, which prevents conclusions about causal relationships between variables. Future studies should employ longitudinal designs to address this limitation. Second, all data were collected through self-report measures which are susceptible to response bias. More studies are needed to use other assessment methods such as interviews. Third, our sample included a non-clinical population. It would be helpful for future studies to test the 3ST in a clinical sample of adolescents. Fourth, in the current study, only the first two steps of 3ST were tested. Thus, future studies should examine all three steps of 3ST in adolescents. Finally, for the present study, the thwarted belongingness subscale of INQ assessed connectedness, which could not fully capture the comprehensive extent of connectedness as explained by the 3ST. The 3ST broadly conceptualizes connectedness, encompassing various forms of connection, including careers, hobbies, pets, or any meaningful purpose (14). Future studies should develop and use new measures specifically designed to evaluate connectedness. Despite these previously mentioned limitations, our findings complement and advance prior studies by testing 3ST in a large sample of Iranian adolescents. These findings suggest that 3ST provides a promising conceptual framework for directing future studies focused on developing interventions for suicidal ideation.

### Conclusion

We evaluated the validity of the first two steps of the 3ST in a sample of Iranian adolescents. Our findings indicated that both hopelessness and psychological pain separately and interactively predict suicidal ideation. Additionally, connectedness was a protective factor for suicidal ideation for adolescents experiencing high levels of both hopelessness and psychological pain. The findings suggest that the effectiveness of any intervention designed to reduce suicide risk in adolescents depends on the capacity to reduce psychological pain, enhance hope, and improve connectedness. Policymakers should prioritize mental health interventions that address these

factors to effectively mitigate suicide risk among adolescents.

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### **Conflict of Interest**

None.

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