

Research paper

Shared and distinct psychosocial network patterns of suicidal ideation across four countries

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ABSTRACT

Cross-national examinations can clarify whether associations among theory-derived and social-cognitive factors related to suicidal ideation (SI) are shared or context-specific, yet evidence remains scarce. This study estimated an overall psychosocial network of SI and compared its structure across four countries. In a cross-sectional online survey conducted between June 2025 and January 2026, 2018 adults aged 18–60 years from Italy, Korea, the UK, and the US were recruited through online survey panels. Recruitment aimed for similar age and gender profiles across the countries. Participants completed measures of SI and related psychosocial factors, which were analysed using network and relative importance analyses. The overall cross-country network comprised 39 edges, with the strongest associations between ability- and opinion-based comparison, defeat and internal entrapment, and fear of social disapproval and moral objections. SI was directly associated with perceived burdensomeness, defeat, and internal entrapment, and negatively associated with survival and coping beliefs. Defeat showed the highest centrality, whereas perceived burdensomeness showed the highest relative importance, followed by defeat and internal entrapment. The model explained 25.2% of the variance in SI severity. Cross-national networks showed broadly similar structures, although direct associations with SI varied across countries, with higher explained variance in the UK and Italy than in the US and Korea. Defeat and internal entrapment may occupy central positions within the psychological network of SI, whereas perceived burdensomeness may represent a more proximal correlate of SI. Cross-national variation highlights the importance of considering both shared and context-dependent associations in understanding SI.

1. Introduction

Suicide is a major global public health concern, accounting for an estimated 727,000 deaths worldwide in 2021, with substantial variation across countries (World Health Organization, 2025), highlighting the need to examine whether associations among psychological factors related to suicidal ideation (SI) are shared or context-specific.

In recent years, there has been a growth in theoretical frameworks to understand suicide risk. For example, the integrated motivational–volitional model of suicidal behaviour (IMV) proposes that SI arises through a progression from defeat to entrapment (O'Connor and Kirtley, 2018), with empirical findings generally supporting associations among these components (Torino et al., 2026). Similarly, within the interpersonal theory of suicide (IPTs), perceived burdensomeness and thwarted belongingness are well-established correlates of SI (Chu et al., 2017). While the IMV and IPTs have advanced understanding of SI by

identifying key motivational and interpersonal processes, less is known about how these theory-derived constructs are interrelated with social-cognitive factors, including social comparison and relative deprivation. Social comparison theory proposes a general tendency to evaluate one's opinions and abilities in relation to others (Gibbons and Buunk, 1999), and negative comparisons have been linked to defeat and entrapment (Wetherall et al., 2019). Such comparisons may contribute to perceptions of relative deprivation (Smith et al., 2012), defined as feeling disadvantaged relative to others, which has been associated with poorer mental health outcomes (Mishra and Carleton, 2015) and proposed as a form of psychological strain relevant to suicidal behaviour (Zhang, 2019). Protective factors, including reasons for living, are also important components of SI-related psychological processes. Taken together, these findings suggest that multiple motivational, interpersonal, social-cognitive, and protective factors are relevant to SI, but their interrelations have rarely been examined within the same analytic model.

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Network approaches have been applied to examine patterns of association among key components of suicide theories, including constructs from the IMV and IPTS frameworks (De Beurs et al., 2019). Although a few studies have examined social-cognitive factors alongside theory-derived constructs (Wetherall et al., 2019), the patterns of association among these constructs within broader psychological networks remain insufficiently understood. However, cross-national examinations of these network structures remain scarce, limiting understanding of how these interrelations may vary across countries. More broadly, it remains unclear whether patterns of association among psychological factors, and their relations to SI, differ across countries, underscoring the need for more fine-grained, cross-national analyses of underlying psychological processes (Kirmayer, 2022). Prior cross-national research suggests that the associations between reasons for living and SI may differ across countries (Siegmann et al., 2018). Such comparisons are difficult to draw from separate single-country studies, as differences in samples, measures, and analytic methods can limit direct comparison. Italy, Korea, the UK, and the US were included as distinct national contexts across different geographical regions, varying in suicide mortality and broader social contexts.

Given the limited cross-national evidence, the present study used a network approach to examine interrelations among psychological factors related to SI and to identify shared and context-specific patterns across these four countries.

2. Methods

2.1. Participants and procedures

This cross-sectional survey was conducted in four countries (Italy, Korea, the UK, and the US). Eligible participants were adults aged 18–60 years. Participants were recruited through online survey panels (Prolific in Italy, the UK, and the US; InVight in Korea).

A total of 2018 participants were included (Italy: $n = 500$; Korea: $n = 516$; the UK: $n = 502$; the US: $n = 500$). Recruitment used platform-based quota settings to achieve approximately balanced representation by gender and across two age groups (18–39 and 40–60 years). Sociodemographic characteristics by country are presented in Table 1.

Data were collected between June 2025 and January 2026. Participants provided informed consent electronically and received monetary compensation in accordance with platform guidelines. The study was approved by the Institutional Review Board of Pusan National University (PNU IRB/2024_209_HR).

2.2. Sample size considerations

Prior simulation work suggests that approximately 450 participants per group are required for stable estimation of networks of this size (Constantin et al., 2026). Accordingly, a target of approximately 500 participants per country was expected to support for stable estimation of country-specific network models and cross-national comparisons.

2.3. Measures

2.3.1. Suicidal ideation severity

SI severity was assessed using the Columbia Suicide Severity Rating Scale (C-SSRS; Posner et al., 2008). The five dichotomous items assess progressively severe levels of recent suicidal thoughts. Following the C-SSRS scoring procedure, SI severity was coded as the highest level endorsed rather than as a summed score, yielding a score ranging from 0 to 5.

2.3.2. Theory-based risk factors

Defeat and internal/external entrapment were assessed using the 8-item short form of the Defeat and Entrapment Scale (Griffiths et al., 2015), rated on a 5-point Likert scale. The scale included three

Table 1
Sociodemographic characteristics by country.

	Total ($N = 2018$)	Country				F/χ^2
		IT ($n = 500$)	KR ($n = 516$)	UK ($n = 502$)	US ($n = 500$)	
	$n(\%)$					
Age ($n = 2017$)	39.13 (10.6)	38.31 (11.1)	39.78 (10.4)	39.70 (10.2)	38.69 (10.6)	2.5
Sex ($n = 2009$)						
Male	1011 (50.3)	251 (50.9)	256 (49.6)	257 (51.2)	247 (49.6)	0.4
Female	998 (49.7)	242 (49.1)	260 (50.4)	245 (48.8)	251 (50.4)	
Income ($n = 2017$)						
Low	694 (34.4)	166 (33.2)	194 (37.6)	168 (33.5)	166 (33.2)	5.2
Middle	693 (34.4)	184 (36.8)	165 (32.0)	177 (35.3)	167 (33.4)	
High	630 (31.2)	150 (30.0)	157 (30.4)	156 (31.1)	167 (33.4)	
Education						
High school graduate or less	437 (21.7)	177 (35.4)	68 (13.2)	104 (20.7)	88 (17.6)	82.6***
College or higher	1581 (78.3)	323 (64.6)	448 (86.8)	398 (79.3)	412 (82.4)	
Marital status						
Married	863 (42.8)	127 (25.4)	238 (46.1)	232 (46.2)	266 (53.2)	88.7***
Unmarried	1155 (57.2)	373 (74.6)	278 (53.9)	270 (53.8)	234 (46.8)	
Religion						
Yes	1007 (49.9)	233 (46.6)	198 (38.4)	217 (43.2)	359 (71.8)	134.6***
No	1011 (50.1)	267 (53.4)	318 (61.6)	285 (56.8)	141 (28.2)	
Race						
White	1216 (60.3)	472 (94.4)	0(0.0)	424 (84.5)	320 (64.0)	1887.1***
Black/African Caribbean	103 (5.1)	7(1.4)	0(0.0)	24 (4.8)	72 (14.4)	
Hispanic/Latino	52 (2.6)	4(0.8)	0(0.0)	3(0.6)	45 (9.0)	
Asian	600 (29.7)	9(1.8)	516 (100.0)	42 (8.4)	33 (6.6)	
Others	47 (2.3)	8(1.6)	0(0.0)	9(1.8)	30 (6.0)	
Work						
Employed	1617 (80.1)	342 (68.4)	417 (80.8)	432 (86.1)	426 (85.2)	62.5***
Not employed	401 (19.9)	158 (31.6)	99 (19.2)	70 (13.9)	74 (14.8)	

Note. Unless otherwise indicated, $N = 2018$; valid sample sizes are reported for variables with missing data. Nine participants selected “Other” for sex (non-binary, $n = 6$; agender, $n = 1$; preferred not to specify, $n = 2$). Income was categorised as low (lowest 33%), middle (34–66%), and high (highest 33%). Marital status was categorised as married or unmarried (single, cohabiting, widowed, separated, or divorced). Employment was categorised as employed (wage-employed or self-employed) or not employed. Age was analysed using one-way ANOVA with Games–Howell post hoc tests; all other variables were analysed using chi-square tests.

*** $p < .001$.

subscales: defeat (4 items; range: 0–16; e.g., “I feel defeated by life”), internal entrapment (2 items; range 0–8; e.g., “I would like to escape from my thoughts and feelings”), and external entrapment (2 items; range 0–8).

Perceived burdensomeness (PB) and thwarted belongingness were assessed using the 15-item Interpersonal Needs Questionnaire (INQ; Van Orden et al., 2012), rated on a 7-point Likert scale. PB comprised 6 items (range: 6–42), whereas thwarted belongingness comprised 9 items

(range: 9–63), six of which were reverse-coded (items 7, 8, 10, 13, 14, and 15). Example items include “These days, I think I am a burden on society” for PB and “These days, I feel disconnected from other people” for thwarted belongingness.

2.3.3. Social-cognitive factors

Social comparison tendencies were assessed using the 11-item Iowa–Netherlands Comparison Orientation Measure (INCOM; Gibbons and Buunk, 1999), rated on a 5-point Likert scale. The measure comprised two subscales: ability-based comparison (6 items; range: 6–30; e.g., “I often compare myself with others with respect to what I have accomplished in life”) and opinion-based comparison (5 items; range: 5–25). Items 5 and 11 were reverse-coded.

Relative deprivation was measured using the 3-item Personal Relative Deprivation Scale (Callan et al., 2011), consisting of 3 items rated on a 6-point Likert scale (range: 3–18), assessing perceived unfair disadvantage relative to others (e.g., “I feel deprived when I think about what I have compared to what other people like me have”).

2.3.4. Protective factors

Reasons for living were assessed using the 12-item short form of the Reasons for Living Inventory (Ivanoff et al., 1994), rated on a 6-point Likert scale across six subscales. Each subscale was assessed using two items and had a possible range of 2–12. The subscales covered fear of suicide, responsibility to family, survival and coping beliefs, child-related concerns, fear of social disapproval, and moral objections.

2.3.5. Depressive symptoms in sensitivity analyses

Depressive symptoms were assessed using the Patient Health Questionnaire-2 (PHQ-2) (Kroenke et al., 2003), rated on a 4-point scale reflecting symptom frequency over the past two weeks (range: 0–6).

2.3.6. Demographic characteristics

Demographic variables included age, gender, ethnicity, marital status, educational level, religion, employment status, and income.

Item scores were summed for all measures except the C-SSRS, and higher scores indicated greater levels of each construct. Where validated translations were available, these were used; otherwise, standard translation and back-translation procedures were applied to ensure linguistic equivalence across countries. Reliability coefficients and validation details for each country are provided in Table S1.

2.4. Statistical analyses

Descriptive statistics were computed for all study variables. Between-country differences were examined using χ^2 tests for categorical variables and one-way ANOVA for continuous variables.

2.4.1. Network estimation and centrality

An overall network and country-specific networks were estimated using Gaussian Graphical Models (GGM) based on Pearson correlation matrices. Networks were estimated using the graphical LASSO with Extended Bayesian Information Criterion (EBICglasso; $\gamma = 0.5$) in the qgraph package. For visualisation, the Fruchterman–Reingold algorithm (Fruchterman and Reingold, 1991) was applied to the overall network, and this layout was fixed across country-specific networks to facilitate comparison.

Expected Influence (EI) was used as the primary centrality metric, given its suitability for networks including both positive and negative edges (McNally, 2016), and was computed using qgraph. EI values were standardised (z-scores) to facilitate cross-country comparison.

2.4.2. Network comparison and relative importance

Similarity between networks was quantified using Spearman correlations between edge-weight matrices. Network Comparison Test (NCT; Van Borkulo et al., 2023) was conducted with 10,000 permutations

across all country pairs (6 comparisons) to test structural and edge invariance. Bonferroni correction was applied ($\alpha = 0.05/6 = 0.0083$).

Relative importance analysis was conducted using the Lindeman–Merenda–Gold (LMG) method (relaimpo package; Grömping, 2007) to assess the contribution of each variable to SI. SI was specified as the outcome, with all variables included simultaneously in the model. Estimates were based on 10,000 bootstrap samples, with 95% confidence intervals (CI) and pairwise comparisons derived from the bootstrap distributions.

2.4.3. Accuracy, stability and sensitivity analyses

Network accuracy and stability were evaluated using the bootstrap package with 10,000 bootstrap samples. Edge-weight accuracy was assessed using nonparametric bootstrap CIs. Nonparametric bootstrap procedures were also used to test differences between edge weights and between centrality indices. Centrality stability was evaluated using case-dropping bootstrap procedures to estimate the correlation stability coefficient (CS-coefficient) with values ≥ 0.50 indicating good stability (Epskamp et al., 2018).

Sensitivity analyses included re-estimating the overall network by including depression as an additional node, estimating separate networks for participants with and without lifetime suicide attempts (C-SSRS), and varying the EBIC hyperparameter ($\gamma = 0.25$ and 0.75). Similarity to the original network was assessed using Spearman correlations between edge weights.

All descriptive analyses were conducted in IBM SPSS Statistics 30.0, and network analyses were performed in R version 4.5.0.

3. Results

3.1. Descriptive statistics

Study variables are summarised in Table S2. Most variables showed significant cross-national differences in mean levels, with the exception of fear of suicide. Differences were observed across multiple domains, including SI, IMV/IPTS constructs, social–cognitive factors, and reasons for living domains.

3.2. Overall network structure and centrality

Bootstrapping analyses indicated adequate accuracy of edge weight estimates (Fig. S1). The overall network included 39 edges (Fig. 1). The strongest edges were observed between ability- and opinion-based comparison ($r = 0.53$), defeat and internal entrapment ($r = 0.45$), and fear of social disapproval and moral objections ($r = 0.43$) (Fig. S2).

SI was directly connected with PB ($r = 0.21$), defeat ($r = 0.07$), and internal entrapment ($r = 0.06$), and negatively connected with survival and coping beliefs ($r = -0.10$).

Protective factors formed a relatively cohesive cluster, with strong positive connections among reasons for living variables. Social–cognitive variables showed limited direct links to SI, but were connected to motivational and interpersonal variables within the broader network.

3.2.1. Expected influence centrality

The CS-coefficient for expected influence was 0.75, indicating high stability. Defeat showed the highest centrality, followed by internal entrapment and fear of social disapproval (Fig. 2). Bootstrap difference tests indicated that defeat showed higher centrality than several other nodes, whereas internal entrapment and fear of social disapproval did not differ significantly from each other (Fig. S3).

3.3. Relative importance for SI

The model explained 25.16% of the variance in SI severity (Fig. 3). PB, defeat, and internal entrapment showed the highest relative

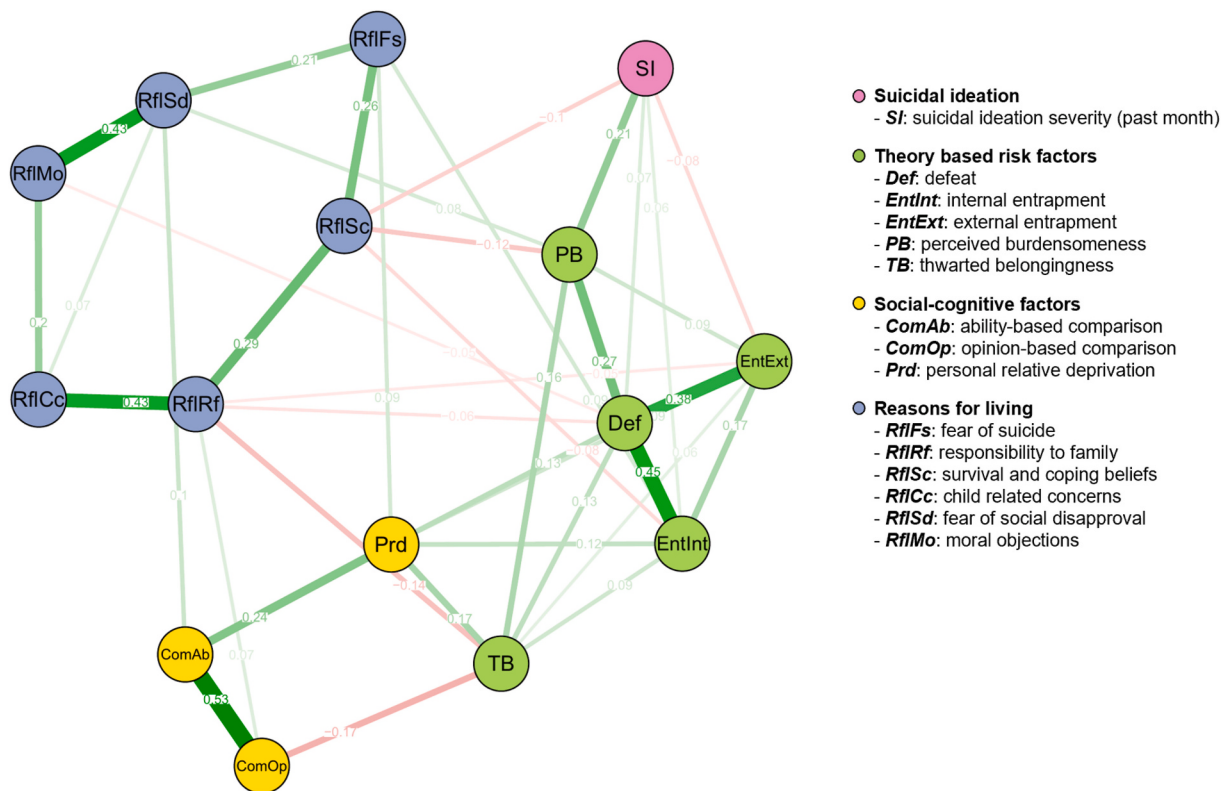


Fig. 1. Network structure of suicidal ideation

Note. The network was estimated using EBICglasso ($\gamma = 0.5$) with a spring layout. Edges not retained after regularization are shown as absent. Edge colour indicates the direction of associations (green = positive, red = negative), and edge thickness reflects magnitude. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

importance, whereas social-cognitive factors including ability- and opinion-based comparison and several reasons for living domains showed relatively lower importance.

Tests of differences in relative importance indicated that PB showed greater relative importance than most other nodes. Defeat showed greater relative importance than thwarted belongingness, and internal entrapment more than personal relative deprivation. Among protective factors, survival and coping beliefs showed greater importance than responsibility to family.

3.4. Country-specific network structures and centrality

Bootstrapping indicated adequate accuracy of edge-weight estimates across the country-specific networks (Fig. S4). The number of estimated edges varied across countries, with 22 edges in Korea, 24 in Italy, 27 in the UK, and 28 in the US.

At the overall network level, network similarity analyses showed moderate correlations between country networks ($r_s = 0.59$ – 0.76), although the NCT indicated structural differences for most country pairs except between Italy and the UK, and between the UK and US.

The strongest edge in each country network was the ability- and opinion-based comparison edge in Italy ($r = 0.68$) and Korea ($r = 0.55$), the defeat and internal entrapment edge in the UK ($r = 0.49$), and the responsibility to family and child-related concerns edge in the US ($r = 0.49$) (Fig. 4; see Fig. S5 for bootstrap edge-difference tests within country-specific networks).

At the individual edge level, we first examined descriptively patterns of direct connections with SI severity across countries. SI was directly linked to defeat in Italy ($r = 0.14$), Korea ($r = 0.16$), and the UK ($r = 0.07$), but not in the US, and to PB in Italy ($r = 0.20$), the UK ($r = 0.21$), and the US ($r = 0.23$), but not in Korea. SI was additionally negatively associated with survival and coping beliefs in the UK ($r = -0.17$) and

Italy ($r = -0.25$), and positively associated with internal entrapment in the UK ($r = 0.08$).

Edge-level NCT comparisons identified several significant cross-national differences. For SI-related edges, the SI–defeat association was significantly weaker in the US than in Korea and Italy, and the negative SI–survival and coping beliefs association was significantly weaker in Korea than in the UK and Italy.

For social-cognitive factors, the ability-comparison–defeat association was significantly stronger in Korea than in other countries and was retained only in the Korean network. The defeat–personal relative deprivation association was significantly weaker in the UK than in each of the other countries and was not retained in the UK network. The thwarted belongingness–personal relative deprivation association was also significantly stronger in the UK than in Korea.

Regarding protective factors, the negative associations between thwarted belongingness and survival and coping beliefs and between PB and responsibility to family, were significantly stronger in the UK than in Korea, where neither edge was retained. Complete results of all pairwise edge-level NCT comparisons are provided in Table S3.

3.4.1. Country-specific expected influence centrality

Stability analyses indicated adequate centrality stability across all countries, with CS coefficients of 0.75 for Korea and the UK, 0.67 for Italy, and 0.52 for the US. Bootstrap difference tests showed that defeat was the most central node across country-specific networks. Other relatively central nodes varied by country: internal entrapment and ability-based comparison in Italy; ability-based comparison and survival and coping beliefs in Korea; internal entrapment in the UK; and ability-based comparison and internal entrapment in the US (Figs. S6 and S7).

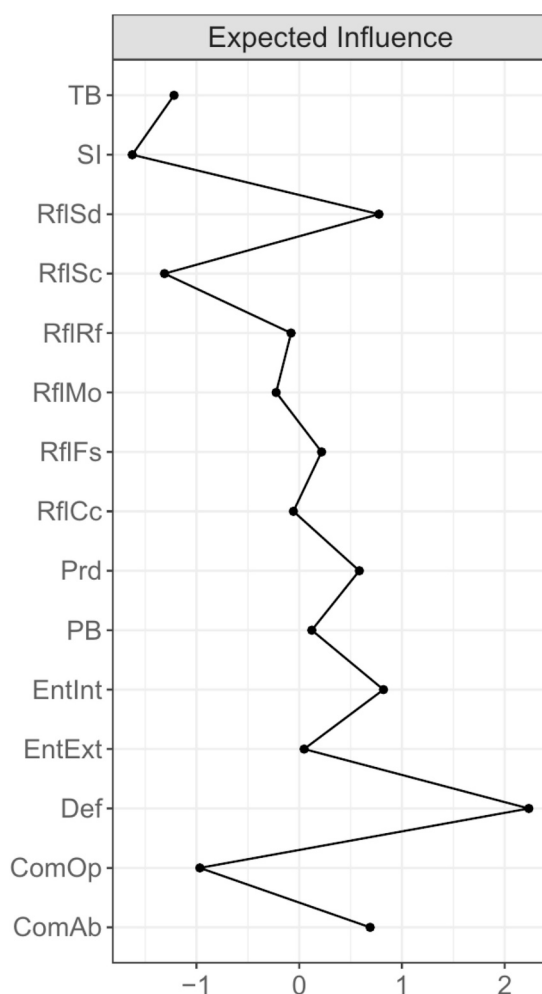


Fig. 2. Expected influence in the suicidal ideation network

Note. Centrality indices are standardised (z-scores) to facilitate comparison across nodes. Higher values indicate greater expected influence.

Abbreviations: SI: suicidal ideation severity (past month); Def: defeat; EntInt: internal entrapment, EntExt: external entrapment; PB: perceived burdensomeness; TB: thwarted belongingness; ComAb: ability-based comparison; ComOp: opinion-based comparison; Prd: personal relative deprivation; RflFs: fear of suicide; RflRf: responsibility to family; RflSc: survival and coping beliefs; RflCc: child-related concerns; RflSd: fear of social disapproval; RflMo: moral objections.

3.5. Country-specific relative importance

Relative importance for SI varied across countries, with higher explained variance in the UK and Italy (39.71% and 38.46%) than in the US (27.59%) and Korea (20.74%) (Fig. S8). Across countries, PB consistently showed high explanatory importance. Defeat and survival and coping beliefs were also prominent, although less so in the US and Korea, respectively.

Country-specific patterns were broadly similar, although some variation was observed. In Italy, survival and coping beliefs, PB, and defeat showed the highest contributions, followed by internal entrapment. In Korea, defeat and PB were the strongest contributors. In the UK, PB, survival and coping beliefs, defeat, and internal entrapment were among the strongest contributors. In the US, PB, internal entrapment, and survival and coping beliefs showed the highest contributions.

3.6. Sensitivity analyses

Sensitivity analyses indicated that the depression-adjusted network

retained a broadly similar structure to the original network (Fig. S9). The original and depression-adjusted networks comprised 39 edges, with 33 shared edges and six unique edges in each network. In the depression-adjusted network, depression showed a direct association with SI ($r = 0.23$), whereas the direct associations of SI with defeat and internal entrapment were no longer retained.

The networks stratified by lifetime suicide attempt history showed moderate-to-high similarity ($r_s = 0.73$), suggesting broadly comparable structures with some differences across groups. However, the lifetime attempt group showed lower network stability, warranting cautious interpretation (Fig. S10).

Networks estimated using different EBIC hyperparameter values showed highly similar structures to the original network ($\gamma = 0.50$ vs. 0.25 : $r_s = 0.97$; $\gamma = 0.50$ vs. 0.75 : $r_s = 1.00$).

4. Discussion

Overall, the network structure was characterised by several strong associations among conceptually related variables, particularly between defeat and internal entrapment. Defeat showed the highest expected influence centrality, followed by internal entrapment, whereas PB showed the strongest direct association with SI and the greatest relative importance for SI severity. This divergence between centrality and indicators of SI relevance suggests that highly central nodes may not necessarily show the strongest associations with SI severity. Internal entrapment showed higher centrality and relatively stronger associations with SI than external entrapment, suggesting that internally constrained or inescapable states may have comparatively greater relevance to SI within the broader network.

These findings can be understood within the frameworks of the IMV model and the IPTS. Consistent with the IMV model (O'Connor and Kirtley, 2018), defeat and entrapment occupied central positions within the network, supporting their role as key motivational processes and aligning with recent evidence highlighting the central role of defeat-entrapment processes within the IMV model (Souza et al., 2024). This pattern is broadly consistent with prior network findings showing defeat as a central node and PB as more directly associated with suicidal ideation or desire (De Beurs et al., 2019; Ordóñez-Carrasco et al., 2023), while also supporting prior findings suggesting greater relevance of internal versus external entrapment (De Beurs et al., 2019). In line with the IPTS, PB showed stronger direct associations with SI and greater relative importance for SI, consistent with prior meta-analytic evidence (Chu et al., 2017).

Taken together, these findings suggest a distinction between structurally central variables and variables more directly linked to SI severity, with defeat-internal entrapment occupying more central positions within the network and PB showing stronger direct associations with SI.

Relative deprivation and social comparison variables showed limited direct associations with SI and were more strongly connected with core motivational and interpersonal variables, including defeat, suggesting that these factors may be more indirectly related to SI within the broader social-evaluative context. These patterns are broadly consistent with the pre-motivational phase of the IMV model, in which broader social or contextual factors may be indirectly related to SI through their associations with core psychological processes. They also highlight the importance of understanding an individual within their social context. This aligns with recent efforts to integrate social-contextual factors within suicide theories, including the IMV (Wetherall et al., 2019) and the IPTS (Mulligan et al., 2025).

Among protective factors, survival and coping beliefs showed a more prominent association with SI than other reasons-for-living domains, consistent with prior evidence highlighting the protective relevance of this domain for SI (Bakhiyi et al., 2016). Fear of social disapproval also showed relatively high centrality despite limited direct associations with SI. In contrast, most other reasons-for-living domains showed relatively limited relevance within the broader network. This pattern may indicate

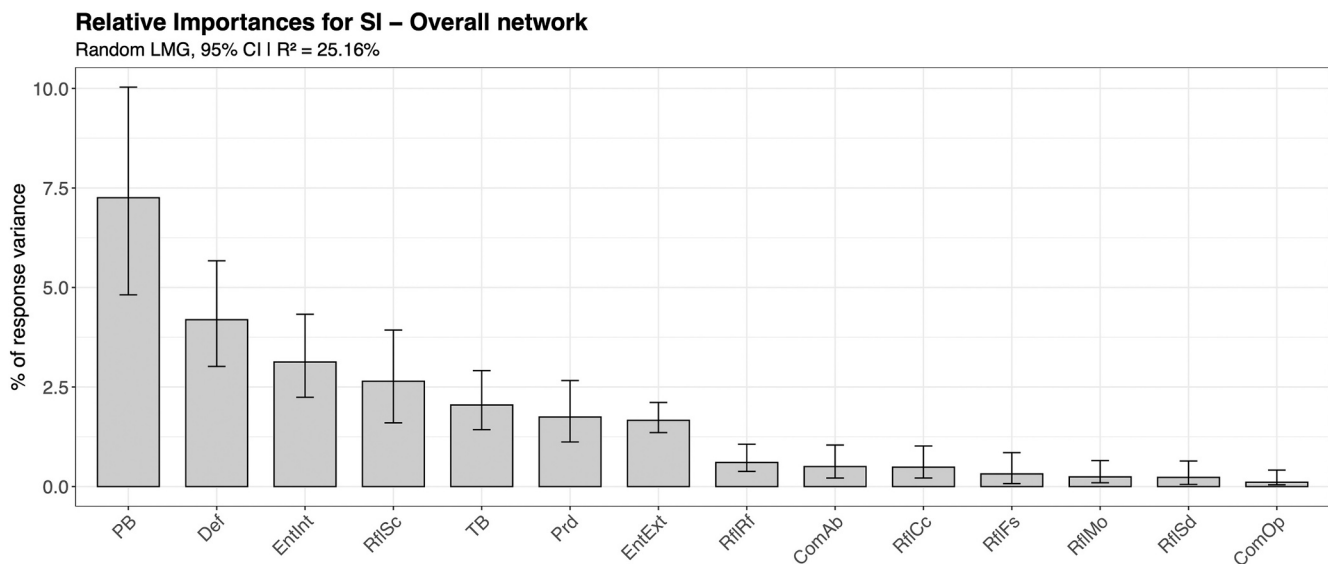


Fig. 3. Relative importance for suicidal ideation

Note. Bars represent relative contributions to explained variance in suicidal ideation (LMG method). Error bars indicate bootstrapped 95% confidence intervals.

Abbreviations: *SI*: suicidal ideation severity (past month); *Def*: defeat; *EntInt*: internal entrapment, *EntExt*: external entrapment; *PB*: perceived burdensomeness; *TB*: thwarted belongingness; *ComAb*: ability-based comparison; *ComOp*: opinion-based comparison; *Prd*: personal relative deprivation; *RfIFs*: fear of suicide; *RfIRf*: responsibility to family; *RfISC*: survival and coping beliefs; *RfICc*: child-related concerns; *RfISd*: fear of social disapproval; *RfIMo*: moral objections.

that some protective factors become more salient under conditions of elevated SI (Tsypes et al., 2022).

The country-specific networks showed broadly comparable patterns, although cross-national differences were observed in several specific associations and patterns of relative importance. Defeat showed relatively consistent prominence across countries, whereas internal entrapment, protective factors, and associations involving social comparison and relative deprivation showed greater cross-national variability. PB showed consistently high relative importance across countries, supporting its cross-national relevance to SI. In contrast, survival and coping beliefs appeared less relevant in Korea than in the other countries, suggesting possible cross-national variation in how protective processes are represented within the broader network related to SI. This finding is compatible with a prior review evidence suggesting that RFL may vary across cultural and ethnic groups, with lower RFL scores noted among Korean college students than among Asian-American and Caucasian student samples (Bakhiyi et al., 2016).

Associations involving social comparison and relative deprivation varied across countries. Ability-based comparison was linked to defeat only in Korea, whereas personal relative deprivation showed country-specific connections with motivational and interpersonal variables, including defeat and thwarted belongingness. This Korea-specific pattern may be interpreted in relation to prior Korean evidence linking income-based relative deprivation with higher odds of suicidal ideation and suicide planning or attempt (Pak and Choung, 2020). Cross-national variation also appeared to involve a limited number of SI-related associations, particularly those involving defeat, internal entrapment, and survival and coping beliefs. The four countries differ in suicide mortality (World Health Organization, 2025), as well as in broader sociocultural contexts that may shape how social-cognitive, interpersonal, and protective factors are experienced and expressed.

However, the observed country-specific patterns should be interpreted cautiously. The present study compared country-specific networks and relative importance patterns, but did not measure cultural dimensions or test whether country-level cultural factors contributed to these differences. In addition, most variables showed significant differences in their mean levels across countries, which may influence the estimation and comparability of network structures, including edge weights and centrality. Accordingly, observed differences should not be

interpreted as reflecting fixed national or cultural characteristics, but may instead reflect broader social contexts shaping psychological processes, consistent with ecosocial perspectives on suicide (Kirmayer, 2022).

The present findings extend existing models by suggesting that SI may involve interconnected processes within a broader network structure in which social-cognitive factors appear indirectly related to SI through their associations with motivational and interpersonal variables. While PB showed comparatively stronger direct associations with SI, defeat and internal entrapment occupied relatively central positions within the broader network. Approaches to understanding SI may therefore benefit from considering both directly associated factors and broader interpersonal and social-evaluative processes, while accounting for contextual variation across countries. This highlights the importance of adopting a socio-ecological approach to understanding and preventing suicide (O'Connor et al., 2023).

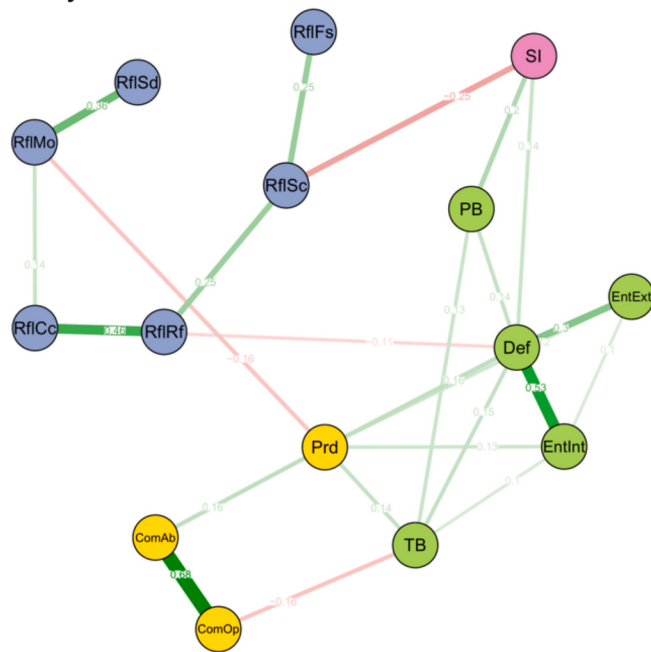
Sensitivity analyses generally supported the overall consistency of the network structure across depression-adjusted and hyperparameter-adjusted models. However, when depression was included, the direct associations of SI with defeat and internal entrapment were no longer retained. This pattern may reflect overlapping associations involving depressive symptoms, suggesting that the associations of defeat and entrapment with SI may partly overlap with depressive symptomatology. Although subgroup analyses by lifetime suicide attempt history suggested some structural differences, these findings should be interpreted cautiously given the lower stability of the attempt network.

4.1. Limitations

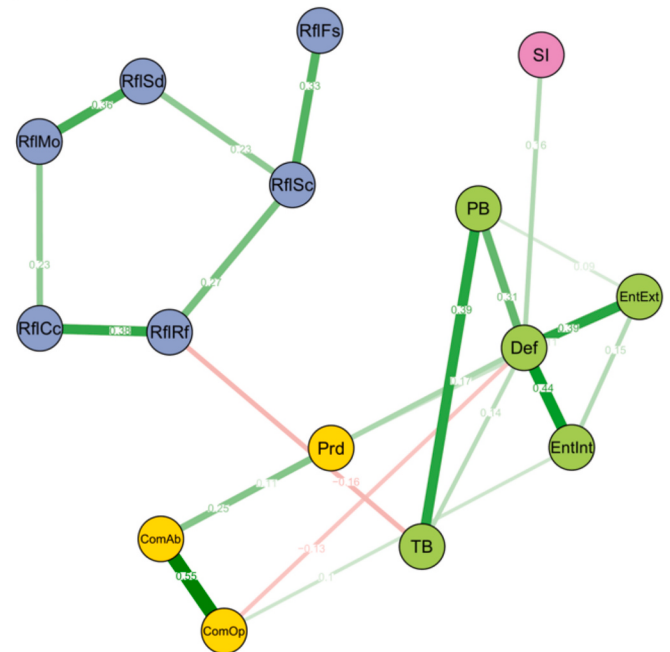
Several limitations should be noted. Participants were recruited from online survey panels, which may limit generalisability and introduce selection bias that may have influenced prevalence estimates and association strengths. Findings may not generalise beyond the countries examined, and the age range was restricted to adults aged 18–60 years.

Most study variables showed significant cross-national differences in mean levels. Although network models estimate conditional associations, differences in variable distributions across countries may still influence the estimation and comparability of network structures. Thus, some observed cross-national differences may reflect differences in

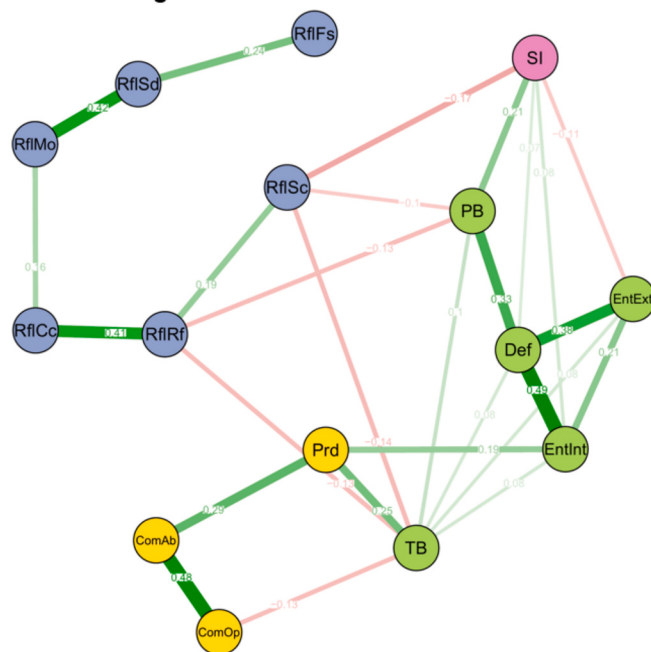
a. Italy



b. Korea



c. United Kingdom



d. United States

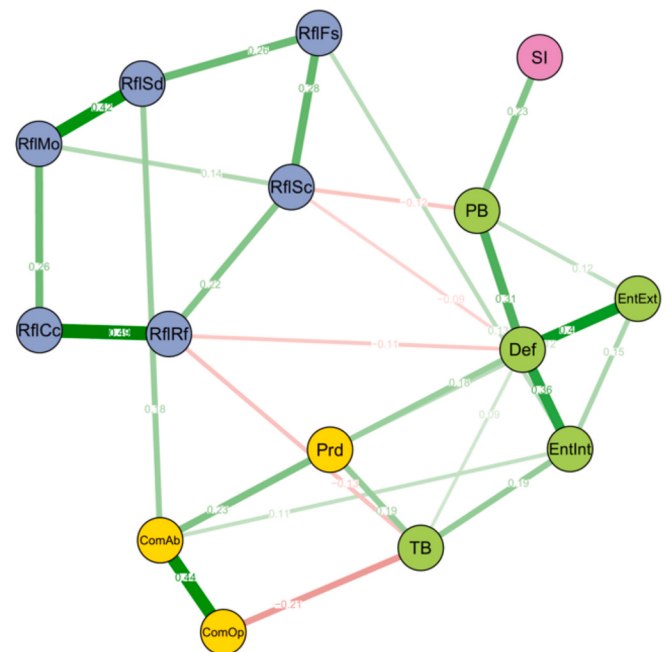


Fig. 4. Country-specific network structures

Note. Networks were estimated using EBICglasso ($\gamma = 0.5$) with a fixed layout based on the overall network. Edges not retained after regularization are omitted. Edge colour indicates the direction of association (green = positive, red = negative), and edge thickness reflects magnitude.

Abbreviations: *SI*: suicidal ideation severity (past month); *Def*: defeat; *EntInt*: internal entrapment, *EntExt*: external entrapment; *PB*: perceived burdensomeness; *TB*: thwarted belongingness; *ComAb*: ability-based comparison; *ComOp*: opinion-based comparison; *Prd*: personal relative deprivation; *RfIFs*: fear of suicide; *RfIFsC*: responsibility to family; *RfIFsD*: survival and coping beliefs; *RfIFsCc*: child-related concerns; *RfIFsMo*: moral objections. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

overall levels rather than purely structural variation. In addition, measurement invariance was not fully established across countries, which may have resulted in measurement non-equivalence and influenced some associations.

The cross-sectional design precludes causal inference, and the observed associations may reflect bidirectional or reverse relationships. Although sensitivity analyses indicated broadly consistent findings,

network estimates may still be influenced by analytical decisions, including model specification and regularization. The study focused on SI and does not address the transition to suicide attempts, which may involve partly distinct mechanisms and pathways.

Taken together, the present study integrated theory-driven and social-cognitive factors within a cross-national framework, identifying broadly shared network patterns alongside some context-specific

variation, particularly with respect to social-cognitive and protective factors.

CRedit authorship contribution statement

Eun-Jung Shim: Writing – review & editing, Writing – original draft, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Dapin Cho:** Writing – review & editing, Investigation, Formal analysis, Data curation. **Banu Cankaya Sahin:** Writing – review & editing. **Rory O'Connor:** Writing – review & editing, Methodology, Conceptualization.

Consent

All participants provided informed consent electronically.

Ethical approval

The study was approved by the Institutional Review Board of Pusan National University (PNU IRB/2024_209_HR).

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jad.2026.122475>.

Data availability

The data are available from the corresponding author upon reasonable request.

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