IJBMC
International Journal of Body, Mind and Culture

Volume 13, Issue 2, pp 96-105
DOI: 10.61838/ijbmc.v13i2.1231

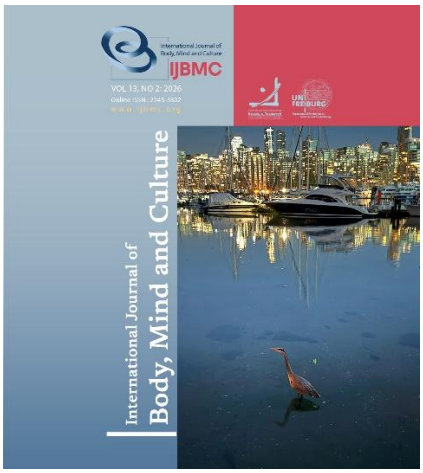
Article type:
Original Research

Psychological Sex Differences in Suicidal Ideation: Testing the Three-Step Theory in Iranian Adolescents

Roghayeh. Molodinia[1], Roya. Pooyanfard[2], Fatemeh. Mohammadi Asl[3], Mohammadamin. Fotouhi Ardakani[4], Shahla. Chaghamirzaei[5], Amirmahdi. Amraei[6], Hossein. Fayazmanesh[7*]

1 Ministry of Education, Kermanshah District 1 Education Department, Kermanshah, Iran.
2 MD assistant professor, Department of psychiatry, Shahid Beheshti Hospital, Afzalipour Faculty of Medicine, Kerman University of Medical Sciences, Kerman, Iran.
3 School of Medicine, Kermanshah University of Medical Sciences, Kermanshah, Iran.
4 Master's student of Clinical Psychology, Mashhad University of Medical Sciences, Mashhad, Iran.
5 Ministry of Education, Kermanshah District 1 Education Department, Kermanshah, Iran.
6 Master's student in clinical psychology, Kermanshah University of Medical Sciences, Kermanshah, Iran.
7 Department of Psychology, Faculty of Literature and Humanities, Lorestan University, Khoramabad, Iran.

Corresponding author email address:
hossein.fayazmanesh@kums.ac.ir



Article history:

Received 11 Oct 2025
Revised 27 Dec 2025
Accepted 30 Jan 2026
Published online 01 Feb 2026

How to cite this article:
Molodinia, R., Pooyanfard, R., Mohammadi Asl, F., Fotouhi Ardakani, M., Chaghamirzaei, S., Amraei, A., & Fayazmanesh, H. (2026). Psychological Sex Differences in Suicidal Ideation: Testing the Three-Step Theory in Iranian Adolescents. International Journal of Body, Mind and Culture, 13(2), 96-105.

ABSTRACT

Objective: Suicide is a major adolescent public-health concern. Klonsky's Three-Step Theory (3ST) posits that suicidal ideation emerges when psychological pain co-occurs with hopelessness (Step 1) and is buffered by connectedness (Step 2). This study tested Steps 1–2 of 3ST in Iranian adolescents.

Methods and Materials: In a cross-sectional school-based survey, 456 adolescents (75.7% female; ages 12–20) from six secondary schools in Tehran completed the Beck Scale for Suicidal Ideation, Psychache Scale, Beck Hopelessness Scale, and the Interpersonal Needs Questionnaire-15 (reverse-scored thwarted belongingness as connectedness). Empathy (EQ-10) and systemizing (SQ-10) were also assessed. Hierarchical OLS regression with mean-centered predictors examined the main effects of pain and hopelessness and their interaction (pain×hopelessness) on suicidal ideation. Step 2 was explored via associations between connectedness and ideation and subgroup analyses among high-pain/high-hopelessness adolescents. Suicide-risk management procedures (clinical evaluation/referral) were implemented for elevated ideation.

Findings: Pain and hopelessness independently predicted suicidal ideation (β≈.42–.43, p<.001). Their interaction explained additional variance (ΔR^2 = .02, p = .001), and the full Step 1 model accounted for 59% of ideation variance (R^2 = .59). Connectedness was negatively associated with ideation (r =- .52, p < .01) and showed a protective pattern, particularly in the high-pain/high-hopelessness subgroup.

Conclusion: Results support 3ST Steps 1–2 in a convenience sample of adolescents in Tehran, highlighting the combined impact of pain and hopelessness and the potential protective role of connectedness. Longitudinal and continuous moderation models are recommended.

Keywords: Suicidal ideation, adolescents, psychological pain, hopelessness, empathy, Iran.

Introduction

Suicide, often conceptualized as an expression of the "wish to hasten death (WTHD)" (Balaguer et al., 2016), is a major global public health concern and the ninth leading cause of mortality worldwide (Lovero et al., 2023). In Iran, although the overall suicide mortality rate has declined in recent years from 7.91 to 5.2 per 100,000 individuals, the incidence of suicide attempts remains alarmingly high at 193.49 per 100,000 (Abbasi-Ghahramanloo et al., 2024).

Beyond reflecting the general burden of suicide, these figures emphasize the necessity of focusing on populations at greater risk. Adolescence, as a developmental stage marked by profound psychosocial and biological transitions, constitutes a critical period of heightened susceptibility to suicidal ideation (Gelvez-Gafaro et al., 2022). Suicidal behaviors during this stage not only jeopardize individual well-being but also generate substantial consequences for families, social networks, education, and broader socioeconomic stability (Fonseca-Pedrero et al., 2022). Alarmingly, suicide is one of the leading causes of death among adolescents and young people worldwide, underscoring the urgency of prevention efforts tailored to this age group (Bilsen, 2018).

Adolescence is a developmental stage marked by profound psychosocial and biological transitions, rendering young individuals particularly vulnerable to suicidal ideation (Gelvez-Gafaro et al., 2022). Suicidal behaviors during adolescence not only threaten individual well-being but also impose significant burdens on families, social networks, education, and broader socioeconomic stability (Fonseca-Pedrero et al., 2022). A consistent gender disparity exists in suicidal outcomes: while women generally report higher rates of suicidal ideation and attempts, men are significantly more likely to die by suicide (Cabrera-Mendoza et al., 2020). Although sociocultural factors partly account for this discrepancy, psychological and biological sex differences must also be considered to achieve a more comprehensive understanding (Nock & Kessler, 2006).

Suicidal ideation, defined as persistent thoughts of self-inflicted death, differs conceptually and clinically from suicide attempts, which involve actual self-injurious behavior with some intent to die (Klonsky et al., 2017). Suicidal ideation in adolescence substantially increases the risk of future suicide attempts and completed suicide (Al-Halabí et al., 2016). Thus, identifying mechanisms underlying ideation is crucial for prevention strategies targeted at this age group (Fan et al., 2023). Despite decades of research, accurate prediction and prevention of suicide remain limited (Franklin et al., 2017; Klonsky & May, 2014). Recent ideation-to-action models—such as the Interpersonal Theory of Suicide (IPTS), the Integrated Motivational-Volitional Model (IMV), and the Three-Step Theory (3ST)- have advanced the field by distinguishing between the emergence of suicidal ideation and the transition to attempts, highlighting these as two distinct processes with different risk factors (Klonsky & May, 2014; Klonsky et al., 2017).

The 3ST provides a parsimonious yet comprehensive framework, positing that (1) suicidal ideation arises when psychological pain co-occurs with hopelessness, (2) connectedness serves as a buffer preventing escalation of ideation, and (3) suicide attempts occur when suicidal ideation coincides with the capability to enact self-harm (Klonsky & May, 2014). This theory emphasizes both psychological vulnerability and social protective factors as key components in suicide risk. Empirical studies have validated the 3ST across adult populations, showing that pain and hopelessness predict ideation, connectedness mitigates risk, and capability predicts attempts (Dhingra et al., 2019; Klonsky & May, 2014).

However, research on the 3ST within adolescent populations remains limited (Kirshenbaum et al., 2024). Existing studies suggest its applicability: psychological pain and hopelessness strongly predict suicidal desire in inpatient adolescents (May et al., 2016), while connectedness—both social and familial—reduces risk in community-based adolescent samples (Gunn III et al., 2018). Nevertheless, most investigations have focused on adults, leaving important developmental and cultural nuances in adolescents insufficiently explored (Klonsky et al., 2021).

Moreover, no prior studies have simultaneously examined the interaction of pain, hopelessness, and connectedness in adolescents, nor has research integrated sex differences into the 3ST framework. Given established evidence that women typically exhibit higher

Ijbmc.org
E-ISSN: 2345-5802

empathy and relational connectedness than men, these differences may play a role in adolescent suicidal ideation. Empathy fosters belonging and protects against loneliness—both relevant to connectedness—whereas reduced empathy or reliance on systemizing tendencies may exacerbate isolation and despair, potentially contributing to the higher suicide mortality observed in men (Cabrera-Mendoza et al., 2020).

In the Iranian cultural context, where social roles, family dynamics, and gender norms may distinctly shape suicide risk, applying the 3ST to adolescents can provide unique insights. The present study investigates suicidal ideation in Iranian adolescents within the framework of the 3ST, with particular attention to sex differences. We hypothesize that psychological pain and hopelessness (Step 1) will independently and interactively predict suicidal ideation. Connectedness (Step 2) will serve as a protective factor, attenuating the impact of pain and hopelessness. Sex differences in empathy and connectedness will influence the strength of these relationships.

Methods and Materials

Study Design

This cross-sectional descriptive–correlational study was conducted as a school-based survey in Tehran. Data were collected from 456 adolescents using standardized self-report measures (suicidal ideation, psychache, hopelessness, connectedness/thwarted belongingness, empathizing, and systemizing) and analyzed primarily with hierarchical OLS regression to test Step 1 (pain, hopelessness, and their interaction) and Step 2 (the protective role of connectedness) of the Three-Step Theory.

Participants and Sampling

Participants were 456 Iranian adolescents recruited from six secondary schools in Tehran (75.7% female; age range = 12–20 years). Eligible students were (a) between 12 and 20 years old, (b) currently enrolled in grades 6–12, and (c) able to read and complete questionnaires in Persian independently. No exclusions were applied based on psychiatric diagnosis, ongoing psychotherapy, or psychotropic medication use; these variables were not systematically assessed, which represents a limitation of the study.

Schools were selected via convenience sampling from districts in Tehran where the research team had existing collaborations and where school principals agreed to support the study. Within each participating school, school counselors distributed an information sheet about the study to all eligible students and their parents and shared a secure survey link. All students who returned consent/assent and completed at least 80% of the questionnaire were included in the final sample. Because denominator data were not available for each classroom, precise participation and refusal rates could not be calculated; however, the final sample reflects those adolescents who both received parental permission (for those <18 years) and completed the online survey. No individual-level data were collected from non-participating students, so formal comparisons between participants and non-participants were not possible.

Instruments

Beck Scale for Suicidal Ideation (BSS) (Beck & Steer, 1993): The BSS is a 19-item self-report measure assessing suicidal ideation over the past week. Items are scored on a 0–2 scale, yielding a total score of 0-38, with higher scores indicating more severe ideation. The first five items serve as a screening tool: if respondents endorse any item with a score above zero, they complete the full scale; otherwise, they receive a total score of zero (Beck et al., 1979; Beck & Steer, 1993). In this study, the screening items were used to identify participants with suicidal ideation. The Persian version of the BSS has demonstrated good reliability (α = .80). Internal consistency in the current sample was high (α = .88).

Beck Hopelessness Scale (BHS) (Beck et al., 1974): A 20-item true–false instrument measuring negative expectations about the future. Scores range from 0 to 20, with higher values indicating greater hopelessness. Internal consistency in the present study was excellent (α = .91).

Psychache Scale (Holden et al., 2001): A 13-item self-report questionnaire that evaluates psychological pain. Items 1–9 are rated on a 5-point scale (1 = never, 5 = always), and items 10–13 on a 5-point agreement scale (1 = strongly disagree, 5 = strongly agree). Total scores range from 13 to 65, with higher scores indicating more intense and frequent psychological pain. Reliability in the current study was excellent (α = .96).

Ijbmc.org
E-ISSN: 2345-5802

Interpersonal Needs Questionnaire-15 (INQ-15) (Van Orden, 2009): The INQ-15 measures perceived burdensomeness and thwarted belongingness using a 7-point Likert scale (1 = never, 7 = always). For this study, only the thwarted belongingness subscale (reverse scored) was used as an index of connectedness. The Persian version has shown strong reliability, with burdensomeness α = .90 and belongingness α = .85 (Amini-Tehrani et al., 2021). In the current sample, Cronbach's alpha was .84.

Empathy Quotient–Short Form (EQ-10) (Wakabayashi et al., 2006): The EQ-10, derived from the original 60-item Empathy Quotient (Wakabayashi et al., 2006), assesses the ability to recognize and respond to others' emotions. Each of the 10 items is rated on a 4-point scale (0 = strongly disagree to 3 = strongly agree), with total scores ranging from 0 to 30. Higher scores reflect greater empathy. Previous research has reported reliability between α = .75–.82; in the present sample, internal consistency was acceptable (α = .79).

Systemizing Quotient–Short Form (SQ-10) (Wakabayashi et al., 2006): The SQ-10, adapted from the 75-item Systemizing Quotient-Revised (Wakabayashi et al., 2006), assesses the tendency to analyze and understand systems across domains such as mathematics, technology, and nature. Each of the 10 items is rated on a 4-point scale (1 = strongly disagree to 4 = strongly agree), producing a total score from 10 to 40. Higher scores indicate stronger systemizing tendencies. Previous studies have reported good reliability (α = .80–.85). Internal consistency in the current study was strong (α = .82).

Procedure and Data Quality

Data were collected via an anonymous online survey platform in October 2024 during school hours in computer labs or via supervised classroom devices. After receiving study information, eligible students accessed the survey link and completed the questionnaires in a single session (~20–30 minutes). To protect data quality, we implemented a priori quality-control (QC) rules. First, two simple attention-check items (e.g., "Please select 'agree' for this item") were embedded; adolescents failing both checks were excluded from analyses. Second, extremely short completion times (below a pre-defined minimum consistent with reading the items) were flagged, and those cases were removed. Third, duplicate entries from the same IP address and device within a short time frame were identified; only the first complete response was retained. After applying QC rules, the final analytic sample comprised 456 adolescents.

Missing data were examined at the item level. Overall, missingness was low (each variable had <5% missing values). Given this low level and the cross-sectional design, regression analyses used listwise deletion, and Ns for each model are reported in the Results section. Pattern analyses suggested that missingness was not strongly associated with age or gender.

Analytic Strategy

Before hypothesis testing, we inspected univariate distributions, outliers, and bivariate correlations among all variables. Because the BSS total score was semi-continuous, with a substantial proportion of zeros, we examined histograms, skewness/kurtosis, and the proportion of zeros, and fitted exploratory alternative models (e.g., hurdle/zero-inflated and ordinal models) as sensitivity checks. These models yielded substantively similar conclusions, and residual diagnostics for linear models were acceptable; therefore, we retained hierarchical ordinary least squares (OLS) regression for ease of interpretation.

To test Step 1 of the 3ST, we conducted hierarchical OLS regressions predicting suicidal ideation. All continuous predictors were mean-centered. In Step 1, centered psychological pain and hopelessness were entered simultaneously; in Step 2, their multiplicative interaction term (pain × hopelessness) was added. We report R^2, adjusted R^2, ΔR^2, standardized regression coefficients (β), and 95% confidence intervals. Multicollinearity was evaluated using variance inflation factors (VIFs), and residual plots were examined to assess homoscedasticity and normality.

Ethical Considerations and Suicide-Risk Management

The study protocol was approved by the institutional ethics committee [name of committee] of [institution] ([approval number]). Procedures complied with the Declaration of Helsinki and national regulations governing research with minors and online data collection.

For adolescents under 18 years, written parental consent was obtained through the participating schools before providing the survey link, and adolescents provided online assent at the start of the questionnaire. Participants aged 18–20 years provided their own informed consent online. The consent/assent page

Ijbmc.org
E-ISSN: 2345-5802

clearly explained voluntariness, confidentiality, the right to withdraw at any time, and limits of confidentiality in cases of acute risk.

Because the study involved assessment of suicidal ideation, a predefined suicide-risk management protocol was implemented. Endorsement of active suicidal intent or a specific plan on BSS items triggered an automated alert to the research team. An on-call clinical psychologist contacted the school counselor the same day to arrange a confidential, in-person risk assessment with the adolescent. Depending on the assessed risk, procedures included notifying parents/guardians, referring to school counseling services or external mental health clinics, and, when necessary, facilitating an emergency psychiatric evaluation. Crisis hotline numbers and local mental health resources were displayed at the end of the survey for all participants.

All data were de-identified at the point of export from the survey platform; no names or direct identifiers were stored with questionnaire responses. A unique code linked the dataset to school-held consent lists accessible only to a designated liaison for safety follow-up. De-identified data were stored on encrypted, password-protected servers at [institution] in Tehran, with access restricted to the core research team. Data will be retained for [X] years after publication and then securely destroyed.

Findings and Results

Descriptive Statistics and Intercorrelations

The final sample consisted of 456 adolescents aged 12–20 years (M = 16.44, SD = 3.28), of whom 341 (75.7%) were female, and 115 (24.3%) were male. Table 1 summarizes the demographic and descriptive characteristics of the participants.

Table 1

Demographic and descriptive characteristics of the participants

Variables	*N*	*%*
Gender	456	
Female	341	75.7
Male	115	24.3
Educational level	456	
Sixth grade	46	10.08
Seventh grade	57	12.5
Eighth grade	18	3.9
Ninth grade	44	9.6
Tenth grade	38	8.3
Eleventh grade	85	18.6
Twelfth grade	168	36.8

Descriptive statistics and correlations among the study variables are presented in Table 2. Suicidal ideation was positively correlated with psychological pain (r = .66, p < .01) and hopelessness (r = .68, p < .01). In contrast, connectedness was negatively correlated with suicidal ideation (r = –.52, p < .01). Connectedness was also strongly and positively associated with empathy in both females (r = .69, p < .01) and males (r = .67, p < .01), indicating a robust link between empathic ability and bonding.

Table 2

Means, standard deviations, and intercorrelation for study variables

Variables	*Mean (SD)*	1	2	3	4	5
1. Suicidal ideation	2.25 (2.62)	1				
2. Pain	24.68 (12.45)	0.66**	1			
3. Hopelessness	32.88(14.37)	0.68**	0.58**	1		
4. Connectedness	6.40 (4.86)	-0.52**	-0.63**	-0.51**	1	
5. EQ	17.36 (9.44)	-0.51**	-0.65**	-0.53**	0.68**	1
6. SQ	11.84 (8.82)	0.53**	0.51**	0.54**	-0.62**	-0.67**

Ijbmc.org
E-ISSN: 2345-5802

p < 0.05; p < 0.01***

In line with the empathizing–systemizing theory, Table 3 displays the distribution of brain types by gender, as well as the frequency distributions of empathy and systemizing scores. As expected, females reported higher empathy scores than males, supporting theoretical assumptions of sex differences in empathic tendencies. Combined with the results from Table 2, this pattern highlights the role of empathy in fostering connectedness and its potential function as a protective factor against suicidal ideation, as suggested by the Three-Step Theory (3ST).

Table 3

Classifications of brain type based upon percentiles

Brain Type	E	B	S
Brain Sex	Female	Balanced	Male
Defining characteristic	S < E	S ≈ E	S > E
Female %	43.2	36.4	20.4
Male %	16.6	42.3	41.1

Testing Step 1 and Step 2 of the 3ST

Step 1

To test Step 1 of the 3ST, hierarchical regression analyses were conducted with psychological pain, hopelessness, and their interaction as predictors of suicidal ideation (Table 4). Consistent with theoretical expectations, the interaction between psychological pain and hopelessness was statistically significant in predicting suicidal ideation. The full model accounted for 59% of the variance in suicidal ideation (R^2 = .59, p < .001), with the interaction term contributing an additional 2% of unique variance.

Table 4

Summary of Regression Models

variables	R^2	R^2 change	β	t	p
Step 1	0.56			-8.91	.000
Pain			0.43	11.28	.000
Hopelessness			0.42	11.55	.000
Step 2	0.59	.02		-3.08	.001
Pain × Hopelessness			0.43	3.96	.000

Step 2

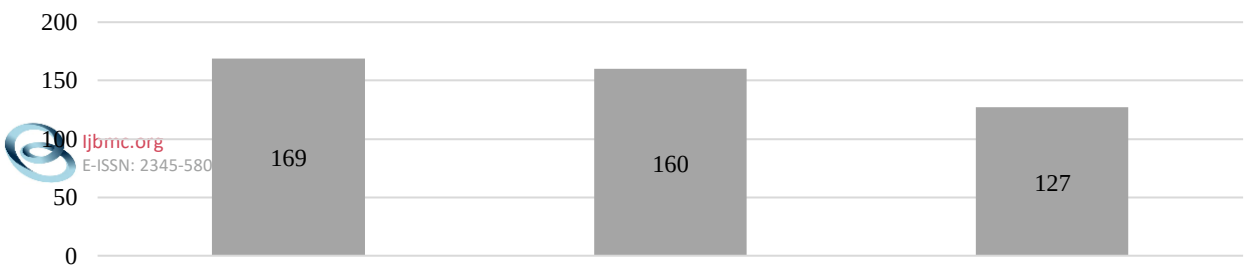
Median splits were used to classify participants into subgroups based on psychological pain and hopelessness scores: (a) high pain and high hopelessness (n = 169), (b) low pain and low hopelessness (n = 160), and (c) either high pain or high hopelessness (n = 127). Figure 1 illustrates these subgroup classifications.

To examine Step 2 predictions, standardized scores for psychological pain and connectedness were computed, and a difference score (pain – connectedness) was created. Positive scores indicated greater psychological pain than connectedness, whereas negative scores indicated the reverse.

As hypothesized, in the subgroup characterized by high psychological pain and high hopelessness, the pain–connectedness score was positively associated with suicidal ideation (r = .29, p < .01). By contrast, in the subgroup with low psychological pain and hopelessness, this association was nonsignificant (r = –.15, p = .08). Similarly, among adolescents with either high psychological pain or high hopelessness (but not both), the relationship was not significant (r = –.08, p = .47).

Figure 1

Frequency of groups: (a) Both high psychological Pain (P) and High Hopelessness (H), (b) Low P and H, and (c) Either High P or High H.



ijbmc.org
E-ISSN: 2345-580

Together, these results provide empirical support for the first two steps of the 3ST in an adolescent sample. Psychological pain and hopelessness interact to predict suicidal ideation. At the same time, connectedness emerges as a protective factor that buffers against suicidal thoughts, particularly among adolescents experiencing high levels of both pain and hopelessness.

Discussion and Conclusion

This study empirically evaluated the first two steps of the Three-Step Theory (3ST) in a large sample of Iranian adolescents. To our knowledge, this is the first investigation to comprehensively examine the initial two steps of the 3ST in this age group. Overall, the findings provide robust support for the applicability of the 3ST framework in an adolescent, non-clinical population.

Consistent with our first hypothesis, suicidal ideation was predicted by both psychological pain and hopelessness, as well as by their interaction. This aligns with prior research in diverse cultural contexts (Dhingra et al., 2019; Klonsky & May, 2014; Tsai et al., 2021). Together, these factors explained a substantial proportion of the variance in suicidal ideation (59%), underscoring the centrality of pain and hopelessness in the emergence of suicidal desire. These findings also resonate with Shneidman's (1993) seminal conceptualization of "psychache" as the primary driver of suicide, and with the hopelessness theory (HT), which highlights pessimistic attributional styles and negative expectations about the future (Abramson et al., 2002). Importantly, the interactive model of Step 1 of the 3ST provides a more nuanced framework, explaining why psychological pain alone is insufficient and why the combination of pain and hopelessness presents a heightened risk for suicidal ideation.

Our second hypothesis—that connectedness acts as a protective factor against the intensification of suicidal ideation—was also supported. As predicted by the 3ST, connectedness significantly attenuated suicidal ideation in adolescents experiencing high levels of both pain and hopelessness, although its protective effect was weaker in other subgroups. This finding highlights the role of social bonds and emotional ties in buffering suicide risk, echoing the emphasis on belongingness and burdensomeness in the Interpersonal Theory of Suicide (IPTS) and the Integrated Motivational-Volitional (IMV) model (Klonsky & May, 2014; O'Connor, 2011). Collectively, these perspectives converge on the importance of relational connectedness in mitigating suicidal thoughts. The current study strengthens the empirical foundation for this claim within an adolescent, Middle Eastern context.

Several limitations must be acknowledged. First, the cross-sectional design limits causal inference; longitudinal research is needed to clarify temporal dynamics. Second, reliance on self-report measures may have introduced bias; future work should incorporate multi-method assessments, including clinical interviews and behavioral tasks. Third, the use of a non-clinical sample restricts generalizability to adolescents with psychiatric diagnoses; replication in clinical populations is warranted. Fourth, the present study focused exclusively on Steps 1 and 2 of the 3ST, leaving Step 3—capability for suicide—unexamined. A comprehensive assessment of all three steps could yield deeper insights into the transition from ideation to action. Finally, our operationalization of connectedness using the thwarted belongingness subscale of the INQ may not fully capture the broader construct described in the 3ST, which encompasses diverse sources of meaning such as relationships, roles, hobbies, or spirituality. Developing culturally sensitive and comprehensive measures of connectedness should therefore be a priority for future studies.

This study provides empirical support for the first two steps of the Three-Step Theory (3ST) among Iranian adolescents. Psychological pain and hopelessness were found to independently and interactively predict suicidal ideation. At the same time, connectedness emerged as a

protective factor that attenuates risk in adolescents experiencing high levels of both pain and hopelessness. These findings underscore the importance of targeting psychological pain, promoting hope, and fostering connectedness in suicide prevention efforts. Interventions that incorporate these elements may be particularly effective in addressing the underlying mechanisms of suicidal ideation and in building resilience among adolescents at risk.

Contributions

Despite these limitations, the current study makes important contributions. It is the first to empirically test the first two steps of the 3ST in an adolescent population in Iran, providing evidence for the model's cross-cultural applicability. By demonstrating that psychological pain and hopelessness jointly predict suicidal ideation and that connectedness mitigates this risk, the study highlights key targets for intervention. Specifically, programs that reduce psychological pain, foster hope, and strengthen social connectedness may be especially effective in preventing suicidal ideation among adolescents.

Funding

This study was supported by the Clinical Health Research Center, Iran-England Institute of Psychology, Tehran, Iran (Project No. 2024/10836).

Acknowledgments

The authors express their gratitude and appreciation to all participants.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Ethical considerations in this study included the fact that participation was entirely optional.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

Funding

This research was carried out independently with personal funding and without the financial support of any governmental or private institution or organization.

Authors' Contributions

All authors equally contribute to this study.

References

Abbasi-Ghahramanloo, A., Jafarzadeh, M., Pourfarzi, F., Afrashteh, S., Azimi, A., Yusuf, M. A., Adham, D., & Moradi-Asl, E. (2024). Characteristics of suicide attempts in Northwestern Iran: a five-year population-based survey. *BMC psychiatry*, *24*(1), 15. https://doi.org/10.1186/s12888-023-05483-4

Abramson, L., Alloy, L., Hogan, M., Whitehouse, W., Gibb, B., Hankin, B., & Cornette, B. (2002). The hopelessness theory of suicidality: Suicide science. In: Springer. https://link.springer.com/chapter/10.1007/0-306-47233-3_3

Al-Halabí, S., Sáiz, P. A., Burón, P., Garrido, M., Benabarre, A., Jiménez, E., Cervilla, J., Navarrete, M. I., Díaz-Mesa, E. M., & García-Álvarez, L. (2016). Validación de la versión en español de la Columbia-Suicide Severity Rating Scale (Escala Columbia para Evaluar el Riesgo de Suicidio). *Revista de psiquiatría y salud mental*, *9*(3), 134-142. https://doi.org/10.1016/j.rpsm.2016.02.002

Amini-Tehrani, M., Sadeghi, R., Nasiri, M., Jalali, T., & Zamanian, H. (2021). Suicide-related interpersonal needs of young Iranian people: A preliminary validation of thwarted belongingness and perceived burdensomeness constructs. *Clinical psychology & psychotherapy*, *28*(2), 422-437. https://doi.org/10.1002/cpp.2507

Balaguer, A., Monforte-Royo, C., Porta-Sales, J., Alonso-Babarro, A., Altisent, R., Aradilla-Herrero, A., Bellido-Pérez, M., Breitbart, W., Centeno, C., & Cuervo, M. A. (2016). An international consensus definition of the wish to hasten death and its related factors. *Plos one*, *11*(1), e0146184. https://doi.org/10.1371/journal.pone.0196754

Bilsen, J. (2018). Suicide and youth: risk factors. *Frontiers in Psychiatry*, *9*, 540. https://doi.org/10.3389/fpsyt.2018.00540

Cabrera-Mendoza, B., Fresno, C., Monroy-Jaramillo, N., Fries, G. R., Walss-Bass, C., Glahn, D. C., Ostrosky-Wegman, P., Mendoza-Morales, R. C., García-Dolores, F., & Díaz-Otañez, C. E. (2020). Sex differences in brain gene expression among suicide completers. *Journal of Affective Disorders*, *267*, 67-77. https://doi.org/10.1016/j.jad.2020.01.167

Dhingra, K., Klonsky, E. D., & Tapola, V. (2019). An empirical test of the three-step theory of suicide in UK university students. *Suicide and Life-Threatening*

Behavior, *49*(2), 478-487. https://doi.org/10.1111/sltb.12437

Esfahani, M., Hashemi, Y., & Alavi, K. (2015). Psychometric assessment of the Beck Scale for suicidal ideation (BSSI) in the general population in Tehran. *Medical journal of the Islamic Republic of Iran*, *29*, 268. https://pmc.ncbi.nlm.nih.gov/articles/PMC4715388/

Fan, Q., Li, Y., Gao, Y., Nazari, N., & Griffiths, M. D. (2023). Self-compassion moderates the association between body dissatisfaction and suicidal ideation in adolescents: A cross-sectional study. *International Journal of Mental Health and Addiction*, *21*(4), 2371-2388. https://doi.org/10.1007/s11469-021-00727-4

Fonseca-Pedrero, E., Al-Halabí, S., Pérez-Albéniz, A., & Debbané, M. (2022). Risk and protective factors in adolescent suicidal behaviour: A network analysis. *International Journal of Environmental Research and Public Health*, *19*(3), 1784. https://doi.org/10.3390/ijerph19031784

Franklin, J. C., Ribeiro, J. D., Fox, K. R., Bentley, K. H., Kleiman, E. M., Huang, X., Musacchio, K. M., Jaroszewski, A. C., Chang, B. P., & Nock, M. K. (2017). Risk factors for suicidal thoughts and behaviors: A meta-analysis of 50 years of research. *Psychological Bulletin*, *143*(2), 187. https://doi.org/10.1037/bul0000084

Gelvez-Gafaro, L.-M., Medina-Duarte, D.-M., Villa-Belluci, I.-P., Rivera-Porras, D., & Bonilla-Cruz, N.-J. (2022). Psychosocial risk factors associated with suicide in youth and adolescents: A systematic review. https://doi.org/10.47307/GMC.2022.130.s3.14

Gunn III, J. F., Goldstein, S. E., & Gager, C. T. (2018). A longitudinal examination of social connectedness and suicidal thoughts and behaviors among adolescents. *Child and Adolescent Mental Health*, *23*(4), 341-350. https://doi.org/10.1111/camh.12281

Klonsky, E. D., & May, A. M. (2014). Differentiating suicide attempters from suicide ideators: A critical frontier for suicidology research. *Suicide and Life-Threatening Behavior*, *44*(1), 1-5. https://doi.org/10.1111/sltb.12068

Klonsky, E. D., Pachkowski, M. C., Shahnaz, A., & May, A. M. (2021). The three-step theory of suicide: Description, evidence, and some useful points of clarification. *Preventive medicine*, *152*, 106549. https://doi.org/10.1016/j.ypmed.2021.106549

Klonsky, E. D., Qiu, T., & Saffer, B. Y. (2017). Recent advances in differentiating suicide attempters from suicide ideators. *Current opinion in psychiatry*, *30*(1), 15-20. https://doi.org/10.1097/YCO.0000000000000294

Lovero, K. L., Dos Santos, P. F., Come, A. X., Wainberg, M. L., & Oquendo, M. A. (2023). Suicide in global mental health. *Current psychiatry reports*, *25*(6), 255-262. https://doi.org/10.1007/s11920-023-01423-x

May, A. M., O'Brien, K. H. M., Liu, R. T., & Klonsky, E. D. (2016). Descriptive and psychometric properties of the inventory of motivations for suicide attempts (IMSA) in an inpatient adolescent sample. *Archives of suicide research*, *20*(3), 476-482. https://doi.org/10.1080/13811118.2015.1095688

Nock, M. K., & Kessler, R. C. (2006). Prevalence of and risk factors for suicide attempts versus suicide gestures: analysis of the National Comorbidity Survey. *Journal of Abnormal Psychology*, *115*(3), 616. https://doi.org/10.1037/0021-843X.115.3.616

O'Connor, R. C. (2011). The integrated motivational-volitional model of suicidal behavior. In: Hogrefe Publishing. https://econtent.hogrefe.com/doi/abs/10.1027/0227-5910/a000120?journalCode=cri

Tsai, M., Lari, H., Saffy, S., & Klonsky, E. D. (2021). Examining the three-step theory (3ST) of suicide in a prospective study of adult psychiatric inpatients. *Behavior therapy*, *52*(3), 673-685. https://doi.org/10.1016/j.beth.2020.08.007

Abbasi-Ghahramanloo, A., Jafarzadeh, M., Pourfarzi, F., Afrashteh, S., Azimi, A., Yusuf, M. A., Adham, D., & Moradi-Asl, E. (2024). Characteristics of suicide attempts in Northwestern Iran: a five-year population-based survey. *BMC psychiatry*, *24*(1), 15. https://doi.org/10.1186/s12888-023-05483-4

Abramson, L., Alloy, L., Hogan, M., Whitehouse, W., Gibb, B., Hankin, B., & Cornette, B. (2002). The hopelessness theory of suicidality: Suicide science. In: Springer. https://link.springer.com/chapter/10.1007/0-306-47233-3_3

Al-Halabí, S., Sáiz, P. A., Burón, P., Garrido, M., Benabarre, A., Jiménez, E., Cervilla, J., Navarrete, M. I., Díaz-Mesa, E. M., & García-Álvarez, L. (2016). Validación de la versión en español de la Columbia-Suicide Severity Rating Scale (Escala Columbia para Evaluar el Riesgo de Suicidio). *Revista de psiquiatría y salud mental*, *9*(3), 134-142. https://doi.org/10.1016/j.rpsm.2016.02.002

Amini-Tehrani, M., Sadeghi, R., Nasiri, M., Jalali, T., & Zamanian, H. (2021). Suicide-related interpersonal needs of young Iranian people: A preliminary validation of thwarted belongingness and perceived burdensomeness constructs. *Clinical psychology & psychotherapy*, *28*(2), 422-437. https://doi.org/10.1002/cpp.2507

Balaguer, A., Monforte-Royo, C., Porta-Sales, J., Alonso-Babarro, A., Altisent, R., Aradilla-Herrero, A., Bellido-Pérez, M., Breitbart, W., Centeno, C., & Cuervo, M. A. (2016). An international consensus definition of the wish to hasten death and its related factors. *Plos one*, *11*(1), e0146184. https://doi.org/10.1371/journal.pone.0196754

Beck, A. T., Kovacs, M., & Weissman, A. (1979). Assessment of suicidal intention: the Scale for Suicide Ideation. *Journal of consulting and clinical psychology*, *47*(2), 343.

Beck, A. T., & Steer, R. A. (1993). *Beck scale for suicide ideation: Manual*. Psychological Corporation. https://www.scirp.org/reference/ReferencesPapers?ReferenceID=2594738

Beck, A. T., Weissman, A., Lester, D., & Trexler, L. (1974). The measurement of pessimism: the hopelessness scale. *Journal of consulting and clinical psychology*, *42*(6), 861. https://doi.org/10.1037/h0037562

Bilsen, J. (2018). Suicide and youth: risk factors. *Frontiers in Psychiatry*, *9*, 540. https://doi.org/10.3389/fpsyt.2018.00540

Cabrera-Mendoza, B., Fresno, C., Monroy-Jaramillo, N., Fries, G. R., Walss-Bass, C., Glahn, D. C., Ostrosky-Wegman, P., Mendoza-Morales, R. C., García-Dolores, F., & Díaz-Otañez, C. E. (2020). Sex differences in brain gene expression among suicide completers. *Journal of Affective Disorders*, *267*, 67-77. https://doi.org/10.1016/j.jad.2020.01.167

Dhingra, K., Klonsky, E. D., & Tapola, V. (2019). An empirical test of the three-step theory of suicide in UK university students. *Suicide and Life-Threatening Behavior*, *49*(2), 478-487. https://doi.org/10.1111/sltb.12437

Esfahani, M., Hashemi, Y., & Alavi, K. (2015). Psychometric assessment of the Beck Scale for suicidal ideation (BSSI) in the general population in Tehran. *Medical journal of the Islamic Republic of Iran*, *29*, 268. https://pubmed.ncbi.nlm.nih.gov/26793659/

Fan, Q., Li, Y., Gao, Y., Nazari, N., & Griffiths, M. D. (2023). Self-compassion moderates the association between body

dissatisfaction and suicidal ideation in adolescents: A cross-sectional study. *International Journal of Mental Health and Addiction*, *21*(4), 2371-2388. https://doi.org/10.1007/s11469-021-00727-4

Fonseca-Pedrero, E., Al-Halabí, S., Pérez-Albéniz, A., & Debbané, M. (2022). Risk and protective factors in adolescent suicidal behaviour: A network analysis. *International Journal of Environmental Research and Public Health*, *19*(3), 1784. https://doi.org/10.3390/ijerph19031784

Franklin, J. C., Ribeiro, J. D., Fox, K. R., Bentley, K. H., Kleiman, E. M., Huang, X., Musacchio, K. M., Jaroszewski, A. C., Chang, B. P., & Nock, M. K. (2017). Risk factors for suicidal thoughts and behaviors: A meta-analysis of 50 years of research. *Psychological Bulletin*, *143*(2), 187. https://doi.org/10.1037/bul0000084

Gelvez-Gafaro, L.-M., Medina-Duarte, D.-M., Villa-Belluci, I.-P., Rivera-Porras, D., & Bonilla-Cruz, N.-J. (2022). Psychosocial risk factors associated with suicide in youth and adolescents: A systematic review. https://doi.org/10.47307/GMC.2022.130.s3.14

Gunn III, J. F., Goldstein, S. E., & Gager, C. T. (2018). A longitudinal examination of social connectedness and suicidal thoughts and behaviors among adolescents. *Child and Adolescent Mental Health*, *23*(4), 341-350. https://doi.org/10.1111/camh.12281

Holden, R. R., Mehta, K., Cunningham, E. J., & McLeod, L. D. (2001). Development and preliminary validation of a psychache scale. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement*, *33*(4), 224. https://doi.org/10.1037/h0087144

Klonsky, E. D., & May, A. M. (2014). Differentiating suicide attempters from suicide ideators: A critical frontier for suicidology research. *Suicide and Life-Threatening Behavior*, *44*(1), 1-5. https://doi.org/10.1111/sltb.12068

Klonsky, E. D., Pachkowski, M. C., Shahnaz, A., & May, A. M. (2021). The three-step theory of suicide: Description, evidence, and some useful points of clarification. *Preventive medicine*, *152*, 106549. https://doi.org/10.1016/j.ypmed.2021.106549

Klonsky, E. D., Qiu, T., & Saffer, B. Y. (2017). Recent advances in differentiating suicide attempters from suicide ideators. *Current opinion in psychiatry*, *30*(1), 15-20. https://doi.org/10.1097/YCO.0000000000000294

Lovero, K. L., Dos Santos, P. F., Come, A. X., Wainberg, M. L., & Oquendo, M. A. (2023). Suicide in global mental health. *Current psychiatry reports*, *25*(6), 255-262. https://doi.org/10.1007/s11920-023-01423-x

May, A. M., O'Brien, K. H. M., Liu, R. T., & Klonsky, E. D. (2016). Descriptive and psychometric properties of the inventory of motivations for suicide attempts (IMSA) in an inpatient adolescent sample. *Archives of suicide research*, *20*(3), 476-482. https://doi.org/10.1080/13811118.2015.1095688

Nock, M. K., & Kessler, R. C. (2006). Prevalence of and risk factors for suicide attempts versus suicide gestures: analysis of the National Comorbidity Survey. *Journal of Abnormal Psychology*, *115*(3), 616. https://doi.org/10.1037/0021-843X.115.3.616

O'Connor, R. C. (2011). The integrated motivational-volitional model of suicidal behavior. In: Hogrefe Publishing. https://doi.org/10.1027/0227-5910/a000120

Shneidman, E. S. (1993). Commentary: Suicide as psychache. *Journal of Nervous & Mental Disease*, *181*(3), 145-147. https://www.ovid.com/jnls/jonmd/abstract/00005053-199303000-00001~commentary-suicide-as-psychache?redirectionsource=fulltextview

Tsai, M., Lari, H., Saffy, S., & Klonsky, E. D. (2021). Examining the three-step theory (3ST) of suicide in a prospective study of adult psychiatric inpatients. *Behavior therapy*, *52*(3), 673-685. https://doi.org/10.1016/j.beth.2020.08.007

Van Orden, K. A. (2009). *Construct validity of the Interpersonal Needs Questionnaire*—the Florida State University. https://www.proquest.com/openview/892147dd633a4b67df03baa70a736111/1?pq-origsite=gscholar&cbl=18750

Wakabayashi, A., Baron-Cohen, S., Wheelwright, S., Goldenfeld, N., Delaney, J., Fine, D., Smith, R., & Weil, L. Systemizing Quotient--Short Form. *Personality and individual differences*. https://doi.org/10.1037/t73009-000

Wakabayashi, A., Baron-Cohen, S., Wheelwright, S., Goldenfeld, N., Delaney, J., Fine, D., Smith, R., & Weil, L. (2006). Development of short forms of the Empathy Quotient (EQ-Short) and the Systemizing Quotient (SQ-Short). *Personality and individual differences*, *41*(5), 929-940. https://doi.org/10.1016/j.paid.2006.03.017