Suicidal ideation with and without intention to act: A transdiagnostic network analysis on the interplay between psychopathology, impulsivity, and childhood maltreatment

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Abstract

Background. Suicide represents a significant public health concern. Suicide prevention strategies are shifting toward transdiagnostic perspectives examining interrelated risk factors, but their interrelationships remain unclear. This study investigated relationships between psychopathological dimensions, impulsivity, and childhood maltreatment in individuals with suicidal ideation (SI), comparing those with versus without intention to act using network analysis.

Methods. Data were obtained from the Suicide Prevention and Intervention Study project. Participants were categorized into two groups based on their intention to act according to the Columbia Suicide Severity Rating Scale. Psychological symptoms, impulsivity traits, and childhood maltreatment were assessed. Network analysis was performed, and centrality measures were computed.

Results. A total of 1,265 individuals were categorized into the SI without intention to act ($n = 345$) and SI with intention to act ($n = 920$) groups. The former showed lower depression and hostility scores, and lower prevalence of major depressive and anxiety disorders. Network analyses revealed that in the SI without intention to act group, obsessive-compulsive symptoms were central, connecting to depression and anxiety, while negatively correlating with non-planning impulsivity. In contrast, the SI with intention to act group showed a more densely interconnected network where emotional abuse served as a bridge between childhood maltreatment and other psychopathological dimensions.

Conclusions. This study identifies symptom interaction patterns between individuals with SI without and with intention to act. Understanding these relationships may improve suicide risk assessment and inform personalized interventions, potentially reducing the transition from ideation to action. Trauma-focused approaches addressing emotional abuse may be especially relevant for individuals at high risk.

Introduction

Suicide is a critical public health concern, claiming worldwide nearly 700,000 lives annually. It leaves profound emotional, psychological, and economic impacts on individuals, families, and communities (World Health Organization, 2021). The complexity of suicide poses substantial challenges for accurate prediction and prevention, emphasizing the need for a more comprehensive understanding of its contributing factors (Franklin et al., 2017). Rather than being limited to a single psychiatric disorder, suicidal behavior is viewed as a transdiagnostic feature, present across the spectrum of mental health conditions (Le et al., 2024; Schechter & Goldblatt, 2020). This perspective encourages a shift from focusing solely on specific diagnoses to examining a broader array of mental health and environmental factors that contribute to suicide risk. In fact, analyzing the interplay between these variables may offer a more comprehensive understanding of suicidal ideation (SI) and behavior (Karnick et al., 2022). Previous research has identified several factors associated with suicidal behavior, including impulsivity (Liu, Trout, Hernandez, Cheek, & Gerlus, 2017), childhood maltreatment (Angelakis, Austin, & Gooding, 2020; Angelakis, Gillespie, & Panagioti, 2019), and psychopathological dimensions such as depression, anxiety (Oliva et al., 2024), or emotion dysregulation (Turton, Berry, Danquah, & Pratt, 2021). These elements often interact, creating a complex network of risks that vary across individuals. For instance, multidimensional measures of impulsivity have been used to differentiate between those with suicidal thoughts and those who attempted suicide (Klonsky & May, 2010), while early-life trauma consistently correlates with increased vulnerability to SI and attempts throughout the lifespan (Andreo-Jover et al., 2024b; Gómez-Vallejo et al., 2025). Since SI exists on a spectrum, ranging from passive thoughts of death to active plans and intentions, differentiating between ideation with and without intent is essential. The psychological mechanisms and risk factors may differ between these groups (Marie, Poindexter, Fadoir, & Smith, 2020), potentially requiring distinct prevention and intervention strategies.

This study aims to investigate the relationships between psychopathological dimensions, impulsivity, and childhood maltreatment in individuals with SI, both with and without intention to act. We seek to uncover how these factors interact across different manifestations of suicidal behaviors through a transdiagnostic network approach (Borsboom, 2017; De Beurs, 2017). Our goal is to refine the understanding of suicide risk profiles, ultimately informing the development of personalized and effective prevention and intervention strategies tailored to individual risk patterns.

Methods

Participants

Data for this study were obtained from the 'Suicide Prevention and Intervention Study' (SURVIVE) project (Pérez et al., 2020), a multisite cohort study with nested randomized controlled trials.

Participants were individuals aged 12 years and older who had recently attempted suicide (i.e. within the last 10 days, as per the study protocol), recruited from nine University Hospitals across Spain between 2020 and 2024. All participants provided informed consent after being fully informed of the study's aims and procedures. Detailed inclusion and exclusion criteria can be found in the study protocol (Pérez et al., 2023).

For the present study, we focused on baseline data after the attempted suicide from participants aged 18 years and older. Data collection was conducted during the baseline visit in a face-to-face clinical interview. Assessments were conducted on hospital premises, either in the emergency department or in specialized mental health units, within 10 days of the event and following the patient's discharge from acute care. We classified participants based on their SI with or without intent to act: (1) those who reported SI without a clear intention to act, referred to as the 'SI without intention to act' group, and (2) those who expressed SI accompanied by an intention to act, referred to as the 'SI with intention to act' group. These classifications were determined using the Columbia Suicide Severity Rating Scale (C-SSRS) (Posner et al., 2008), as described below.

Measures

All participants underwent a semi-structured clinical interview conducted by a clinician. Sociodemographic information was collected, including age, sex, employment status, and educational level. Psychiatric disorders, both current and lifetime, were assessed using the Mini-International Neuropsychiatric Interview (Sheehan et al., 1998). Diagnoses were recorded for descriptive purposes and were not used as exclusion criteria, except when the presence of a psychiatric condition impaired the participant's ability to provide informed consent.

Suicidality was evaluated with the C-SSRS (Al-Halabí et al., 2016; Posner et al., 2008), a widely used tool for assessing SI and behavior. The scale includes five dichotomous questions related to SI. Participants who answered 'yes' to question 4 (i.e. active SI with some intent to act but without a specific plan) or question 5 (i.e. active SI with a specific plan and intent) were categorized into the SI with intention to act group. Those who answered 'no' to these two questions but indicated suicidal thoughts in earlier questions were placed in the SI without intention to act group. It is important to note that the intention to act refers to a psychological state of readiness or desire to engage in suicidal behavior. This state may or may not be accompanied by planning (i.e. the development of specific methods) or preparatory behaviors (i.e. initial steps toward a suicide attempt). Accordingly, this group includes individuals who have moved beyond passive or nonspecific thoughts of death, reflecting a more active suicidal mindset, even if they have not yet developed concrete plans or taken preparatory actions.

Psychological distress and general psychopathological symptoms were measured using the Brief Symptom Inventory (BSI) (Derogatis & Melisaratos, 1983; Pereda, Forns, & Peró, 2007). BSI is a self-report scale that assesses nine primary symptom dimensions: somatization,

obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism.

Impulsivity traits were measured using the Barratt Impulsiveness Scale (BIS) (Barratt, 1983), a self-report measure that evaluates impulsivity across three domains: attentional, motor, and non-planning impulsiveness.

Finally, participants' lifetime exposure to childhood maltreatment was evaluated using the Childhood Trauma Questionnaire-Short Form (CTQ-SF) (Bernstein et al., 2003; Hernandez et al., 2013), which assesses five types of childhood maltreatment, classified into emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect.

For further details on additional variables collected but not included in the present study, please refer to the original study protocol (Pérez et al., 2023).

Statistical analyses

All statistical analyses were conducted using RStudio, R version 4.3.1 (R Core Team, 2023). The R package 'skimr' (Elin Waring, McNamara, de la Rubia, Zhu, & Ellis, 2021) was used to inspect missing data. Missing values were imputed using the median for continuous variables to minimize the impact of outliers, and the mode for dichotomous variables, representing the most frequent category. Normality of the data was assessed using the Shapiro–Wilk test (Royston, 1982).

Group comparisons for continuous variables were performed using independent samples t-tests for normally distributed data or the Mann–Whitney–Wilcoxon test when data did not meet normality assumptions. The former are presented as mean and standard deviation, while the latter are presented as median and interquartile range (IQR). Categorical variables were compared using the chi-square test. Statistical significance was set at $p < 0.05$, with Bonferroni correction applied to adjust for multiple comparisons.

A network analysis was performed to investigate the relationships between general psychopathological symptoms, impulsivity, and childhood maltreatment using the R packages 'bootnet' (Epskamp, Borsboom, & Fried, 2018) and 'qgraph' (Epskamp, Cramer, Waldorp, Schmittmann, & Borsboom, 2012). Specifically, for both the SI without intention to act group and the SI with intention to act group, we conducted a network analysis with 17 variables, including (a) the nine psychopathological dimensions according to the BSI, (b) the three impulsivity domains according to the BIS, and (c) the five types of childhood maltreatment according to the CTQ-SF. If the variables did not follow a normal distribution, a nonparanormal transformation was applied before network estimation (Epskamp et al., 2018).

To prevent spurious connections, we selected an optimal regularization parameter using graphical Least Absolute Shrinkage and Selection Operator (LASSO) (Tibshirani, 1996) and extended Bayesian information criterion (EBIC) (Chen, Yuan, & Sekiguchi, 2008). We estimated the network structures using a Gaussian Markov random field (Costantini et al., 2015) with the EBICglasso model. In the network, each node represents a variable, and each edge represents the bidirectional and undirected partial correlation between a pair of nodes. Stronger correlations are represented by thicker and more saturated edges; blue and red edges indicate positive and negative partial correlations, respectively. Edges that did not meet a significance threshold of $p < 0.05$ were removed.

For each node, we calculated three centrality measures: (a) expected influence, defined as the sum of all edges connected to a node, while preserving the sign of each edge (Robinaugh, Millner, & McNally, 2016); (b) betweenness, which represents the number of times a node lies on the shortest path between two other nodes (Brandes, 2001); and (c) closeness, defined as the inverse of the average shortest path length from a node to all other nodes, indicating how closely a symptom is linked to other symptoms in the network (Rubinov & Sporns, 2010). To examine the connectivity between different communities within the network, we also calculated one- and two-step bridge expected influence (Jones, Ma, & McNally, 2021). Bridge expected influence quantifies the extent to which a node directly (one-step) or via a one-intermediate node (two-step) connects different symptom communities, with higher values indicating stronger cross-community 'bridging' roles.

The accuracy of edge weights was assessed using 95% confidence intervals (CIs) obtained through bootstrapping (Efron, 1992). The stability of centrality indices was evaluated using a case-dropping bootstrap procedure, with the correlation stability coefficient (CS-coefficient) calculated to quantify robustness. The CS-coefficient represents the maximum proportion of cases that can be dropped while maintaining a 95% probability that the correlation between the original centrality indices and those from subset networks remains not below 0.25 and preferably above 0.5 (Epskamp et al., 2018).

We compared the network structure, global strength, and significant edges between the two groups using the 'Network Comparison Test' R package (Van Borkulo et al., 2022), with statistical significance set at $p < 0.05$.

Because the two groups differed substantially in sample size, we conducted post-hoc sensitivity analyses to assess the robustness of our findings. We downsampled the larger group via 1:1 nearest-neighbor propensity score matching on age and sex to create comparable subsamples. Matching was implemented using the 'MatchIt' R package (Ho et al., 2018). Balance was assessed with mean differences (visualized in a love plot) and quantified using Rubin's B and R. After confirming acceptable balance, networks were reestimated and compared using the same procedure as the primary analysis.

Results

A total of 1,701 individuals with a recent suicide attempt were recruited for the SURVIVE project. We excluded 260 participants who were under 18 years of age and 40 participants who withdrew their consent. Additionally, 136 individuals were excluded because they did not report SI at the time of the baseline assessment, according to the C-SSRS. This left 1,265 participants in our final analysis, with 345 in the SI without intention to act group and 920 in the SI with intention to act group. Regarding missing data, most variables had <1% missing values, except for the CTQ-SF scores, which had 14% missing data. Missing values for the CTQ-SF score showed modest variation (<10% difference) across age quartiles (9.8% in the 18–26 years age group, 19% in the 26–41 years age group, 13.5% in the 41–52 years age group, and 17.2% in the 52–93 years age group) and between sexes (17.3% in males and 12.5% in females). All variables followed a non-normal distribution. Table 1 provides detailed information on the sociodemographic and clinical characteristics of the two groups. After Bonferroni correction, significant differences between the two groups were observed. Specifically, participants in the SI without intention to act group showed significantly lower scores in the depression (median = 3 [IQR = 1.5] vs. median = 3.17 [IQR = 1.5]; $p = 0.003$) and hostility domain of the BSI (median = 1.2 [IQR = 1.6] vs. median = 1.4

Table 1. Sociodemographic and clinical characteristics of people included in the SI without intention to act and the SI with intention to act groups

Sociodemographic and clinical variables	SI without intention to act (n = 345)	SI with intention to act (n = 920)	Statistical test	*p*-value (Bonferroni corrected)
Continuous	Median [IQR]	Median [IQR]	Mann–Whitney	
Age	41 [29]	41 [26]	154875.5	1
Brief Symptom Inventory				
Somatization	1.43 [1.43]	1.57 [1.71]	149874.5	1
Obsessive-compulsive behavior	2.17 [1.33]	2.33 [1.54]	142135.5	0.12
Interpersonal sensitivity	2 [1.5]	2 [1.75]	151892.5	1
Depression	3 [1.5]	3.17 [1.5]	**136138**	**0.003**
Anxiety	1.83 [1.5]	2 [1.5]	145565	0.67
Hostility	1.2 [1.6]	1.4 [1.8]	**140286**	**0.042**
Phobic anxiety	1.2 [1.8]	1.4 [1.6]	148399.5	1
Paranoid ideation	1.8 [1.4]	1.8 [1.6]	153705.5	1
Psychoticism	1.8 [1.4]	1.8 [1.4]	141978.5	0.11
Barratt Impulsiveness Scale				
Attentional impulsiveness	17 [7]	18 [7]	146399	0.96
Motor impulsiveness	17 [10]	18 [10]	145241	0.58
Non-planning impulsiveness	19 [12]	20.5 [11.25]	144777.5	0.47
Childhood Trauma Questionnaire				
Emotional abuse	12 [9]	12 [10]	160595	1
Physical abuse	7 [5]	7 [6]	153074.5	1
Sexual abuse	5 [4]	5 [7]	150663	1
Emotional neglect	13 [8]	13 [8]	153470.5	1
Physical neglect	8 [4]	8 [6]	150430.5	1
Categorical	*n (%)*	*n (%)*	*Chi-square (df)*	
Sex, female	257 (74.49%)	650 (70.65%)	1.64 (1)	1
Educational level				
No education	9 (2.61%)	30 (3.26%)	2.34 (3)	1
Elementary school	61 (17.68%)	144 (15.65%)		
Middle school	185 (53.62%)	473 (51.41%)		
High school or higher	90 (26.09%)	273 (29.67%)		
Employment status				
Unemployed	98 (28.41%)	259 (28.15%)	5.03 (3)	1
Employed	137 (39.71%)	374 (40.65%)		
Student	54 (15.65%)	106 (11.52%)		
Retired	56 (16.23%)	181 (19.67%)		
Psychiatric diagnosis				
Major depressive disorder	158 (45.8%)	556 (60.43%)	**21.28 (1)**	**<0.001**
Bipolar Disorder	23 (6.67%)	56 (6.09%)	0.06 (1)	1
Anxiety disorders	106 (30.72%)	437 (47.5%)	**28.14 (1)**	**<0.001**
Obsessive-compulsive disorder	15 (4.35%)	47 (5.11%)	0.17 (1)	1
Post-traumatic stress disorder	26 (7.54%)	129 (14.02%)	9.22 (1)	0.07
Eating disorders	25 (7.25%)	98 (10.65%)	2.94 (1)	1
Schizophrenia spectrum related disorders	11 (3.19%)	31 (3.37%)	0 (1)	1
Substance use disorders	56 (16.23%)	121 (13.15%)	1.73 (1)	1

Abbreviations: df, degrees of freedom; IQR, interquartile range; SI, suicidal ideation.

[IQR = 1.8]; $p = 0.042$) and had significantly fewer people diagnosed with major depressive disorder (45.8% vs. 60.43%; $p < 0.001$), and anxiety disorders (30.72% vs. 47.5%; $p < 0.001$) compared to those in the SI with intention to act group. No significant differences were observed between groups in the frequencies of bipolar disorder (6.67% vs. 6.09%; $p = 1$), obsessive-compulsive disorder (4.35% vs. 5.11%; $p = 1$), post-traumatic stress disorder (7.54% vs. 14.02%; $p = 0.07$), eating disorders (7.25% vs. 10.65%; $p = 1$), schizophrenia spectrum-related disorders (3.19% vs. 3.37%; $p = 1$), and substance use disorders (16.23% vs. 13.15%; $p = 1$).

Network structure

The networks estimated are shown in Figure 1 for both the SI without intention to act (Figure 1A) and SI with intention to act (Figure 1B) groups, with detailed weight matrices available in the Supplementary Material (eTables 1–2). Centrality measures are presented in Figure 2. In the SI without intention to act group centrality plot (Figure 2A), the CTQ-SF subscale 'emotional abuse' and the BSI dimensions 'anxiety', 'psychoticism', and 'obsession-compulsion' showed the highest expected influence. The BSI dimension 'obsession-compulsion' had the highest betweenness and closeness. Childhood maltreatment was poorly connected to other communities. The BIS subscales 'motor impulsiveness' and 'attentional impulsiveness', and the BSI dimension 'hostility' followed by 'obsession-compulsion' served as the strongest connectors between these communities, as illustrated by the network plot in Figure 1A and the one- and two-step bridge expected influence measures provided in the Supplementary Material (eFigure 1).

In the SI with intention to act group centrality plot (Figure 2B), the CTQ-SF subscale 'emotional abuse', along with the BSI dimensions 'anxiety', 'interpersonal sensitivity', 'psychoticism', and 'obsession-compulsion' had the highest expected influence. The CTQ-SF subscale 'emotional abuse' and the BSI dimension 'interpersonal sensitivity' showed the highest betweenness, while the BSI dimensions 'interpersonal sensitivity', 'depression', and 'paranoid ideation' showed the highest closeness. The BIS subscales 'attentional impulsiveness' and 'motor impulsiveness', BSI dimensions 'obsession-compulsion', 'hostility', 'interpersonal sensitivity', and 'depression', and the CTQ-SF subscale 'emotional abuse' served as the strongest connectors between different communities, as indicated by the one- and two-step bridge expected influence measures provided in the Supplementary Material (eFigure 2). For both groups, bootstrapping showed discrete accuracy and good stability for expected influence (see Supplementary eFigures 3–4 for edge-weight accuracy). Betweenness, bridge expected influence, and closeness appeared unstable in people in the SI without intention to act group, while betweenness and closeness appeared unstable in people in the SI with intention to act group (see Supplementary eFigures 5–6 for the stability of centrality indices). Additional details can be found in the Supplementary Material.

Network comparisons

The networks estimated for both the SI without intention to act and the SI with intention to act groups did not differ in either global strength ($p = 0.82$) or network structure ($p = 0.8$). Detailed visualizations of the global strength comparison and network structure are provided in Supplementary eFigures 9 and 10, respectively. Significant differences in edge strength were found between the BSI dimensions 'anxiety' and 'paranoid ideation' ($p = 0.029$; SI without intention to act > SI with intention to act; Supplementary

eFigure 11), 'depression' and 'anxiety' ($p = 0.019$; SI without intention to act < SI with intention to act; Supplementary eFigure 12), 'depression' and 'psychoticism' ($p = 0.049$; SI without intention to act > SI with intention to act; Supplementary eFigure 13), 'interpersonal sensitivity' and 'psychoticism' ($p = 0.039$; SI without intention to act < SI with intention to act; Supplementary eFigure 14), 'anxiety' and 'phobic anxiety' ($p = 0.039$; SI without intention to act > SI with intention to act; Supplementary eFigure 15), between the CTQ-SF subscales 'emotional abuse' and 'physical neglect' ($p = 0.009$; SI without intention to act > SI with intention to act; Supplementary eFigure 16), and between the BIS subscales 'attentional impulsiveness' and 'non-planning impulsiveness' ($p = 0.039$; SI without intention to act > SI with intention to act; Supplementary eFigure 17).

Sensitivity analyses

After 1:1 nearest-neighbor propensity score matching, the larger SI with intention to act group was downsampled to match the SI without intention to act group on age and sex. The matching achieved an excellent balance (Rubin's $B = 0.006$; Rubin's $R \approx 1$). The love plot is presented in the Supplementary Materials (eFigure 18). Networks were reestimated in the matched samples, and the network for the SI with intention to act group is available in Supplementary eFigure 19. In this group, the BSI dimensions 'anxiety' and 'obsession-compulsion' retained the highest expected influence. The BSI dimension 'obsession-compulsion' and the BIS subscale 'attentional impulsiveness' showed the highest betweenness, with 'obsession-compulsion' also exhibiting the highest closeness (Supplementary eFigure 20). The BIS subscale 'attentional impulsiveness' and the BSI dimension 'obsession-compulsion' served as the strongest connectors between different communities, as indicated by the one- and two-step bridge expected influence measures (Supplementary eFigure 21).

Consistent with the primary analysis, there were no significant differences between the matched SI without intention to act and SI with intention to act groups in global strength ($p = 0.41$) or network structure ($p = 0.77$). Detailed visualizations of the global strength comparison and network structure are provided in eFigures 22 and 23, respectively. Significant differences in edge strength were maintained between the BSI dimensions 'depression' and 'anxiety' ($p = 0.049$; Supplementary eFigure 24), 'depression' and 'psychoticism' ($p = 0.02$; Supplementary eFigure 25), and between the CTQ-SF subscales 'emotional abuse' and 'physical neglect' ($p = 0.02$; Supplementary eFigure 26). Additional differences in edge strength were found between the CTQ-SF subscales 'emotional neglect' and 'physical neglect' ($p = 0.02$; Supplementary eFigure 27).

Discussion

This study examined the interplay between psychopathology, impulsivity, and childhood maltreatment in individuals experiencing SI following a suicide attempt, both with and without the intention to act, using network analysis. The two groups showed shared connections in terms of impulsivity and psychopathology. However, childhood maltreatment was poorly connected to other communities in the group with SI without intention to act. A central feature in both networks was obsessive-compulsive symptomatology. Differences emerged between individuals with SI without intention to act and those with intention to act. Specifically, in the former group, non-planned impulsivity was negatively
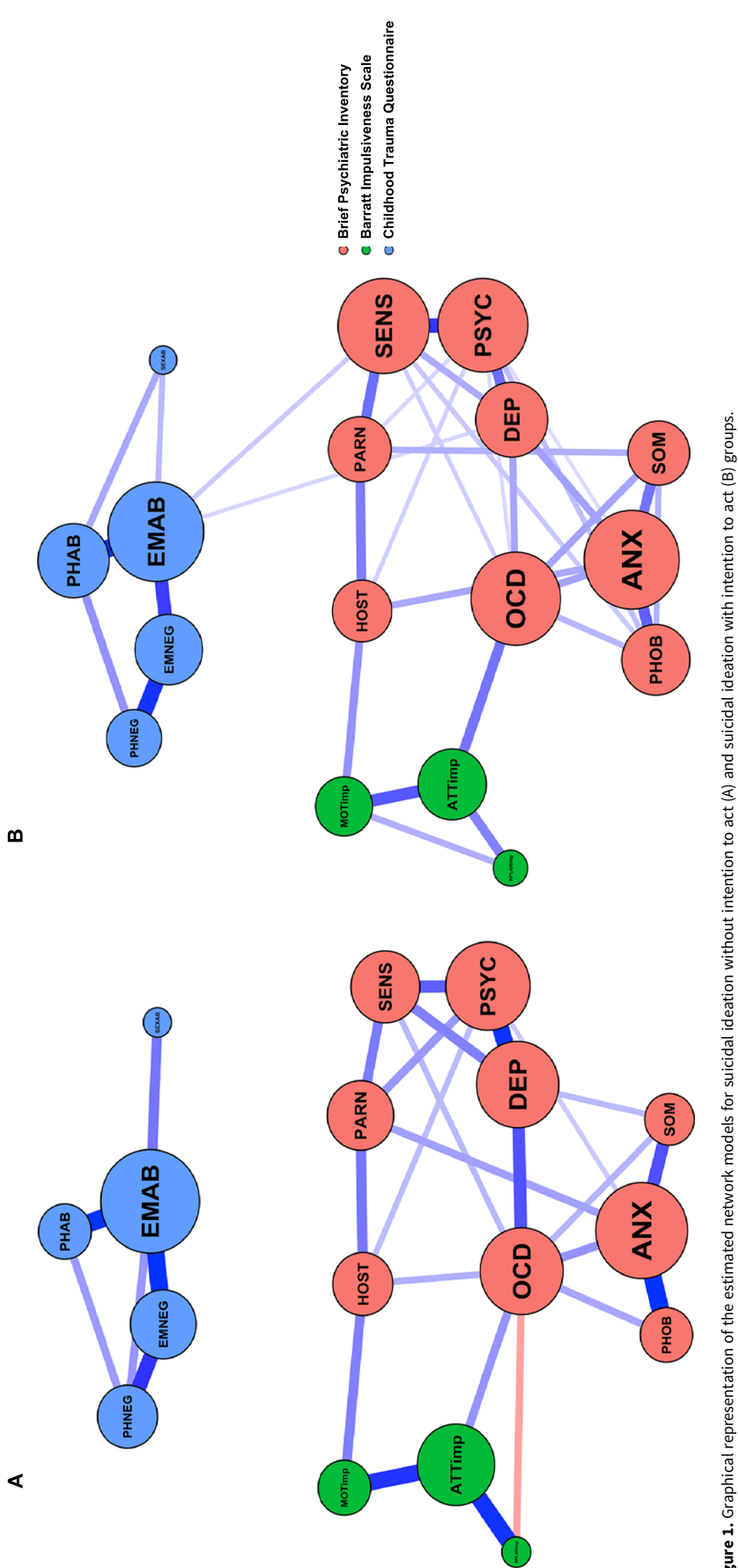
Figure 1. Graphical representation of the estimated network models for suicidal ideation without intention to act (A) and suicidal ideation with intention to act (B) groups.

Legend: Red nodes represent psychopathological symptom domains measured with the Brief Symptom Inventory (*ANX*, anxiety; *DEP*, depression; *HOST*, hostility; *OCD*, obsession-compulsion; *PARN*, paranoid ideation; *PHOB*, phobic anxiety; *PSYC*, psychoticism; *SENS*, interpersonal sensitivity; *SOM*, somatization). Green nodes represent impulsivity traits measured with the Barratt Impulsiveness Scale (*ATTimp*, attentional impulsiveness; *MOTimp*, motor impulsiveness; *NPLANimp*, non-planning impulsiveness). Blue nodes represent the lifetime exposure to childhood maltreatment measured with the Childhood Trauma Questionnaire (*EMAB*, emotional abuse; *EMNEG*, emotional neglect; *PHAB*, physical abuse; *PHNEG*, physical neglect; *SEXAB*, sexual abuse).

Blue edges indicate positive partial correlations and red edges indicate negative partial correlations. The edge thickness and saturation represent the strength of the correlation between symptom nodes. Node size is proportional to its expected influence within the network.
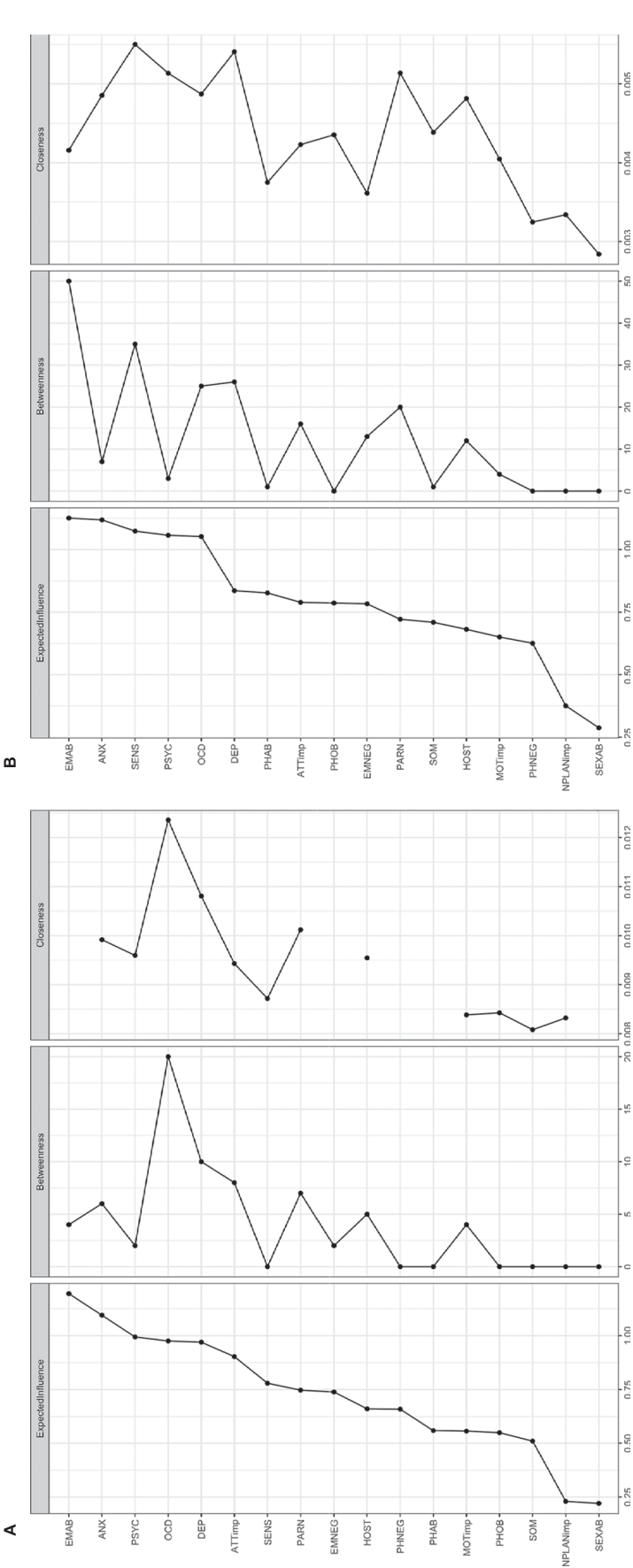
Figure 2. Centrality plots displaying the expected influence, betweenness, and closeness of each node for suicidal ideation without intention to act (A) and suicidal ideation with intention to act (B) groups.

Legend: Psychopathological symptom domains measured with the Brief Symptom Inventory (*ANX*, anxiety; *DEP*, depression; *HOST*, hostility; *OCD*, obsession-compulsion; *PARN*, paranoid ideation; *PHOB*, phobic anxiety; *PSYC*, psychoticism; *SENS*, interpersonal sensitivity; *SOM*, somatization). Impulsivity traits measured with the Barratt Impulsiveness Scale (*ATTimp*, attentional impulsiveness; *MOTimp*, motor impulsiveness; *NPLANimp*, non-planning impulsiveness). Lifetime exposure to childhood maltreatment measured with the Childhood Trauma Questionnaire (*EMAB*, emotional abuse; *EMNEG*, emotional neglect; *PHAB*, physical abuse; *PHNEG*, physical neglect; *SEXAB*, sexual abuse).

correlated with obsessive-compulsive symptoms. In contrast, among those with SI and intent to act, emotional abuse was the only form of childhood maltreatment linked to other psychopathological symptoms, through paranoid ideation and interpersonal sensitivity. Overall, the SI without intention to act group revealed a weaker, less integrated network, while the SI with intention to act group presented a network that was more densely interconnected.

Obsessive-compulsive symptomatology emerged as a central element in both networks, but it was particularly associated with depression and anxiety in the SI without intention to act group, where it was also negatively correlated with impulsive traits. This pattern suggests that obsessive-compulsive symptoms may fuel persistent suicidal ruminations, while at the same time inhibiting action, thus explaining their inverse relationship with non-planned impulsivity. Factors such as childhood maltreatment and comorbid psychiatric conditions may facilitate the transition from ideation to action in individuals with obsessive-compulsive disorder (Benster, Weissman, & Daskalakis, 2022), and indeed, these factors were more prominent in the SI with intention to act group. This finding is consistent with previous research linking suicidality in this population to both depression (Breet, Kidd, McGregor, Stein, & Lochner, 2019) and trauma (Rukiye & Erbay, 2018).

Among childhood maltreatment subtypes, emotional abuse served as a central node for individuals with SI with intention to act, highlighting the long-lasting impact of childhood maltreatment on suicidal behavior. It served as a bridge across multiple psychopathological domains, consistent with findings from previous research showing a relationship between childhood maltreatment and increased vulnerability to suicide (Andreo-Jover, Ramos, et al., 2024b; Angelakis et al., 2020). Notably, emotional abuse also showed the highest node strength in another study involving individuals with multiple suicide reattempts, further emphasizing its critical role in the escalation of suicidal risk (Pemau et al., 2025). This form of abuse contributes to the development of negative self-schemas and heightened emotional reactivity, which can persist in adulthood and exacerbate suicidal thoughts (DeCou & Lynch, 2019). Heightened interpersonal sensitivity and paranoid ideation, both reflecting an excessive awareness and concern about others' opinions, may originate from early childhood maltreatment experiences (Masillo et al., 2019). These psychological patterns can contribute to the formation of negative beliefs about oneself, ultimately promoting core beliefs related to worthlessness (Hamilton et al., 2013). These beliefs may increase the likelihood of interpreting social interactions as threatening through mediating factors such as hopelessness and dissociation, thus maintaining or worsening SI even after a suicide attempt, also in individuals with psychosis (Berardelli et al., 2022; Fares-Otero et al., 2024). Clinically, this emphasizes the need to address early-life trauma (especially emotional abuse) within suicide prevention strategies. Our results support the idea that trauma-focused interventions could be crucial in reducing the risk of progression from SI to intent.

The network analysis results must also be interpreted considering group differences. Individuals in the SI without intention to act group showed lower levels of depressive symptoms and hostility, and had a lower prevalence of major depressive and anxiety disorders compared to the SI with intention to act group. These differences support the belief that the severity of specific symptoms plays a crucial role in the progression from SI to intent (Klonsky, May, & Saffer, 2016). Specifically, depression emerged as a key differentiator, consistent with previous research that identifies it as one of the predictors of suicidal behavior (Keilp et al., 2012; Klonsky et al., 2016; Scocco, Marietta, Tonietto, Dello Buono, & De

Leo, 2000), emphasizing the need to address depressive symptoms in suicide prevention strategies.

In the SI without intention to act group, the network was weakly connected, with fewer relationships between variables, suggesting that SI in this group may represent a psychopathological state that is less integrated. The centrality of anxious and obsessive-compulsive symptoms highlights the potential role of these domains in sustaining suicidal thoughts. Notably, the weak connections between symptoms may indicate a form of SI that may respond better to targeted interventions. In weakly connected networks, each node can be modified without having a great impact on or being strongly influenced by other nodes. This characteristic is associated with making the system more adaptable and responsive to change (Branchi, 2023; Delli Colli, Chiarotti, Campolongo, Giuliani, & Branchi, 2024). Therefore, interventions that focus on specific symptoms, such as anxiety and obsessive-compulsive symptomatology, may be more effective for this population than attempting to treat broader psychopathological profiles.

In contrast, the network for SI with intention to act was more strongly interconnected, with psychoticism, interpersonal sensitivity, motor impulsivity, and emotional abuse serving as key nodes that link different domains. These relationships suggest that suicidal intent reflects a more rigid psychopathological state, where clinical symptoms and early life experiences are more closely intertwined. The higher influence of psychoticism and interpersonal sensitivity indicates that individuals in this group may be more vulnerable to distorted perceptions of reality or heightened sensitivity to interpersonal rejection, whose relationship with suicidality has been previously studied (Gesi et al., 2016). Additionally, the prominent role of motor impulsivity in connecting domains may reflect a greater tendency to act on suicidal thoughts (Andreo-Jover et al., 2024a; Ponsoni et al., 2018; Wang et al., 2017), further differentiating those with the intention to act from those with only SI. In contrast to what we discussed regarding the SI without intention to act group, the presence here of a strongly interconnected network means that addressing one symptom will often need simultaneous adjustments to all related domains, making targeted interventions more challenging (Branchi, 2023; Delli Colli et al., 2024).

Despite the differences discussed so far, global strength and overall network structure did not show significant differences between groups, an observation consistent with findings from other studies involving individuals with multiple suicide reattempts (Núñez et al., 2020; Pemau et al., 2025). As aggregate metrics, global network measures may mask subtle but clinically meaningful changes in the relationships between individual symptoms. Indeed, when we focused on the specific edge level, we identified several significant differences, suggesting changes in the functional organization of psychopathological domains between the two groups. While these local differences may not alter the overall network architecture, they may represent critical pathways that contribute to the transition from SI to action. In fact, from a clinical perspective, the identification of highly influential and bridging nodes may offer valuable insights for risk stratification in emergency and clinical settings. For example, routinely assessing for a history of emotional abuse in individuals presenting with SI may help clinicians better identify those at higher risk of acting on these thoughts, particularly when coupled with elevated impulsivity traits. This symptom-focused approach fits well with emerging trends in precision psychiatry (Harris, Vanzhula, Cash, Levinson, & Smith, 2025), which emphasize using specific risk markers to guide more targeted and personalized care.

Our findings contribute to the growing body of research on suicide risk by identifying specific factors that may help differentiate between SI and intention to act. However, several limitations should be considered. First, for the present study, a cross-sectional design was used, which limits our ability to draw conclusions about temporal relationships (Vieta & De Prisco, 2024), but future analysis of the SURVIVE cohort could assess the robustness of these findings. By tracking symptom fluctuations over time in relation to the progression of SI and the emergence of suicidal behavior, such analyses may help determine whether the central nodes identified in our network models function as early warning signals or key mechanisms in the transition from ideation to action. This longitudinal approach would not only deepen our understanding of the temporal dynamics underlying suicide risk but also enhance the clinical utility of network-informed assessments and interventions. Second, the sample consists of individuals who had recently attempted suicide, which may limit the generalizability of the results to other populations, such as those with SI but no history of attempts. Third, the clinical interviews were conducted within the last 10 days after the suicide attempts, and the timing varied depending on when patients were clinically stable enough to discuss the event. However, the C-SSRS scale, which we used to categorize individuals into two risk groups, was administered at baseline, ensuring that the psychopathological dimensions assessed reflect the same time period as the reported suicidal symptoms. Fourth, we were unable to control for the effects of current or past medications and their doses. While this scenario closely mirrors real-world conditions, where detailed psychopharmacological histories are often unknown, it is possible that certain treatments may have influenced the relationships between domains (Ilzarbe & Vieta, 2023). For instance, on the one hand, individuals receiving antidepressants may have shown reduced levels of depressive or anxiety symptoms compared to untreated individuals, potentially altering the pattern of symptom interconnections. On the other hand, selective serotonin reuptake inhibitors have been associated with acute increases in anxiety and impulsivity during the early stages of treatment (Murphy et al., 2021), factors that may have influenced the overall network structure. The prominence of the obsessive-compulsive dimension may also be partially treatment-related, as certain antipsychotics have been linked to the emergence of obsessive-compulsive symptoms (Burk et al., 2023). Finally, sedative agents may dampen affective and anxiety-related fluctuations, potentially weakening the observed connections within those domains. Fifth, although our overall sample size is a strength, the two groups we examined were unevenly distributed, with roughly two-thirds fewer individuals in the SI with intention to act (De Prisco & Vieta, 2024). To address this, we conducted a sensitivity analysis using 1:1 propensity score matching based on age and sex to generate balanced subsamples. While key findings, such as the central role of obsessive-compulsive symptomatology, were preserved, the matched sample revealed a network in which certain features identified in the primary analysis (e.g. connections involving the childhood maltreatment community) were no longer evident. This may be attributable to reduced statistical power due to downsampling. Future research should prioritize the recruitment of larger samples with lower levels of psychopathology to establish an adequately sized control group capable of revealing meaningful structural and connectivity differences across symptom dimensions. Sixth, although the two networks showed different connections and centrality parameters, the network comparison test did not reveal significant differences in global strength or overall structure between the SI and suicidal intention groups. However, differences in edge strength were observed (e.g. 'anxiety' and 'paranoid ideation' were more connected in the SI without intention group, while 'depression' and 'anxiety' were more connected in the SI with intention group), with some of them maintained in the sensitivity analyses. This suggests that in populations with significant but often clinically subtle differences, it's important to focus on specific symptom interactions rather than relying on broad, overall measures. Recognizing these unique connections can offer more accurate insights and guide the development of more targeted and effective interventions. Seventh, while the majority of variables had minimal missingness, the CTQ-SF presented 14% missing data. This substantial missingness could introduce bias if data are not missing completely at random, particularly given the sensitive nature of childhood trauma assessments. For example, participants with more severe trauma histories may be systematically less likely to complete these measures, potentially leading to underestimation of trauma prevalence and its associations with clinical outcomes. While we employed simple imputation to maintain procedural transparency, readers should interpret our trauma-related findings with this limitation in mind. Eighth, our analysis did not include psychiatric diagnoses as network nodes. While this transdiagnostic approach may enhance generalizability, it may not capture diagnosis-specific patterns of suicide risk, particularly for conditions with elevated baseline risk, such as bipolar disorder.

By using a large sample size, conducting interviews with trained clinicians, and applying a transdiagnostic network approach, we have gained valuable insights into the relationships among various psychopathological dimensions, impulsivity, and childhood maltreatment in people with SI with and without intention to act. Within the principles of precision medicine (Fusar-Poli et al., 2022; Oliva & De Prisco, 2022), our findings reveal specific dimensions that are differently interconnected in the two groups, prompting the development of targeted interventions that focus on specific symptoms or symptom pairs.

Conclusions

This study reveals distinct patterns of symptom interactions between individuals with SI with and without intention to act. In those without intention to act, the network is more loosely connected. Obsessive-compulsive symptomatology appears among the central nodes, positively correlated to depression and anxiety but negatively correlated to non-planning impulsivity. In contrast, individuals with SI and intention to act showed a more tightly interconnected network, where emotional abuse acts as a central bridge linking childhood maltreatment to interpersonal sensitivity and paranoid ideation. Clinically, patients with SI and intention to act may benefit from trauma-focused interventions addressing emotional abuse history, while those with SI without intention to act might require different therapeutic approaches targeting their specific symptom constellation. In emergency settings, assessment and recognition of psychotic symptoms or interpersonal sensitivity, along with a brief exploration of childhood maltreatment history, could help clinicians identify patients at higher risk of acting on SI, informing immediate safety planning and disposition decisions. These findings emphasize how network analysis can inform evidence-based risk assessment and guide targeted interventions in suicide prevention.

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